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4th SOPRANE SOLO 2023

AN UPDATE OF PAIN MANAGEMENT AND REGIONAL ANESTHESIA AFTER SURGERY

September, 16th – 24th 2024

GRAND MERCURE HOTEL, SOLO BARU

PROSIDING BOOK 4th SOPRANE SOLO 2023

"An Update of Pain Management and Regional Anesthesia After Surgery"

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"An Update of Pain Management and Regional Anesthesia After Surgery"

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KUTIPAN

Alhamdulillahirrabbil'alamin,
Puji syukur kepada Allah SWT.
Berkat rahmat dan hidayah-Nya sehingga rangkaian kegiatan 4th Solo Perioperative Regional Anesthesia & Pain Management 2023 (SOPRANE) yang bertema "An Update of Pain Management and Regional Anesthesia After Surgery" dapat terlaksana dengan baik dan lancar.
Penyelenggaraan SOPRANE ke-4 pada tahun 2023 bertujuan untuk meningkatkan pengetahuan anggotanya dengan menyegarkan dan meningkatkan pengetahuan anestesiologi dan aspek yang berkembang pada masyarakat melalui pertemuan ilmiah secara berkala. Pada SOPRANE 2023 telah dipresentasikan hasil penelitian, review, dan hasil pengabdian yang dilakukan oleh peneliti yang berasal dari berbagai instansi yang beragam.
Kami atas nama panitia ingin mengucapkan apresiasi tertinggi untuk sejawat sekalian dalam kontribusi terhadap peningkatan dan penyegaran pengetahuan anestesiologi melalui artikel ilmiah SOPRANE 2023. Berikut kami lampirkan 10 Besar Finalis Artikel Ilmiah SOPRANE 2023 yang akan diterbitkan pada Solo Journal of Anesthesi, Pain, and Critical Care (SOJA)

"*Acute Fatty Liver of Pregnancy Management in Intensive Care*"
oleh Nadhila Atsari, Ratih Kumala Fajar Apsari, Bowo Adiyanto, Untung Widodo

"*Intra-Anesthetic Anaphylactic Shock due to Rocuronium: Diagnosis and Treatment*"
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"*Feasibility of Using iTIVA Mobile Application as Intraoperative Infusion Guide in Pediatric*"
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"Transnasal Sphenopalatine Ganglion Block as Management Pain for PDPH (Post Dural Puncture Headache): A Case Report"
oleh Diena Ashlihati, Juni Kurniawati, Mahmud Sudadi

"The Regenerative Pain Therapy of Platelet-Rich Plasma Treatment Strategy Compared with Steroids for Spinal Disc Herniation: A Meta-Analysis"
oleh Alfan Rizki Nur Rohman, Taufiq Agus Siswagama, Probo Yudha Pratama Putra

"*Integrating Quadratus Lumborum and Transabdominal Plane Blocks for Effective Pain Management in Colon Cancer: A Case Report*"
oleh Shallahudin, Ristiawan Mudji Laksono, Taufiq Agus Siswagama

"*Anesthetic Management in Cardiac Sympathetic Denervation, A Case Report*" oleh Adhe Kurniawan, Reza Widianto Sudjud

"*Plasma Exchange In High Care Unit For Patient With A Snakebite : A Case Report*"
Oleh Isma Angger Pambayun , Eko Setijanto, Sigit Prasetyo, Septian Adi Permana

"The Relationship Between Total Carbondioxide and Lactate Levels to Hypovolemic Shock Post-Cabg in ICU Dr Kariadi General Hospital"
oleh Aria Pratama Hayanto, Adhitya Putra Widyantoro, Heru Dwi Jatmiko, Himawan Sasongko

"Effectiveness of Atropine Sulfate and Diazepam in Organophosphate Poisoning in Remote Area: A Case Report"
oleh Kadek Ludi Junapati, Fabianus Anugrah Pratama

KATA PENGANTAR

Assalamu'alaikum warahmatullahi wabarakatuh.

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Kegiatan SOPRANE 2023 bertema "*An Update of Pain Management and Regional Anesthesia After Surgery*" yang bertujuan meningkatkan pengetahuan anggotanya dengan menyegarkan dan meningkatkan pengetahuan anestesiologi dan aspek yang berkembang pada masyarakat melalui pertemuan ilmiah secara berkala. Rangkaian kegiatan SOPRANE 2023 mengangkat konsep *hybrid* yaitu acara yang menggabungkan antara pertemuan online dan pertemuan offline, sehingga pertemuan dapat dinikmati oleh seluruh sejawat di belahan dunia manapun secara langsung dan interaktif.

Pada SOPRANE 2023 telah dipresentasikan hasil penelitian, review, dan hasil pengabdian yang dilakukan oleh peneliti yang berasal dari berbagai instansi yang beragam. Hasil seminar tersebut kemudian didokumentasikan dalam prosiding ini.

Atas terselenggaranya seminar dan terselesaikannya Proceeding ini, panitia menyampaikan penghargaan setinggi-tingginya disertai ucapan terimakasih kepada semua pihak yang telah membantu kelancaran kegiatan ini terutama kepada dr. Eko Setijanto., M.Si.Med, Sp.An-TI, Subsp T.I.(K). selaku Ketua Perdatin Komisariat Surakarta dan Dr.dr. Fitri Hapsari Dewi, Sp.An-TI, Subsp.An.O(K) selaku Kepala Program Studi Anestesiologi dan Terapi Intensif Fakultas Kedokteran Universitas Sebelas Maret Surakarta atas segala bentuk dukungan dan partisipasi terhadap rangkaian kegiatan SOPRANE.

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Kami menyadari bahwa masih banyak kekurangan dalam penyusunan prosiding ini sehingga saran dan kritik yang membangun sangat diperlukan. Semoga prosiding ini bermanfaat bagi para pembaca dan pihak yang memerlukan.

Wassalamu'alaikum warahmatullahi wabarakatuh.

Surakarta, September 2023

DAFTAR ISI

AWAKE FIBEROPTIC NASOTRACHEAL INTUBATION FOR PATIENT WITH POSTERIOR TONGUE MASS

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ABSTRACT

Background : Awake fiberoptic nasotracheal intubation (AFNI) is a useful technique, especially in patients with predicted airway obstruction. It must not only provide sufficient anesthesia, but also maintain spontaneous breathing and stability hemodynamic. We introduce a method to achieve this using a small dose of sufentanil in combination with topical anesthesia.

Case Ilustration : A 34-year-old woman with complaint of mass in the posterior tongue for the past one year. The patient feels difficulty swallowing food and drink. The patient was planned oncology surgeon for hemiglossectomy. Pre-operative assessment concluded the physical status of ASA II because has essential hypertension. To avoid difficult airway-related emergency scenarios, the AFNI was successfully performed through intravenous injection of sufentanil 10 µg (0,2 µg/kg) combined with lidocaine 10 % intranasal spray and the patient gurgled using lidocaine 20 mg for 5 ampoules under a conscious state without any uncomfortable feeling or complications. A non-kinking tracheal tube with size 6,5 was inserted through the nasal cavity into the trachea through the fiberoptic channel after topical anesthesia was applied and drug onset of sufentanil has been reached. The duration of intubation was 7 minutes. During intubation, the blood pressure ranged between 143-148 mmHg for the systole and 89-104 mmHg for the diastole, pulse rate ranged between 79-90 times / minutes, respiration rate 20 times / minutes, oxygen saturation (SpO2) ranged between 97-98% in room air and semi fowler's position. The patient was successfully intubated and general condition of the patient was good with stable hemodynamics after intubation.

Conclusion : Awake fiberoptic nasotracheal intubation with small dose of sufentanil and lidocaine topical anesthesia can used an alternative technique in patient with predicted airway obstruction.

Keywords : Awake fiberoptic nasotracheal intubation; airway obstruction; sufentanil; topical anesthesia; hemodynamic

INTRODUCTION

Difficult airway management remains an important challenge to the anesthesiologist because of anesthesia-related morbidity and mortality. Awake intubation is the standard of care for management of a predicted difficult airway. One accepted way of performing this, is using the flexible fiberoptic scope for nasal intubation. Quality and success of this procedure depend on the experience of the intubating physician and on the proper preparation of the patient. Nasotracheal intubation is often preferable to oral intubation in oromaxillofacial surgery[1].

For nasotracheal intubation, generally, a laryngoscope and Magill forceps are used; however, if any difficulty in securing the airway is expected, for example, cervical fracture and dislocation or airway tumor and abscess, fiberoptic nasotracheal intubation is performed. Depending on the situation, if risks, such as difficult facial mask ventilation, restricted mouth opening, or pulmonary aspiration are present, then awake fiberoptic intubation is performed. An anesthesiology resident should be able to perform fiberoptic nasotracheal intubation for the management of difficult airways [2]. Because of the complex anatomical structure of the nasal cavity, performing nasotracheal intubation can cause complications such as nasal cavity damage, dental injuries, airway bleeding and bronchospasm. Thus, securing the airway during FNI can be difficult due to increased risk for bleeding and discharge during emergency situations such as damage to the oral cavity, edema, or hematoma after

surgery. However, in awake intubation, severe airway stimulation may elicit serious cardiovascular reactions, and proper local anesthesia and sedation are absolutely necessary [3].

Airway anesthesia using topical anesthetics alone may require high doses, which may cause unnecessarily long anesthesia and incomplete blockade in some patients. In some cases, it even causes toxic effects such as allergic reaction, nerve damage, and systemic toxicity in the cardiovascular system [4]. For this reason, topical anesthetics combined with systemic administration of narcotics are commonly used to minimize the adverse reactions caused by local anesthetics alone [3] .

Awake nasotracheal fiberoptic can be performed in two ways: inserting the tube into the nasal cavity first, then finding the vocal cord using a fiberoptic; or inserting the fiberoptic first into trachea through the nasal cavity, then inserting the tube into the trachea through the nostril. Although the former method was introduced earlier, and requires fiberscope insertion when it is difficult to secure the airway and the risk for nasal bleeding may increase, the tube can be used as a guide to easily insert a flexible endoscope into the oral cavity. The latter method is generally performed if any difficulty in securing the airway is initially expected when performing FNI. Although interference of the visual field due to bleeding in the nasal cavity can be prevented, damage to the nasal cavity can be more severe when inserting the tube following the fiberscope. The possibility of nasal destruction and hemorrhage simultaneously be prevented by vasoconstrictors and lubricants [4]. We report a case of awake fiberoptic nasotracheal intubation using a low dose sufentanil in combination with topical lidocaine airway anesthesia.

CASE ILLUSTRATION

A 34-year-old woman with complaint of mass in the posterior tongue for the past one year. The patient feels difficulty swallowing food and drink. The patient was planned oncology surgeon for hemiglossectomy. There is no family history of similar disease. The patient had a history of hypertension with routine treatment using Amlodipine 5 mg daily. Preoperative vital signs examination showed the patient was fully conscious with GCS E4V5M6, blood pressure 132/85 mmHg, pulse rate 84 times/minute, respiratory rate 16 times/minute, temperature 36.7ºC, oxygen saturation (SpO2) 98% in room air and supine position, weight 50 kg, and height 167 cm. Physical examination showed the patient's airway was not clear because mass in posterior tongue, able to open his mouth with 3 fingers, mallampati score can not evaluate, free neck movement, and the presence of permanent dentures on the upper incisors. Pulmonary, cardiac, abdominal, and extremity examination were within normal limit. Preoperative laboratory examination showed complete blood, blood chemistry and electrolytes within normal limits. An electrocardiogram showed that there was a normal sinus rhythm. The preoperative screening examinations concluded that the patient had an ASA (American Society of Anesthesiologists) II physical status by considering patient's history of hypertension. The patient was planned to receive general anesthesia with awake fiberoptic nasotracheal intubation.

Figure 1. Picture of patient with posterior tongue mass
(source : author's documentation)

Before surgery, anesthesia scenarios (potential impending dangers and response measures, etc) were explained to the patient and his family, then they agreed and signed informed consent forms for anesthesia. After entering the operating room and establishing peripheral venous access, vital signs were monitored including 3-lead electrocardiography, pulse oximetry, and non invasive blood pressure. Considering the patient with posterior mass tongue , awake fiberoptic nasotracheal intubation was recommended as the optimal choice for anesthetists. . First, the patient was injected premedication with dexamethasone 5 mg (IV) and atropine sulfat 0,25 mg (IV) 30 minutes prior to surgery. The patient gurgled using lidocaine 20 mg for 5 ampoules and lidocaine 10 % intra nasal under a conscious state without any uncomfortable feeling or complications. A few minutes later, sufentanil (10 ug) was given via intravenous injection. The patient was instructed to take a deep breath.

Figure 3. The patient gurgled using lidocaine

Figure 4. Ambu ® aScope™ Fiberoptic

(source : author's documentation)

Figure 5. Insertion nasotracheal tube with semifowler positition

(source : author's documentation

A fiberoptic videoscope (Ambu ® aScope™) loaded with a 6.5-mm non kinking tracheal tube was inserted through the prepared nostril into the hypopharynx after topical anesthesia was applied and drug onset of sufentanil has been reached. The nasotracheal tube was then smoothly advanced into its correct final position as confirmed by the presence of positive end-tidal carbon dioxide and auscultation of bilateral breath sounds. The duration of intubation was 7 minutes. During intubation, the blood pressure ranged between 143-148 mmHg for the systole and 89-104 mmHg for the diastole, pulse rate ranged between 79-90 times / minutes, respiration rate 20 times / minutes, oxygen saturation (SpO2) ranged between 97-98% in room air and semi fowler's position.

Figure 6. Monitoring hemodinamic at o minutes , 6 minutes and 12 minutes during awake fiberoptic nasotracheal Intubation (source : author's documentation)

Rocuronium 30 mg (0.6 mg/kg) and propofol 100 mg (1-1.5 mg/kg) were then intravenously administered for induction of general anesthesia. Anesthesia was maintained using inhalational anesthetic agents sevoflurane , N2O and oxygen.


Figure 7. The patient was successfully awake intubate
(source : author's documentation)

DISCUSSION

Management of the difficult airway is a challenge to anesthesiologists, and may lead to life-threatening complications. It has been reported that 1-18% of patients have a difficult airway [7]. Awake intubation is typically chosen for patients with difficult airways because it minimizes the possibility of airway obstruction caused by airway collapse. During this procedure, appropriate anesthesia and sedation are essential. Current methods used for local airway anesthesia mainly include local anesthetics administered by spray (eg, lidocaine, tetracaine) to the nasal and pharyngeal mucosa above the glottis. In these patients, we anticipated difficult ventilation or intubation because of possible airway obstruction. It was essential that the sedatives and opioids be administrated slowly and carefully, and titrated in low dosages to prevent any airway complications and to suppress stimulation of the airway with sufficient topical anesthetic. The results of this case report that the success rate of intubation and awake FNI increased as the number of attempts increased. However, when bleeding occurred as the endotracheal tube was inserted, the difficulty of FNI increased[5].

Many methods of local anesthesia for the airway are available for awake FNI, and the authors have chosen a highly stable and noninvasive lidocaine. The patient gurgled using lidocaine 20 mg for 5 ampoules and lidocaine 10 % intra nasal. Intra-oral and nasal cavity discharge can be reduced using antisialagogues such as atropine sulfate [8]. Nasal bleeding occurs commonly during nasotracheal intubation when endotracheal tubes with large diameters are used, when too much force is applied during tube insertion, or when multiple attempts at intubation are made. the presence of systemic diseases associated with major bleeding disorders should be screened through patient history taking, and the appropriate nostril for intubation should be selected through physical examination[4].

Studies have shown that combined use of local anesthetics and low-dose opioids can enhance the effects of local anesthetics. Sufentanil is a potent synthetic opioid analgesic drug and is typically administered intravenously during operations for both pain relief and sedation. First synthesized in 1974, sufentanil is a thienyl

analogue of fentanyl. The analgesic potency of sufentanil is 5 to 10 times that of fentanyl, which parallels the greater affinity of sufentanil for opioid receptors compared with that of fentanyl. Based on the plasma concentration necessary to cause 50% of the maximum slowing on the EEG (EC50), sufentanil is 12 times more potent than fentanyl [5]. A single dose of sufentanil, 0.1 to 0.4 μg/kg IV, produces a longer period of analgesia and less depression of ventilation than does a comparable dose of fentanyl (1-4 μg/kg IV). Compared with large doses of morphine or fentanyl, sufentanil, 18.9 μg/kg IV, results in more rapid induction of anesthesia, earlier emergence from anesthesia, and earlier tracheal extubation [6]. Sufentanil is the most powerful m-receptor activator in the fentanyl family, exhibiting very strong lipophilicity and affinity to opioid receptors. In addition, current studies have suggested that sufentanil can act like local anesthetics to enhance the blockade of the peripheral nerves and prolong the analgesia time. It has been reported that sufentanil can promote the opening of potassium channels, inhibit the action potentials and nerve conductions of A fibers and C fibers, and block lowfrequency nerve stimulation. Local anesthetics, however, mainly inhibit sodium channels and open potassium channels, blocking high-frequency nerve stimulation. Combined use of these 2 types of drugs can inhibit the excitability in all types of neurons. This type of synergistic effect was observed when 2 low dose drugs were used in combination [9].

CONCLUSION

Awake fiberoptic nasotracheal intubation with small dose of sufentanil and lidocaine topical anesthesia can used an alternative technique in patient with predicted airway obstruction. The patient was successfully intubated and general condition of the patient was good with stable hemodynamics after intubation.

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MANAGEMENT OF CONGESTIVE HEART FAILURE WITH RESPIRATORY COMPLICATION IN RURAL HOSPITAL WITH LIMITED RESOURCE

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ABSTRACT

Heart failure is a complex pathophysiologic state characterized by the inability of the heart to fill with or eject blood at a rate appropriate to meet tissue requirements. In Indonesia, heart failure is a second major health problem affecting 1,5 % or 1 million adults per year. Symptoms are dyspnea, fatigue, and circulatory congestion and/or hypoperfusion. Various laboratory test and imaging are also needed to diagnose the patient. But in some rural hospitals in Indonesia, the test was not available. We presented a case of woman with NYHA 4 congestive heart failure accompanied by respiratory failure and other complications that refused to be transferred to the district capital hospital, since some tests are not available at our rural hospital include BNA, BGA, echocardiography, and electrolyte. Mechanical ventilation were used in the first 3 days upon patient admission. Therapy that were given to the patient include diuretic, beta blocker, and ajuvant (calcium gluconas, vitamin B, and D). Furosemide is given for reducing edema, improving gas exchange, reducing AKI, and attaining venodilatory effect. Beta blocker also given in to reverse the harmful effects of sympathetic nervous system activation in heart failure. Ajuvants were given to fulfill the mikronutrients needs for the patient. After 6 days care in ICU, the patient were able to recover successfully and transferred to internal medicine ward. Conclusion that we can get from the case is that the outcome of congestive heart failure accompanied by respiratory failure in rural hospital with limited resources were highly dependent on patient's clinical condition, severity, and response to the therapy. Nonetheless, an anesthesiologist should be able to adapt and work the best possible treatment for patient's recovery.

Key Words: Heart Failure; Respiratory Distress; Rural Hospital.

BACKGROUND

Heart failure is a complex pathophysiologic state characterized by the inability of the heart to fill with or eject blood at a rate appropriate to meet tissue requirements. In Indonesia, heart failure is a second major health problem affecting 1,5 % or 1 million adults per year. Symptoms are dyspnea, fatigue, and circulatory congestion and/or hypoperfusion. Dyspnea reflects the increased work of breathing caused by stiffness of the lungs produced by interstitial pulmonary edema. This condition will lead to respiratory failure. Various laboratory test and imaging are also needed to diagnose the patient. But in some rural hospitals in Indonesia, the test was not available. Thus we'd like to present a case of a woman who presented with respiratory failure secondary to congestive heart failure that mandated intensive care support.[1]

CASE ILLUSTRATION

A 51 years old woman came to the hospital with shortness of breath accompanied by loss of consciousness. According to her family, this history began approximately 2 years ago and the patient rarely went to the doctor. Lately, in the recent week, the symptom had been getting worse and is accompanied by abdominal pain, enlarged stomach, nausea, and legs swelling.

Physical examination reveals a stupor condition with GCS at 6 ($E_1M_4V_1$), blood pressure 112/73 mmHg; weak pulse 107 bpm; respiratory rate 36 bpm; body temperature 36,3 ^{O}C; baseline SpO_2 at 50 % with room air; weight 50 kg. Advanced examination reveals a slightly icteric conjunctiva, pale lips, distended neck vein, coarse crackles on lung auscultation along with muscle retractions; heart auscultation reveals a weak but regular heart sound with systolic murmur (2/6 intensity); on abdomen palpation we found liver enlargement about 2 fingers below the ribs, bowel sound and undulation test are both positive. Both lower leg appear to be edematous.

Laboratory findings include complete blood count with Hb 17,6 g/dL; Hct 55%; WBC 12.600/µL; platelet 269.000/µL; Random blood glucose 92 mg/dL; ureum 56 mg/dL; Creatinine 3,4 mg/dL; SGOT 361 IU/L; SGPT 256 IU/L; Direct Bilirubin 1,9 mg/dL; Total Bilirubin 2,3 mg/dL; Albumin 3,2 g/dL; Anti-HCV and HbsAg were negative. Routine urine examination showed a reddish cloudy urine with +3 proteinuria and +1 urobilinogen. Blood gas analysis and electrolyte were not available in our hospital.

Chest X-ray showed cardiomegaly (LVH) with pulmonary edema and aorta dilatation; bilateral pleural effusion. Other imaging tool include echocardiography, also was not available in our hospital. The electrocardiogram showed a rapid heart beat (110 bpm), left axis deviation, left ventricular hypertrophy, and configuration of anterior wall ischemia.

Thus, the diagnosis of the patient was loss of consciousness and respiratory distress caused by congestive heart failure (NYHA 4) complicated by acute kidney injury (dd/ chronic kidney disease) and hyperbilirubinemia caused by intrahepatic disorder (dd/ hepatic cirrhosis).

Our initial treatment is to support the airway with head tilt, chin lift, and oxygenation with 10 Lpm non rebreathing mask. SpO_2 improve to 97 % but there was no improvement in counsciousness, thus an intubation were performed with 7.0 ETT. Next, the patient was planned to be referred to a district capital hospital so she could get more complete and detail treatment, but her family refused, so we continue our therapy. After an IV line was established, Kidmin infusion was given at rate 25 ml/hour; 20 mg IV furosemide continued with 5 mg/hour; 1 gr IV ceftriaxone every 12 hours; installation of feeding tube and urinary catheter. Internal medicine therapy were Urdafalk 250 mg 3 times daily and Curcuma 2 times daily through the feeding tube. Patient then transferred to the ICU and connected to a ventilator (SIMV mode (PSV) with 300 mL tidal volume; 24 bpm respiratory rate; 3 cmH_2O PEEP; 100 % FiO_2; 5 cmH_2O PSV. For sedation, we gave 3 mg per hour of midazolam.

Second day in ICU, patient was sedated and the shortness of breath, crackles in the lung were improved, respiratory muscle also improved with SpO_2 at 99 – 100%. The radial pulse was stronger and neck vein distention also improved. Ventilator's FiO_2 then reduced to 50 – 70 %; 2 cmH_2O PEEP; 3 cmH_2O PSV. We also decrease the sedation and because the patient's bowel was fine, we began enteral diet with 50 ml of milk, 6 times a day. Adjuvant therapy include 1 gram of IV Calcium gluconas; 1 ampoule of Vitamin B every 12 hours IV; oral hygiene twice a day; and 2,5 mg Bisoprolol daily.

On third day, we stoppped the sedation and patient's consciousness started to improve with $E_4V_xM_6$. Shortness of breath also improved and we maintain fluid balance at -3,786 ml over the last 3 days. On chest X ray we found suspicion of bronchopneumonia and also cardiomegaly (but improved compare to previous result). Laboratory findings also showed a significant improvement (Table 1). We carried out spontaneous breathing trial and we found that patient's respiratory rate was 24 times per minute with tidal volume ranged from 270 – 285 mL. No BGA at our hospital, so we solely used RSBI (rapid shallow breathing index) to weaning the patient (RSBI 84 – 88). Next, we extubated the patient and supplied her with 6-8 Lpm oxygen via non rebreathing mask. SpO_2 was stable at 92 – 94 %. Another additional therapy was 10.000 IU of Vitamin D daily, 25 mg Spironolactone 3 times daily, and 30 mg of Ambroxol 3 times daily.

Table 1. Laboratory Finding

	1st day	3rd day	6th day		Refference
Hb	17,6	15	15,8	g/dL	12 – 16
Hct	55	48	47	%	35 – 45
WBC	12.600	9.400	8.100	/µL	3.200 – 10.000
Eosinophyl	0	0	3	%	0 – 6
Basophyl	0	0	0	%	0 – 2
Neutrophyl	76	85	81	%	36 – 73
Lymphocyte	10	5	8	%	15 – 45
Monocyte	13	8	5	%	0 – 10

Platelet	269.000	147.000	185.000	/µL	150.000 – 380.000
Erythrocyte	6.500.000	5.600.000	5.900.000	/µL	3.800.000 – 5.000.000
MCV	84	85	80	fL	80 – 100
MCH	26	26	27	Pg	28 – 34
MCHC	31	30	34	g/dL	32 – 36
Glucose	92	105	180	mg/dL	< 200
Ureum	56	49	20	mg/dL	10 – 50
Creatinine	3,4	1,4	0,8	mg/dL	0,45 – 0,75
SGOT	361	22	31	IU/L	5 – 35
SGPT	256	62	47	IU/L	5 – 35
Direct Bilirubine	1,9	0,8	1,0	mg/dL	< 0,4
Total Bilirubine	2,3	2,0	1,8	mg/dL	< 1,4
Albumine	3,2	N/A	3,2	g/dL	3,5 – 5,0

While in ICU, patient's fluid balance was targeted to be negative every day and diet were adjusted gradually, while the treatment continued and titrated according to patient's condition. On the sixth day, patient was transferred to internal medicine's ward.

Fig. 1. Radiology Findings

DISCUSSION

The main problem of this case is congestive heart failure which causes organ complications. The body attempts to compensate for LV failure through activation of the sympathetic and renin-angiotensin-aldosterone system. Consequently, patients experience salt retention, volume expansion, sympathetic stimulation, and vasoconstriction.[2]

Patient's symptoms were a NYHA 4 Congestive heart failure's symptoms (Framingham criteria, table 2). Include dyspnea that reflects the increased work of breathing caused by stiffness of the lung produced by interstitial pulmonary edema, orthopnea that reflects the inability of the failing LV to handle the increase in venous return associated with the recumbent position. Hallmarks of decreased cardiac reserve and low cardiac output include fatigue and weakness at rest or with minimal exertion. Decrease in cerebral blood flow may produce confusion to loss of consciousness. Heart failure patients may complain of anorexia, nausea, or abdominal pain related to liver congestion or prerenal azotermia.[1]

According to the literature, various tests are needed to diagnose and monitor the heart failure include BNP, BGA, electrolyte, and echocardiography. However, this tests were not available in our rural hospital. Therefore, patient's diagnosis and monitoring were carried based on physical examination and available tests. [1]

Table 2. Framingham Criteria.[1]

Major Criteria:	Minor Criteria:
- Paroxysmal Nocturnal Dyspnea or Orthopnea - Neck vein distention - Rales - Cardiomegaly - Acute pulmonary edema - Third heart sound - Increased central venous pressure - Circulation time > 25 s - Hepatojugular reflux - Weight loss > 4,5 kg in 5 days treatment	- Bilateral ankle edema. - Nocturnal cough. - Dyspnea on exertion - Hepatomegaly - Pleural effusion - Reduction in vital capacity by 1/3 - Tachycardia > 120 bpm
Heart failure present if: 2 major criteria or 1 major criteria + 2 minor criteria	

The primary purposes of instituting mechanical ventilation are (1) to decrease the work of breathing, (2) to support gas exchange, and (3) to buy time for other interventions to reverse or treat the cause of respiratory failure. There are 4 types of respiratory failure but unfortunately in this case, the type of respiratory failure can not be determined. [3]

Diuretics treatment at the beginning of diagnose significantly determine the patient's outcome. Diuretics can relieve circulatory congestion and its accompanying pulmonary and peripheral edema and do so more rapidly other than any other drug. [1] Furosemide is given in this case for reducing edema, improving gas exchange, reducing acute kidney injury, and attaining venodilatory effect. In critically ill patients (with sepsis, inflammation, and heart failure), the oncotic pressure often low, resulting in transcapillary fluid shift, increasing interstitial fluid volume in peripheral tissue and plasma volume reduction. Therefore, fluid balance is increasingly recognized as a 'complementary vital sign' or biomarker in critically ill patients. Malbrain et al. showed that positive cumulative fluid balance was associated with intraabdominal hypertension and other unfavorable outcomes. The purpose of actively removing the fluid is to obtain negative fluid balance by mobilizing fluid that accumulates through late goal directed fluid removal or also known as de-resuscitation. [4]

The most common side effects are fluid, electrolyte, and acid-base imbalance which in this case is unknown because of tidak ada pemeriksaan. Fluid removal using furosemide without control would potentially lead to hypovolemia resulting in hypoperfusion and tissue hypoxia. Nevertheless, previous studies have shown that furosemide increase blood volume due to fluid shift from interstitial to intravascular compartment more than urine production. [4]

Weaning and extubation of this patient were carried on the third day based on patient's condition, chest X ray result, and RSBI calculation, in which suggest that RSBI < 100 times/L/minute can be successfully extubated otherwise RSBI > 120 times/L/minute should retain some degree of mechanical ventilatory support. This consideration was made because the unavailability of BGA test in our hospital. [2]

Spironolactone was given on the third day bacause of the risk of hypokalemia effect of furosemide. This is in accordance with strong evidence that showing reduced mortality and hospitalization rates with use of a low dosage of spironolactone in patients with NYHA class III or IV. Beta blocker therapy also given in this case to reverse the harmful effects of sympathetic nervous system activation in heart failure. B-blocker increase the EF and decrease ventricular remodeling. The 2013 AHA/ACC guidelines for management of heart failure recommend the use of B-blocker as an integral part of therapy. [1]

Vitamin B and D were given to fulfill the mikronutrients (thiamine). According to Intensive Care Med, it is suggesting that thiamine deficiency was associated with mortality and hypermetabolic states and parenteral nutrition without micronutrients predispose to acute deficiency of thiamine. Since 2009, observational studies have clearly shown that vitamin D deficiency is linked to excess morbidity and mortality in adults and children in the ICU. Preliminary data using novel methods suggest that glutathione and glutamat pathway metabolism, which are important for redox regulation and immunomodulation, are affected by vitamin D status. [5]

Enteral feeding was started after 24 hours and hemodynamically stable. The aim of early enteral nutrition is to maintain mucosal integrity, stimulate visceral blood flow, Ig-A secretion, reduce hypermetabolic reactions, and better control of blood sugar. Mucosal integrity is maintained to prevent bacterial translocation. The target of initial nutrition is not to meet the full calorie target, because calorie and protein needs in the early phase of critical illness are not fully known. [6]

CONCLUSION

The outcome of congestive heart failure accompanied by respiratory failure in rural hospital with limited resources is highly dependent on patient's clinical condition, severity, and response to the therapy. Nonetheless, an anesthesiologist should be able to adapt and work the best possible treatment for patient's recovery.

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MIDDLE APPROACH INTERSCALENE BLOCK ANALGESIA FOR REVISION NEGLECTED GALEAZZI FRACTURE: A CASE REPORT

ABSTRACT

Background Interscalene block (ISB) is the most reliable pain controlling technique for both intraoperative and postoperative pain in shoulder surgery. Yet, it has a contradicting analgesia effect on forearm and hand surgery since it might incompletely block the inferior trunk of brachial plexus (C8 and T1). Despite the use of ultrasound and newer technique and approaches, ISB remains challenging for anesthesia provider.

Case Illustration A 17-year-old male scheduled for a revision of previously open reduction internal fixation (ORIF) of neglected Galeazzi fracture. Preoperatively, the patient was given intravenous (IV) diphenhydramine, ondansetron and dexamethasone, which prolong the analgesia effect. The middle approach ISB was done in Post-Anesthesia Care Unit (PACU) with ropivacaine 0,75% 20 cc injected below the C6 nerve root. This approach enables block for forearm surgery and preserves the phrenic function. Afterward, the Patient underwent a three and a half hours surgery procedure in operating room (OR) uneventfully. Some factors might have aided the successfulness of the block such as the needle-to nerve distance and volume. And the concentration given allows faster onset with comparable duration of block. Observation result was uneventful and the patient was able to go home 2 days after.

Conclusion Middle approach ISB able to give a satisfactory analgesia for forearm and hand surgery without any undesirable side effect. Concentration, volume and needle-to-nerve distance of LA injection are important factors affecting the completeness of the block. Intravenous dexamethasone adjunct has beneficial effects in prolonging the duration of analgesia effect of interscalene block.

Keywords: Regional anesthesia; Peripheral nerve block; Interscalene block; Pain management; Brachial plexus block

INTRODUCTION

In 1970, The Interscalene Block (ISB) or Interscalene Brachial Plexus Block (ISBPB) was first introduced by Winnie and recently, it is performed with the aid of ultrasound guidance. It serves as the most reliable pain controlling technique for both intraoperative and postoperative pain. Also, the ultrasound guidance with or without nerve stimulator, allow both specific targeting of any desired portion of the brachial plexus and less use of local anesthesia (LA) in achieving adequate block.[1–3] Although, ISB is an effective analgesic technique for shoulder surgery, even widely considered as gold standard pain relief to both multimodal postoperative and preventive analgesic strategies without significant pulmonary disease, it also able to provide surgical anesthesia and analgesia for the entire upper extremity by depositing local anesthesia adjacent to the seventh cervical nerve root or inferior trunk.[3–8] There have been some approach modifications or techniques to make ISB more possible for below elbow surgery. Nevertheless, the use of ISB for pain management of hand and forearm surgery have the relatively lower success rate than in shoulder surgery and remains challenging for anesthesiologists regarding the risk of incomplete inferior trunk blockade (C8 and T1).[3,9,10] Hereby, we provide a case in which middle approach ISB is used as intraoperative and postoperative analgesia for forearm surgery, revision of post-open reduction and internal fixation neglected Galeazzi fracture.

CASE ILLUSTRATION

A 17-year-old male was presented to Wangaya Regional Hospital for revision post-open reduction and internal fixation neglected Galeazzi fracture which had been previously scheduled on June 20th, 2022. The patient complained of unpleasant feeling on his forearm and wrist with a restricted movement on all direction especially wrist extension. It was because the patient had fallen from a 4-meter-high ladder 10 years ago and by the time the

incident occurred, the patient couldn't remember the exact event as he was fainted. The patient didn't go directly to the hospital and decided to have it traditionally massaged at first, until he felt that his arm was functionally impaired and disturbed his daily life. Then the patient decided to have it operated on April 14th, 2022.

Figure 1. Clinical appearance site of injury. [Source: originally taken by the author]

Physical examination was uneventful other than the injury itself which deformed, slightly swelling, restricted at all range of movement, and pain on wrist hyperextension (**Figure 1**). Laboratory findings (**Table 1**) and chest x-ray showed no abnormality, while the anteroposterior and lateral wrist x-ray showed a non-union internal fixated of distal radius fracture with callus formation (**Figure 2**). Informed consent was taken, the patient was asked to fast for 8 hours and given 2 grams of ceftriaxone for prophylactic antimicrobial prior to surgery.

Table 1. Laboratory findings. [Source: originally made by the author]

Hematologi			
Leucocyte count	6.94	10^3/uL	4.0 - 10.0
Erythrocyte count	5.13	10^6/uL	4.50 - 6.20
Hemoglobin	15.0	g/dL	13.0 - 18.0
Hematocrit	45.1	%	40 - 54
MCV	87.9	fL	81.0 - 96.0
MCH	29.2	pg	27.0 - 36.0
MCHC	33.3	g/dL	31.0 - 37.0
Thrombocyte count	307	10^3/uL	150 - 400
RDW-SD	42.8	fL	37 - 54
RDW-CV	13.2	%	11.0 - 16.0
RDW	9.5	fL	9.0 - 17.0
MPV	8.9	fL	9.0 – 13.0
P-LCR	16.7	%	13.0 – 43.0
PCT	0.27	%	0.17 – 0.35
NEUT%	52.0	%	50 – 70
LYMP%	37.6	%	20 – 40
MONO%	8.6	%	2 – 8
EOS%	1.2	%	0 – 4

BASO%	0.3	%	0 – 1
IG%	0.3	%	
NRBC%	0	%	
NEUT#	3.61	10^3/uL	1.50 – 7.00
LYMP#	2.61	10^3/uL	1.00 – 3.70
MONO#	0.60	10^3/uL	0.00 – 0.70
EOS#	0.08	10^3/uL	0.0 0.40
BASO#	0.04	10^3/uL	0 - 0.10
IG#	0.02	10^3/uL	
NRBC#	0.00	10^3/uL	
NLR15	1.38		3.13
LED Analyzer (Alifax)	15	mm/jam	0 – 20
Coagulation			
Bleeding time	2’00”	menit	1 – 5
Clotting time	10’30”	menit	5 - 15
Serology			
CRP	5	mg/L	<5
SARS-CoV2			
Nasopharyngeal swab	Negative	Negative	Real time RT-PCR

Figure 2. Anteroposterior and lateral view of wrist x-ray. [Source: originally taken by the author]

Preoperatively, the patient was prepared with 10 mg of intravenous (IV) dexamethasone, 4 mg of IV ondansetron, and 10 mg of IV diphenhydramine. Then, the patient was brought to the Post-Anesthesia Care Unit (PACU) for the single-shot interscalene block procedure while being closely monitored.

In supine position, the patient's head was turned away to the right and the landmark for the procedure was being observed with palpation and ultrasound. After anaesthetizing of the skin with 2 ml of 2% lidocaine, the procedure was carried out in a sterile manner using 50 mm, 22-gauge stimuplex needle, which was inserted through the interscalene groove using middle approach ($\frac{1}{2}$ of the site between C6 landmark cricoid high and the upper border of clavicle) below the usual interscalene block (at the level of cricoid) and placed the tip of the needle in the below C6 nerve root using ultrasound guidance and confirmed with nerve stimulator (**Figure 3a & 3b**). Local anesthesia (LA) used was ropivacaine 7,5 mg/cc (0,75%) and given at both areas 10 cc each (**Figure 3c**). Together with the administration, the patient was closely monitored for vital sign (electrocardiography, non-invasive blood pressure, heart rate, respiratory rate and pulse oximetry) and checked for the motor and sensor function at the site of surgery. Once the block was adequate (±20 minutes), the patient was transported to the operating room (OR).

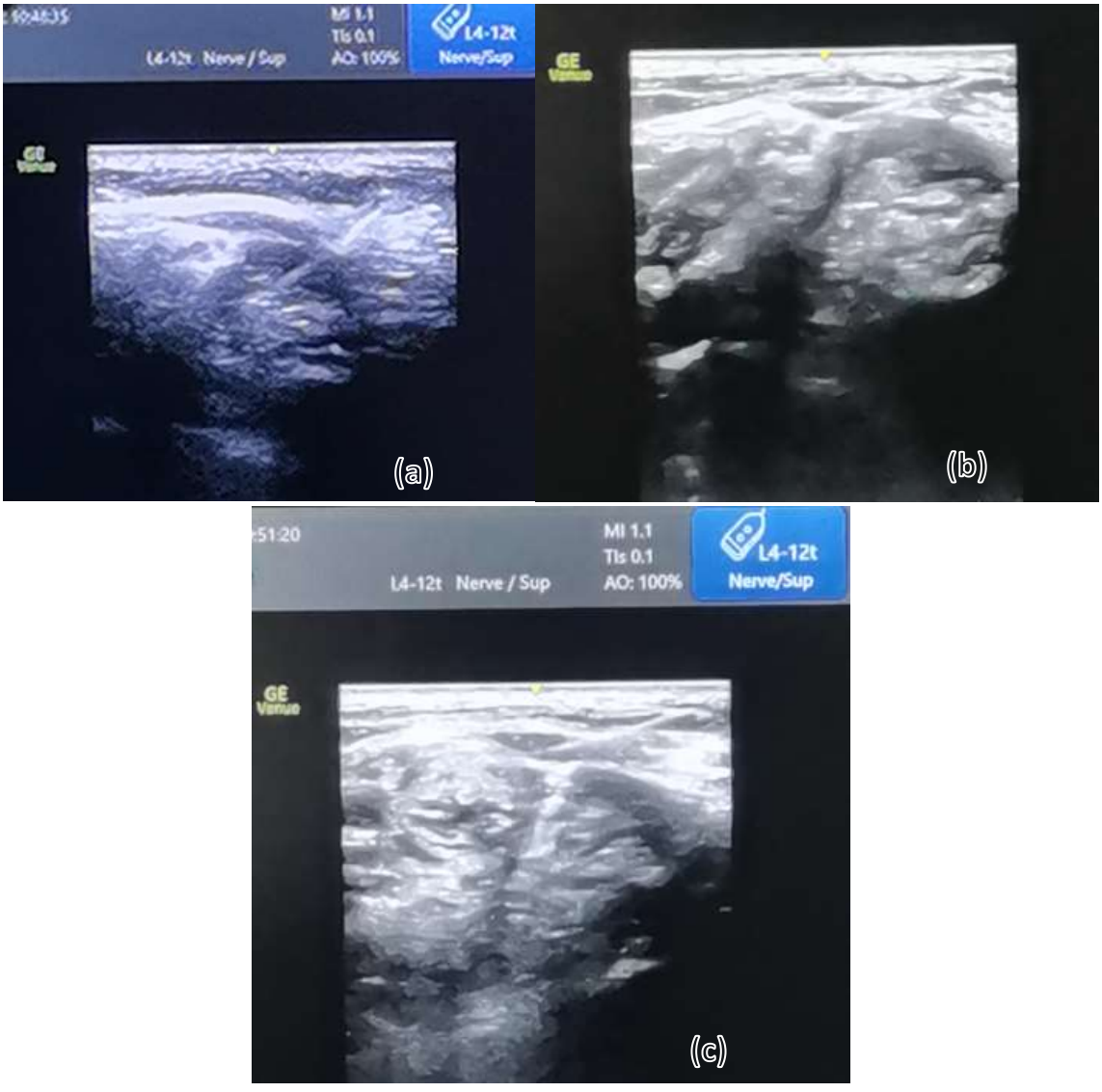

Figure 3. (a) Needle tip at the 1st below C6 nerve root area before the injection of local anesthesia (LA). (b) Needle tip at 2nd below C6 nerve root area after the injection of LA at 1st area. (c) Post-injection of LA at both below C6 areas. [source: originally taken by the author]

Prior to incision, the patient was prepared with 2 mg of midazolam as sedation and 30 mg of fentanyl as additional analgesia despite the complete interscalene block. Along the surgery, there was no concerning event regarding vital sign (**Figure 4**) and cardio-cardio-respiratory function despite some bleeding which was well managed by the administration of tranexamic acid. The surgery lasted three and a half hours and the block was still adequate.

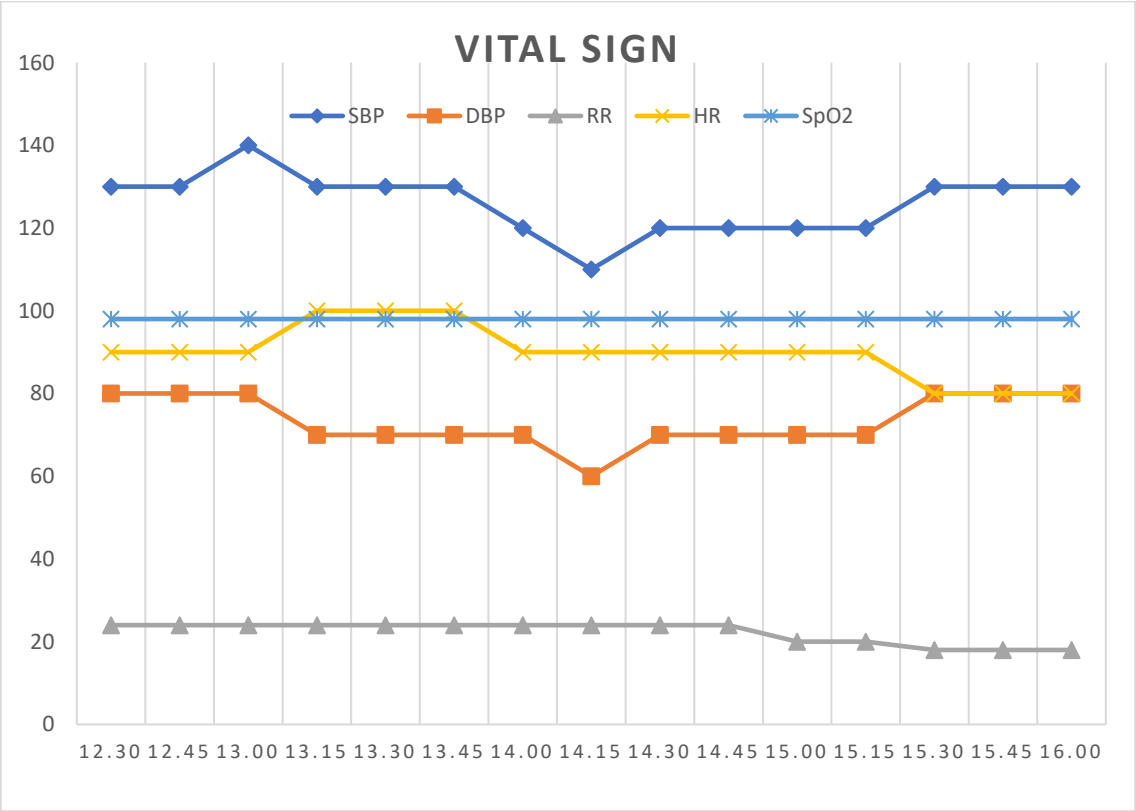

Figure 4. Monitored vital sign during surgery. [source: originally made by the author]

Postoperatively, the patient was being monitored in PACU for vital sign, pain score and cardio-respiratory function. The patient claimed that he did not feel any pain with numerical pain score 1/10 and dyspnea during the surgery until he was asked about in PACU. The vital sign stayed normal and so did the cardio-respiratory function. The patient was moved to the ward after 45 minutes of observation in PACU and dripped with fentanyl 200mg in 500 NaCl 0,9% for 24 hours as maintenance analgesia as soon as he arrived at the ward. The patient was sent home two days after with no concerning event regarding both pain and cardio-respiratory function.

DISCUSION

In this case, even with theoretically 25% longer onset, the interscalene block was used rather than supraclavicular and infraclavicular block. Originally, interscalene block has been chosen as regional anesthesia technique for shoulder surgery, but it actually can be used for forearm and hand surgery with the risk of incomplete blockade of the inferior trunk (C8 – T1). There has been known about phrenic nerve blockade with resultant of diaphragmatic paresis as an inevitable side effect with traditional (C6) level of interscalene block. This side effect causes a subjective dyspnea symptom and could be worsen with the presence of preexisting respiratory disease. Ultrasound-guidance reduces the chance of inferior trunk sparing and makes the below C6 needle placement possible to prevent phrenic blockade involvement. However, it remains contradiction as some studies has shown that 28 out of 33 subjects (85%) had failed to achieve block of hand and forearm. The block failures were known to be caused by inadequate cutaneous anesthesia of the ulnar, median, or radial distributions; medial forearm; and/or the lateral forearm.[3,8,11,12] In this case, the patient had approximately 20 minutes of onset block and the effect of blockade was adequate for both intraoperative and postoperative pain management. The completeness of the block in this case was presumed due to the wide spread of LA to below C6 structure. Some study has shown

that forearm and hand neural block could be achieved with lower approach (below C6). It also has the advantage, if given precisely, in preservation of diaphragmatic function and reduced damage to the dorsal scapular and long thoracic nerve, which both split from the C5 nerve root. A new middle approach interscalene block (MISB) is non-inferior to low approach interscalene block (LISB) in giving sensory blockade after 15 minutes of injections. The difference upon the approaches is affected by the slower onset of higher approach.[9–11] However, the low dose of fentanyl and midazolam as analgesia and anxiolysis supplementation respectively, was given in this case to make the patient even more comfortable during the surgery.[13] The injection of ropivacaine 0,75% in **Figure 3**, was shown to swell the area of C6 interscalene nerve. Nevertheless, there was not any complain of dyspnea both intraoperative and postoperatively.

A study of different concentration and volumes of local anesthesia, especially ropivacaine in ISBPB have different effects. The higher the concentration of ropivacaine (0,75% vs 0,5%/0,25%), the faster the onset of sensory and motor blockade, while other effects are comparable between groups, such as pain score, recovery hand grip strength, absent or paradoxical diaphragmatic movements. The mechanism underlying the fast onset is caused by improved neural penetration by LA molecules while the volumes promote the diffusion around neural structure. The loose surrounding tissue may need a lower concentration of LA compared to the sciatic nerve in labat sciatic nerve block. In this case, 0,75% concentration of ropivacaine was preferred due to fast onset, higher success rate probability, reliable analgesic effect, relatively quick recovery of hand motor function and good preservation of diaphragmatic function.[2]

Effective needle-to-nerve distance in interscalene block also has an effect on the successfulness of the block. In one study, about 8 mm distance between the tip and the brachial plexus sheath produces effective and long-lasting analgesia in 50% patients, while 1,6 mm can achieve a successful block in 95 of patients.[13]

Interestingly, dexamethasone perineural as an adjunct to LA is also the most promising agent to prolong the duration of block. A double-blind study of intravenous dexamethasone effect on analgesic duration of single-shot interscalene block showed a positive result even with in low dose (4mg). Moreover, Cochrane review conclusion of the off-label use of dexamethasone perineurally, could prolong the duration of block by 3 hours (2 – 4 hours) over intravenous dexamethasone in upper and lower extremity peripheral nerve block (PNB). Despite the longer benefit of the perineural dexamethasone, the intravenous dexamethasone was used due to its established safety record. To guarantee the experience of pain-free procedure, the analgesic maintenance of fentanyl in normal saline was given for 24 hours.[14–19]

CONCLUSION

Middle approach interscalene block able to give a satisfactory analgesia for forearm and hand surgery with less or no undesirable common side effect such as phrenic nerve block. Factors affecting the onset and successfulness of complete block including concentration, volume and needle-to-nerve distance should be taken into consideration. Dexamethasone adjunct both perineural and intravenous have beneficial effects in prolonging the duration of analgesia effect of interscalene block.

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AIRWAY MANAGEMENT OF SINONASAL CARCINOMA PATIENTS WITH DWARFISM AND THORACIC SCOLIOSIS

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ABSTRACT

Background : Anesthetic challenges in patients with dwarfism include potentially difficult airways, often complicated by sleep apnea due to obesity, altered breathing mechanisms. We discuss Airway management of a patient of sinonasal carcinoma with a difficult airway and scoliosis thoracal

Case Illustration : The patient was a 43-year-old man who came with sinonasal carcinoma. The patient has problems in airway, namely macrocephaly, macroglossia, thoracic scoliosis, short neck so it is difficult when doing neck extension which can be difficult for intubation, we do induction using spontaneous breathing intubation using video laryngoscope. The aim of this study was to management airway in patient dwarfism and thoracal scoliosis.The difficult mask ventilation was not an issue but was considered due to the facial features described above. Muscle relaxant was administered only after ensuring adequate mask ventilation. No obvious airway difficulty was anticipated as our patient was Mallampati grade III with normal mentohyoid and mentothyroid distance, and limitation neck extension. However, we encountered difficulty in visualisation of cords with video laryngoscope.

Conclusion: The difficult airway management was a challenge for an anesthesiologist. Requires recognition of common clinical features and anticipation of potential airway difficulties, Facilities for managing the difficult airway and suitably experienced personnel should be available. Difficult airway may be encountered even in the absence of known predictors. Video laryngoscope should be the technique of choice.

Keywords : airway management, dwarfism, scoliosis thoracal

INTRODUCTION

Dwarfism, defined as an adult height below 145 cm in males or 135 cm in females, is a category of disorders with extreme global growth failure. Anesthetic management in dwarfism is challenging, as it is often complicated by conditions such as spinal deformities, limited neck mobility, and a narrowed pharynx, leading to high-risk general and regional anesthesia.[1,2] Anesthetic challenges in patients with dwarfism include potentially difficult airways, often complicated by sleep apnea due to obesity, altered breathing mechanisms, and difficult neuraxial access with the unpredictable spread of local anesthetics. Restrictive lung disease and pulmonary hypertension can develop from chronic hypoxemia or hypercarbia secondary to thoracic scoliosis, airway obstruction, or sleep apnea. Preoperative arterial blood gases may be required in this case.[1,2]

The effect of scoliosis on the cardiovascular system is related to changes in mediastinal structure following the scoliosis curvature, increased PVR and pulmonary hypertension as a result of right ventricular hypertrophy and right heart failure, increased PVR: hypoxemia and chest wall changes, can be accompanied by cardiac abnormalities (most often mitral valve prolapse).[5]

The incidence of difficult laryngoscopy or intubation varies depending on visualization of the larynx. Visualization of grades 2 or 3 requiring repeated attempts or a different blade (and including external laryngeal pressure) is quite common and occurs in 1% to 18% of cases. Grade 3 visualization continuing to successful intubation is reported in 1% to 4% of cases. When finding a patient with a difficult airway, good documentation in the patient's medical record is very important to help guide future airway management. In the course of anesthetic practice, there will always be patients with difficult airways. Anesthesiologists are trained in detecting

these patients prior to induction and preparing the steps to achieve successful endotracheal intubation with available devices. [4,5]

CASE ILLUSTRATION

A 43-year-old man came with a diagnosis of sinonasal tumor, dwarfism, thoracic scoliosis and has been unable to walk since birth. General condition looks mildly ill, weight 25 kg, height 60 cm, conscious composmentis, vital signs within normal limits, on Physical examination obtained limited neck mobility for extension and there is deformity in the thoracic spine. On laboratory examination, the hemoglobin value was 10.5 g/dl and the AGD was normal. Assessment of AIWAY LEMON with impaired neck movement and malampathy 3.

Anesthesia is performed by spraying 10% lidocaine spray on the base of the tongue. Pre-oxygenation with 100% oxygen for 3 minutes. Administer Propofol 50 mg incrementally, when the patient is asleep a Video Laryngoscope is inserted to see the patient's epiglottis, when the epiglottis is visible and intubation can be performed, a 7.0 size ETT is inserted using a video laryngoscope. After the ETT is confirmed, 12.5 mg of atracurium is given, maintenance anesthesia using sevoflurance 2 vol %. During the operation, hemodynamic stability was obtained with systolic blood pressure of 116-122 mmHg and diastolic blood pressure of 67-79 mmHg, pulse rate ranging from 72-92 beats per minute. Oxygen saturation 98-99%, urine output 50-50cc per hour. Bleeding as much as 800cc. Maintenance fluid with Ringer's lactate crystalloid as much as 1500cc/2 hours. The duration of the operation is about 2 hours. After the operation, extubation was carried out fully awake, then monitoring was carried out for 1 hour in the recovery room, the patient returned to the treatment room.

DISCUSSION

The problem that exists in patients with dwarfism is the difficulty of managing the airway. atlantoaxial instability with risk of cervicalomedullary compression. Several facial features resulting from abnormal bone growth, such as a large protruding forehead, short maxilla, large mandible, depressed nasal bridge, and macroglossia, can pose a challenge during mask ventilation. In addition, in dwarf patients with atlantoaxial instability, foramen magnum stenosis or cervical kyphoscoliosis, and neck extension may need to be severely limited or avoided to prevent cervicomedullary compression, and this may limit visualization of the larynx for tracheal intubation.[1]

Those diagnosed with dwarfism have increased mortality in both children and adults. Preoperative evaluation must be multidisciplinary and should be carried out thoroughly. In airway management we prepared intubation trolleys containing video laryngoscopes, bougie, guides for endotracheal tubes (styet), laryngeal mask airways (LMA) of various sizes, endotracheal tubes, supraglottic airways and masks which had been prepared for these patients. Then an emergency cricothrotomy set was placed in the basket in case the intubation failed. In addition, calculating drug doses must be adjusted to ideal body weight for height so that we can prevent overdosage or underdosage. Management of a difficult airway must be planned for each patient as a result of various deformities of the craniofacial tract and multiple system disorders. To determine the risk of atlantoaxial subluxation secondary to odontoid hypoplasia and whether or not it is safe to perform traditional maneuvers for intubation, lateral flexion-extension radiographs of the cervical spine should be the standard of imaging. Spinal deformations in these patients include short necks, odontoid hypoplasia, thoracic scoliosis, narrowing of the hips, lordosis, and moderate to severe spinal stenosis. Narrowing of the spinal column can cause cauda equina syndrome, nerve root compression, thoracolumbar spinal cord compression, or, rarely, high cervical cord compression due to stenosed foramen magnum that renders the patient unable to walk.[2-3]

Difficult laryngoscopy can be defined as grade 3 or 4 visualization on laryngoscopy. Several maneuvers can help improve visualization of the larynx through laryngoscopy, but generally, poor visualization can contribute to the greater difficulty of achieving successful tracheal intubation. The components of excellent laryngoscopy performance consist of optimal sniffing position, good muscle relaxation, good anterior laryngoscope traction, and, if necessary, external manipulation of the larynx. For example, application of external laryngeal pressure can

decrease visualization of 3rd degree from 9% to between 5.4% and even 1.3%. In doubtful cases, the anesthesiologist, while performing left-handed laryngoscopy, quickly applies external pressure on the hyoid, thyroid, and cricoid cartilages with the right hand. The pressure point that determines the best laryngeal visualization can be determined in a matter of seconds and the pressure point can be forwarded by the assistant. The occurrence of desaturation at the time of induction is very likely to occur. Then 100% preoxygenation can be given using a face mask for 3-5 minutes and inhaling 4-8 times.[3]

Spontaneous intubation is a method of intubation using sedation and analgesic agents without using muscle relaxants, the patient can breathe on his own without ventilation assistance so that when we intubate and fail the patient can still breathe on his own without having to be assisted. From this case, the use of the spontaneous intubation technique requires good preparation starting from explaining to the patient the steps of the intubation procedure, taking into account the patient's anxiety, discomfort, and the risk of aspiration and the possibility of failure that occurs if we cannot intubate. In this patient, airway topicalization was performed with 10% xylocaine spray. Topicalization should focus on the base of the tongue (the pressure receptors here act as the afferent component of the gag reflex), the oropharynx, hypopharynx, and laryngeal structures.[5-6]

In this patient, the first thing to do was to spray 10% lidocaine spray on the base of the tongue so that there was no gag reflex when inserting the C-MAC video laryngoscope, after that, 100% oxygen was pre-oxygenated for 3 minutes with a face mask, then given propofol sedation with a dose of 1 mg/kg is given intermittently until the patient falls asleep. After the patient is asleep and it is confirmed that there is no gag reflex, coughing and agitation in the patient, a videolaryngoscope is inserted in size 4 in the patient to see the epiglottis and it can be seen that the vocal cords can open clearly, then the laryngoscope is pulled back and pre-oxygenated for 3 minutes, given fentanyl with dose of 2 mcg/kgbb and a size 7.0 ETT was inserted, after the ETT was confirmed and the breath sounds were the same on the right and left, the muscle relaxant atracurium was given at a dose of 0.5 mg/kgbb and during the operation a maintenance dose of sevoflurance inhalation anesthetic drug was given 2-3 vol%.[6]

CONCLUSION

The airway management of patient with sinonasal carcinoma with dwarfism and thoracic scoliosis is a challenge in itself for an anesthesiologist, From this case, the use of the spontaneous intubation technique requires good preparation starting from explaining to the patient the steps of the intubation procedure. The good preparation to find out whether the patient can be intubated directly laryngoscope or using a video laryngoscope, preparation for retrograde intubation and fiber optics.

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CASE REPORT

ANESTHESIA MANAGEMENT IN LOCAL ANESTHETIC SYSTEMIC TOXICITY

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ABSTRACT

Most cases of local anesthetic toxicity develop within the first five minutes of peripheral block administration.ini is an important, life-threatening problem that can lead to seizures, hemodynamic collapse, and cardiac arrest if ignored and not considered. A 53-year-old male patient who underwent Open fracture at right distal femur, Closed fracture at left leg susp proximal third performed OREF debridement. The patient was identified as suspected of local Anesthetic Systemic Toxicity (LAST) at 4 hours during the surgical procedure. Anesthesia management in LAST is carried out and monitoring of the patient's condition continues. The result of the management intervention carried out is that the patient's condition is controlled and stable. The conclusion in reporting this case is that the administration of lipid emulsions on the status of local Anesthetic Systemic Toxicity can reduce morbidity and mortality of patients as evidenced by the stability of the patient's condition after the intervention.

Keywords: Local Anesthesia, LAST, Anesthesia Management

INTRODUCTION

Local anesthetic systemic toxicity (LAST) is a side effect caused by the use of local anesthesia techniques with intravascular injection for epidurals and caudalanesthesia which can produce very high serum drug levels. [1, 2] The mechanism of local anesthesia induces central nervous system toxicity associated with blockade inhibitory neurons at concentrations lower than blocking excitatory neurons. Several studies have shown that local anesthesia inhibits the release of endogenous glutamate in lower consenration on voltage-gated sodium channel blocking, modulating neuronal excitotoxicity by glutamate. [3] Understanding the factors that increase the risk of developing LAST is important for modifying treatment and reducing risk. Hypoxia and acidosis are known predisposing factors to LAST. Identified comorbidities include heart disease (ischemia, arrhythmia, conduction abnormalities, and low ejection fraction), advanced age, liver or kidney disease, and other conditions that can lead to mitochondrial dysfunction (such as carnitine deficiency). [4] The early signs and symptoms of LAST include tinnitus, metallic taste, hypertension, tachycardia. Signs and symptoms that appear in the central nervous system include agitation, obtundation, seizures, and coma. Signs and symptoms that appear in the cardiovascular system include bradiakrdia or disorders of heart block, hypotension, ventricular tachycardia or fibrillation, and asystole. To prevent systemic toxicity from local anesthesia, administering small doses and dividing the administration dose into doses is recommended. In addition, aspiration and the use of ultrasound imaging to assess the location of needles or catheters are also recommended. The use of anesthetics also needs to be considered, such as the use of anesthetics with lower toxic levels (ropivacaine and levobupivacaine).

CASE ILLUSTRATION

The patient named Mr. E aged 53 years, male with a body size of 75 kg and height of 165 cm was hospitalized with a working diagnosis of Open Fracture At Right Distal Femur, Closed Fracture At Left Leg Susp Proximal Third. Patients are consulted by Orthopaedics for OREF and Debridement procedures. The patient had an accident 12 hours before entering the hospital when the patient was riding a motorcycle in the Limbangan area, the patient hit a car from the opposite direction and fell with his right thigh hitting the road. After the incident, the patient complained of injuries and deformities in the thigh and right leg. A history of decreased consciousness is denied. Complaints in other parts of the body are denied. The patient was taken to Al Islam Hospital, x-ray examination and scanning, then referred to RSHS for further management. Previous history of surgery and anesthesia is absent, history of chronic diseases is absent, daily patient activity is within normal limits. The results

of the physical examination showed the level of consciousness with the GCS scale: E4M6V5, BMI value 32.8, blood pressure 132/90 mmHg, regular heart rate 72 times / minute, respiration rate 20 times / minute, temperature 36.8 ^{oC,} SpO2 98% with free air, and pain score 2/10. The generalist status of patients in the head area shows that the conjunctiva is not anemic, the sclera is not icteric, the pupils are isokor. In the thorax shows the results that the right VBS lung is the same as the left, there is no ronkhi and wheezing, in the heart the sound S1 S2 is purely regular, there is no murmur and gallop, in the abdomen shows flat, soft, and normal intestinal noise, the extremities are palpable warm CRT <2 seconds, and there is no edema.

DISCUSSION

Pre-Operation

The results of the preoperative laboratory examination on June 12, 2023 showed the results of: (Table 1).

As a result of the analysis of the condition, Mr. E was diagnosed with Open Fracture at Right Distal Femur, Closed Fracture At Left Leg Susp Proximal Third. The treatment plan prepared for Mr. E includes: Preoperative 6-hour fasting, IV access pairing, fluid maintenance with, Ringer lactate 150 cc/hour, Regional anesthesia plan, and Informed consent of patient and family. During the preoperative process this includes observation of the patient's vital signs, patient's level of consciousness, response to the central nervous system, cardiovascular system response (ST waves, PR, QRS complex).

In the case of fractures, things that really need to be done include establishing an appropriate diagnosis, administering appropriate intravenous antibiotics as a prophylactic mechanism, excision of the injury zone (debridement), fracture stabilization, reassessment, and closure of soft tissues. The mechanism of debridement performed means surgical exposure of the entire zone of pathological injury and removal of all necrotic, contaminated, and/or damaged tissue. Both bone tissue and soft tissue. This action is done to minimize positive microbiological smears on wounds. So the probability of infection decreases. The things that need to be prepared before surgery are proper preoperative skin decontamination planning and upholding aseptic principles to minimize the number of tang bacteria entering the surgical wound. [5]

Intra-operative

The patient entered the operation room and made preparations for induction at 12.30 pm. GCS value of patient E4M6V5 with blood pressure measurement results of 128/85 mmHg, heart rate 88 times/minute, sinus rhythm ECG image, respiration rate 20 times/minute, and Sp02 measurement results 99%. Patients are installed hemodynamic monitoring devices in the form of NIBP, ECG, SpO2. after that induction preparation was carried out using regional techniques with a combination of epidural and spinal anesthesia with a sitting position with a Tuohy 18 G needle at an altitude of L3-L4, confirmed the position of the epidural with a test dose.after there was no change in vital signs after giving the test dose, Spinal Anesthesia injections as high as L3-L4 with Quincke needle no 25 G. Bupivacaine 0.5% 10 mg and fentanyl 25 mcg were given. Given Bupivacaine 0.5% incrementally as much as 5cc-5cc-2cc. Reached blocks as high as T12. Maintenance with bupivacaine 0.5% as much as 3 cc/hour. Recording vital signs and observation of the patient's condition is carried out. At 12.30-13.30 compos mentis patient consciousness, systolic blood pressure ranges from 110-135 mmHg, diastolic blood pressure ranges from 66-79 mmHg, heart rate ranges from 80-89 times/minute, ECG waves show sinus rhythm, respiration rate 12 times/minute, Sp02 ranges from 99-100% with nasal cannula 3 lpm. At 13:30 the operation began. At 13.30-16.30 the patient's condition description includes Compos Mentis Consciousness, systolic blood pressure 80-92 mmHg, diastolic blood pressure ranges from 56-68 mmHg, heart rate ranges from 106-112 times/minute, respiration rate 24 times/minute, ECG waves show sinus rhythm, SpO2 99% O2 with nasal cannula 3 lpm, and Given O2: Air with FiO2 0%, total bleeding 1300 cc, get crystalloid therapy as much as 1500 cc, get colloidal therapy as much as 1000 cc, and get PRC transfusion as much as 450 cc. At that time, repeated vital signs were observed, signs of bleeding and urine output, and a total of bupivacaine that had been given 100 mg. In the next thirty minutes, the patient's consciousness level condition became E2M5V1, systolic blood pressure ranged from 70-82 mmHg, diastolic blood pressure ranged from 48-56 mmHg, heart rate ranged from 135-155 times/minute,

ECG waves showed sinus rhythm, respiration rate 28 times/minute, SpO2 98% O2 with nasal cannula 3 lpm. Total bleeding is 500 cc, receiving crystalloid therapy 500 cc, PRC 225 cc, and FFP 185 cc. At that time, the patient is prepared for general anesthesia. Patients are preoxygenated with O2 100%, induction with Fentanyl 150 mcg, Propofol 150 mg, Atracurium 35 mg. After that, the patient was fitted with Standard ETT no.7.5 and then connected to an anesthesia machine with ventilator mode VCV TV 400 RR 12 PEEP 5 achieved MV 4.2 L / min. With Maintenance with sevoflurane 1-2 vol%. Oxygen: 50% FiO2 free air. Patients are given lipid emulsion as much as 1.5 cc/kg/loading dose because of suspected LAST. In the next 15 minutes, lipid emulsion maintenance was carried out as much as 1.5 cc/kg/hour for 1 minute. The condition of the patient under the influence of the drug shows systolic blood pressure ranging from 98-122 mmHg, diastolic blood pressure ranging from 56-72 mmHg, heart rate ranging from 105-110 times/minute, respiration rate ranging from 12 times/minute with ventilator mode VCV Pins 20 Vt 450 Rate 12 PEEP 5 and SpO2 levels 100%, the results of ECG wave examination show sinus tachycardia. The bleeding experienced by the patient at this time was 200cc, received crystalloid therapy as much as 500 cc and PRC transfusion as much as 220 cc. The pillars of systemic toxicity management of local anesthesia are stopping local anesthesia, managing the airway, controlling seizures with benzodiazepines, 20% lipid emulsion or 1.5 mL/kg (bolus) given 2-3 minutes, and giving CPR if needed. Early resuscitation of LAST is suppression of seizures and increased oxygen saturation of normal arteries because the chances of acidosis and hypoxia will be progressively increased in patients with LAST.[4, 6] Other things that need to be considered regarding the toxicity of local anesthesia are seizures followed by cardiac artimia and hypotension, the expected clinical picture for toxins targeting mitochondrial metabolism.[1]

Anesthesia management in LAST includes: (1) maintaining airway, oxygenation, and ventilation by installing standard ETT no. 75 with ventilator mode VCV TV 400 PEEP 5 MV 4.2 L / min. This is done to prevent hypoxia, hypercapnia, and acidosis (metabolic and respiratory) that are known to potentiate LAST. The airway must be secured and 100% oxygen administered taking into account that hyperventilation and respiratory alkalosis; (2) provide intravenous lipid emulsion therapy. This therapeutic modality is very important in the management of LAST. Lipid emulsions can transfer local anesthetic agents from high blood flow organs (such as the heart or brain) to detoxification organs (such as muscles or liver). Lipid emulsion therapy can also improve cardiac output and blood pressure. In addition, it can also provide postconditioning myocardial protection. Lipid emulsion therapy has also been shown to reduce mortality rates if performed in conjunction with resuscitation interventions. Therefore, the administration of a 20% intravenous lipid emulsion immediately after airway safety measures is important. The recommendation recommended by the American Society of Regional Anesthesia and Pain Medicine bolus wal 100 mL should be given for 2-3 minutes or 1.5 mL/kg in patients weighing <70 kg. In this case it has been done and proven by the patient's vital signs remain within normal limits under the influence of the drug.[2, 7]
(Picture 1)

Post-Operation

Postoperatively, the patient was transferred to the intensive care room with Compos Mentis Consciousness, Systolic Blood Pressure 92-126 mmHg, Diastolic Blood Pressure 53-62 mmHg, heart rate ranged 75-112 times/minute, respiration rate ranged from 20x/min, SpO2 levels 98% 02 with nasal cannula 3 LPM. (Table 2) (Chart 1)

CONCLUSION

Anesthesia management in LAST cases so as to prevent morbidity and mortality is airway management and oxygenation, lipid emulsion, monitoring and observation of hemodynamic and cardiovascular status of patients. This has been shown to reduce potential toxicity to the central nervous system and cardiovascular system.

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Table 1. Preoperative Laboratory Test Results

Test Components	Result
Hb	**7,4**
Ht	**21,9**
Leukocyte	**10.540**
Platelets	**77.000**
PT	**16,0**
INR	**1,12**
APTT	**33,10**
Born	**27,0**
Cr	**0,80**
SGOT	**21**
SGPT	**9**
GDS	**166**

Table 2. Post-operative Laboratory Results

Test Components	Result
Hb	**8,4**
Ht	**25,0**
Leukocyte	**12.030**
Platelets	**56.000**
PT	**18,1**
INR	**1,28**
APTT	**32,10**
Born	**22,2**
Cr	**0,76**
On	**137**
K	**3.6**
GDS	**202**
PH	**7.470**
Pco2	**27.0**
Po2	**112.5**
Hco3	**19.8**
Tco2	**20.6**
Be-b	**-2.7**
Sa02	**98.8**

Chart

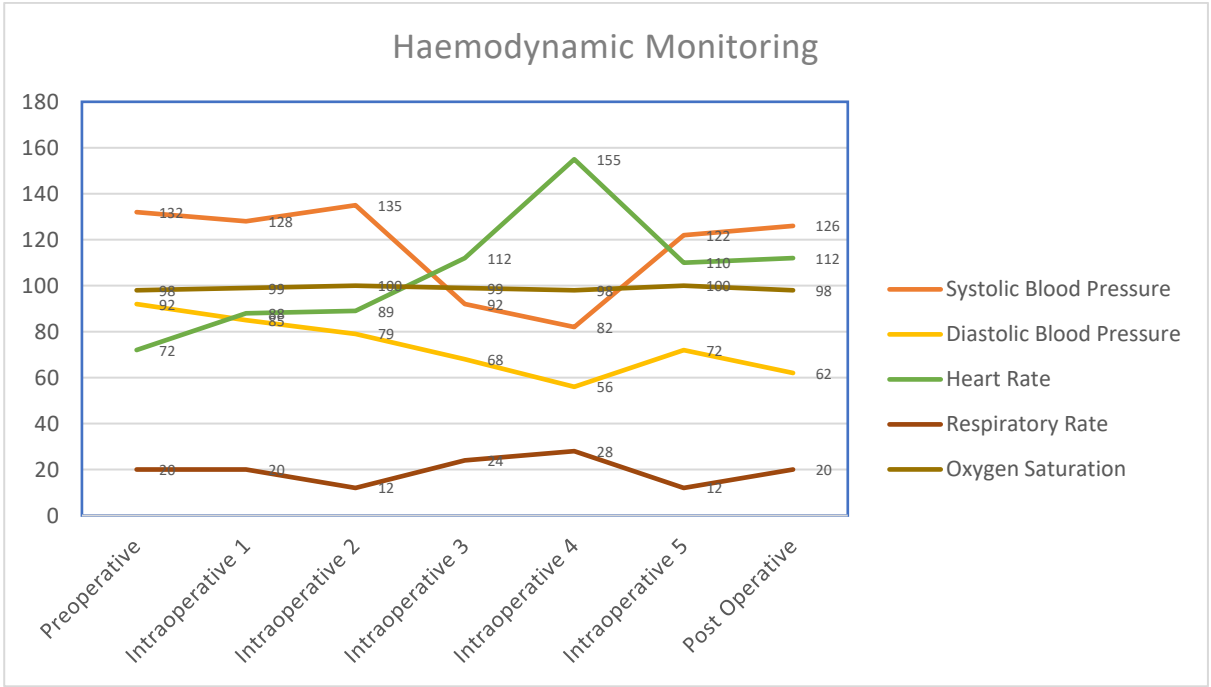
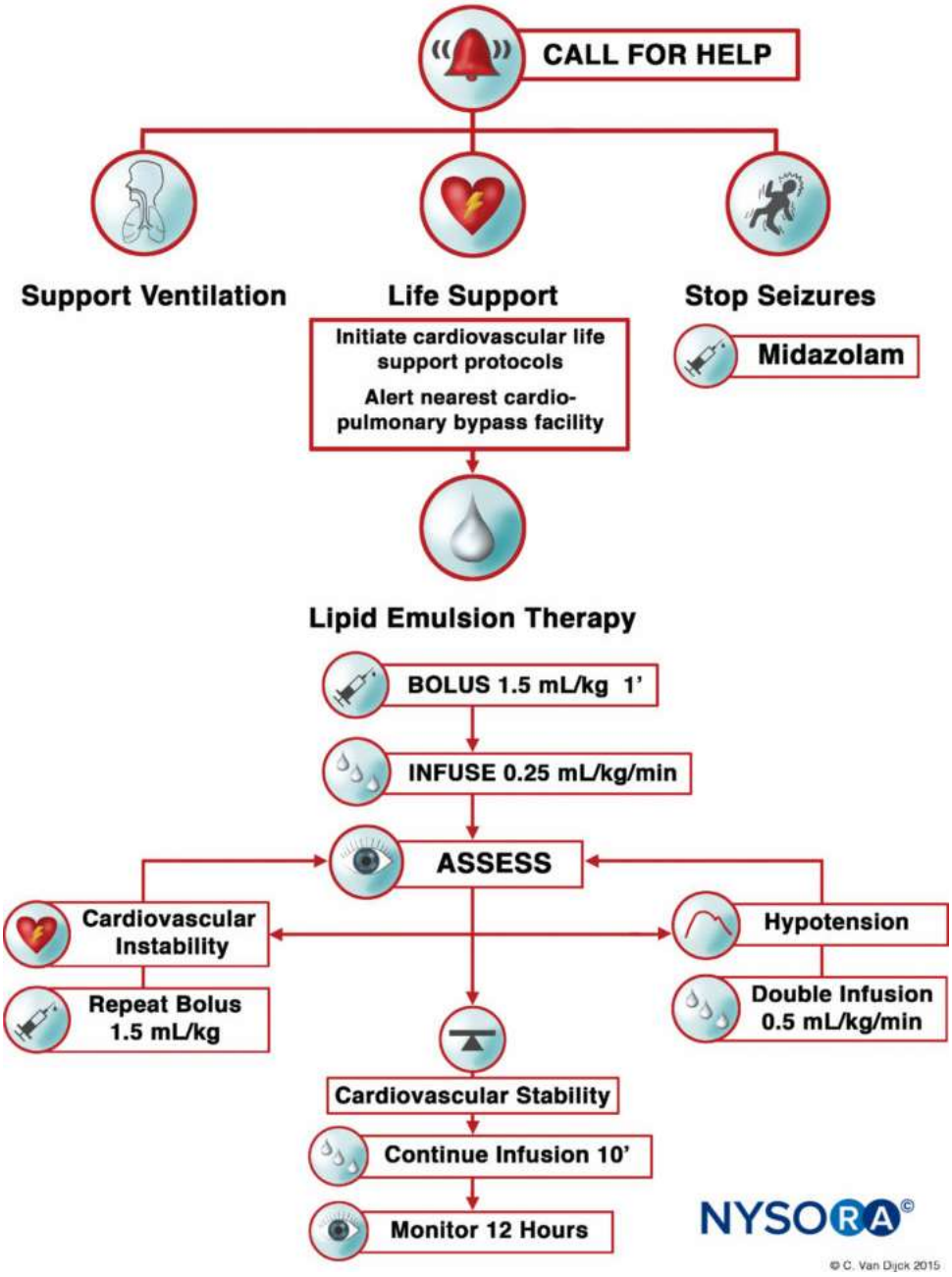


Chart 1. Haemodynamic Monitoring

Picture



Picture 1. LAST Handling Algorithm

Agent	Plain solution		With Epinephrine	
	Maximum Dose ($mg \cdot kg^{-1}$)	Maximum Dose (mg)	Maximum Dose ($mg \cdot kg^{-1}$)	Maximum Dose (mg)
Lidocaine	5 $mg \cdot kg^{-1}$	350 mg	7 $mg \cdot kg^{-1}$	500 mg
Mepivacaine	5 $mg \cdot kg^{-1}$	350 mg	7 $mg \cdot kg^{-1}$	500 mg
Bupivacaine	2 $mg \cdot kg^{-1}$	175 mg	3 $mg \cdot kg^{-1}$	225 mg
Levobupivacaine	2 $mg \cdot kg^{-1}$	200 mg	3 $mg \cdot kg^{-1}$	225 mg
Ropivacaine	3 $mg \cdot kg^{-1}$	200 mg	3 $mg \cdot kg^{-1}$	250 mg

Picture 2. Dosage recommendations for local anesthesia

Adapted from:

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CASE REPORT

ANESTHESIA MANAGEMENT OF SECTIO CAESAREA PROCEDURE IN PATIENT WITH PULMONARY HYPERTENSION IN RURAL AREA: A CASE REPORT

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ABSTRACT

Background : Pulmonary Hypertension (PH) is a condition with increased blood pressure in the pulmonary arteries which might lead to increased mortality and morbidity due to increasing stress on the heart and can worsen during pregnancy and childbirth. Administering anesthesia to a patient with PH requires careful consideration and monitoring due to the potential risks. Subarachnoid block is a type of regional anesthesia commonly used for cesarean section. However, certain precautions and careful option of anesthetic regimens should be taken to minimize complications in patients with PH. **Case Illustration :** We report a case of pulmonary hypertension in a 30-week-old G3P2A0 pregnant woman who underwent a cesarean section. During surgery, subarachnoid block was chosen as the method of anesthesia using combination of bupivacaine 7.5 mg, 100 mcg morphine, and 25 mcg fentanyl as chosen regimen. The surgery was a success with a female baby born with an APGAR score of 8/9. With adjuvant therapy of 0.05 mcg/kgBW/min of Norepinephrine and 10 mcg/kgBW/min of Dopamine, the patient's blood pressure is very stable at approximately 130/90 mmHg with target oxygenation of the patient is 75-80% using Non Rebreathing Mask with 15 litres of oxygen per minute. **Conclusion :** In rural areas with all its limitations, the management of anesthesia for surgery in patients with pulmonary hypertension is very challenging, regional anesthesia techniques, like subarachnoid blocks, are generally preferred over general anesthesia, as they can reduce the risk of cardiovascular complications that may develop during the operation. The use of low-dose bupivacaine combined with opioids is a recommended regimen of choice in patients with pulmonary hypertension undergoing cesarean section.

Keyword: *Pulmonary Hypertension, Cesarean Section, Anesthesia, Subarachnoid Block, Low Bupivacaine - Opioid, LBO*

INTRODUCTION

Pulmonary Hypertension (PH) is a condition characterized by increased pressure in the pulmonary arteries, which can lead to right heart failure and death, currently affecting 49-55 out of a million adults, particularly women with almost twice the risk. PH can be caused by various factors, such as congenital heart disease, chronic lung disease, thromboembolic disease, pulmonary disease related conditions or even drug-induced.[1] It is commonly associated with increased morbidity and mortality in pregnancy and contraindicated for pregnancy.[2]

PH is exacerbated during the pregnancy due to increased stroke volume which ultimately results in increase of right ventricle overload and risk of cardiogenic shock during labor due to changes in blood pressure, heart rate, and cardiac output.[2,3] Thus, careful consideration in preparing the labor, including anesthesia in cesarean section must be adapted based on the patients' condition.

Subarachnoid block anesthesia (SAB) is a common technique for cesarean section (CS), but carries risks in patients with PH, SAB that might lead to hypotension, decreased venous return, and reduced cardiac output, which can worsen PH and right heart failure. Therefore, SAB should be used with caution and with minimal doses

of local anesthetics in patients with PH in achieving safe anesthesia without inducing hypotension and hemodynamic imbalance.[1,4] This article reports a 32-years old woman with 30-weeks gestational age with PH who underwent cesarean section using subarachnoid block anesthesia in a rural area setting with minimal hemodynamic monitoring facilities.

CASE ILUSTRATION

A 30-week-old G3P2A0 pregnant woman with suspected pulmonary hypertension was referred to our hospital to undergo a cesarean section procedure. Preoperative assessments including vital signs, chest x-ray, and echocardiography showed dilated Right Atrium (RA) and Right Ventricle (RV) chambers of the heart, D-shaped Left Ventricle (LV), diastolic dysfunction grade II, highly suggestive of Pulmonary Hypertension type 1 with differential diagnosis PH type 3 results, including “reverse comma sign” in the chest x-ray result.

Dexamethasone is administered by injection and 10 mg daily for 4 days before surgery to stimulate fetal lung maturation, CVC 7.0 was inserted at the right internal jugular vein one day prior to surgery. Pre operative vital signs showed blood pressure of 145/89 mmHg, with heart rate of 89 beats/minute, respiratory rate of 25 times/minute, and blood oxygen saturation 87% with 15 litres of oxygen per minute. Based on the examinations and assessments performed, the patient is classified as PH type 1 with differential diagnosis of PH type 3 and class 4 functional classification according to WHO. Subarachnoid block was performed to the patient with injection level as high as the L3-L4 segment using bupivacaine 7.5 mg with a concentration of 0.5% combined with morphine 100 mcg and fentanyl 25 mcg as the anesthetic drugs. Patient was monitored by blood pressure (NIBP), Electrocardiography, blood oxygen saturation (SpO2), temperature, and urine output. During surgery, vital signs were reported stable with heart rate ranging from 70 - 90 beats/min, systolic BP ranging from 140 - 160 mmHg, diastolic range 80 - 90 mmHg with Norepinephrine 0,05 mcg/kgBW/min and Dopamine 10 mcg/kgBW/min, MAP range 105 - 110 mmHg, temperature 36.8 C, SpO2 83 - 87 % with 15 litres of oxygen/minute with Non-Rebreathing Mask (NRM). Milrinone 0,6 mcg/kgBW/min was administered to the patient as a maintenance dose during and after the surgery ends. The surgery was performed for 1.5 hours with 150 ml of estimated blood loss, the patient received 500 ml of crystalloid and 500 ml of Gelatin Polysuccinate colloid fluid during the surgery.

A female neonate was born, weighing 1600 grams at birth, required intervention from a pediatric specialist for resuscitation due to low APGAR score and was subsequently admitted to the Neonatal Intensive Care Unit (NICU) for ongoing medical attention. At the end of the procedure, the patient was transferred to the ICU for intensive monitoring. During the patient's intensive care in the ICU, hypotension and desaturation developed 4 hours after surgery, and the patient was intubated and assisted with ventilator respiration. Injection of ketamine 30 mg (0,6 mg/kgBW) as induction drug, midazolam 2 mg, atracurium 20 mg (0,4 mg/kgBW), and fentanyl 100 mcg (2 mcg/kgBW) was administered prior to intubation, and 7.0 cuffed ETT was inserted and connected to ventilator. The patient continued to be monitored on intensive care with ventilator assisted breathing and adjuvant vasopressor support of norepinephrine at a dose of 0.2 mcg/kgBW/min and dopamine 10 mcg/kgBW/min with systolic blood pressure ranging from 100 - 120 mmHg and diastolic ranging from 70 - 90 mmHg. The patient developed hypotension and desaturation 6 hours later and passed away in the ICU.

Figure 1. '*Reverse comma sign'* as a highly suggestive Pulmonary Hypertension finding in Chest X-Ray

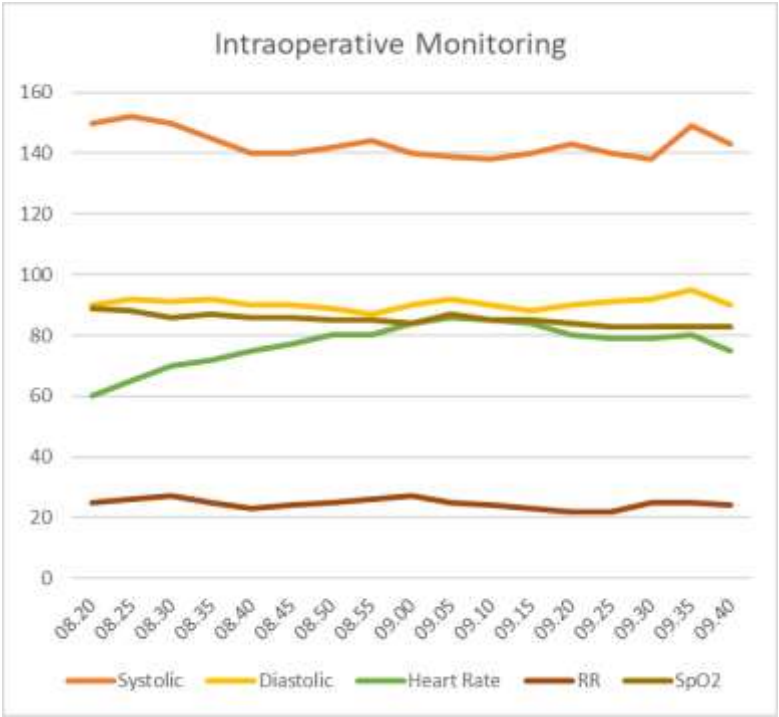

Figure 2. Vital signs monitoring during operative procedure.

DISCUSSION

Pulmonary hypertension is one of the contraindication of pregnancy due to its high mortality and morbidity rate. During pregnancy, there are changes in the blood circulation such as a decrease in diastolic blood pressure due to the effects of increased hormones estrogen and progesterone.[1,2] Furthermore, an increase in blood plasma volume occurs due to fluid retention, leading to mild dilation and stretching of the cardiac chambers, resulting with an increase in stroke volume and cardiac remodeling. The pulmonary circulation, in its normal state, is characterized by a system of low pressure and high compliance.[3] However, in PH, there is a decrease in

compliance, which results in an inability to adjust to the increased cardiac output and pulmonary blood flow. This leads to RV dysfunction due to increased RV afterload and end diastolic volume.[3,5] Survival among those with PH is primarily determined by the decrease in RV ejection fraction.[5] The gradual rise in PAP (pulmonary artery pressure) enables the RV to adapt and leads to RV hypertrophy. However, the hemodynamic changes that occur during pregnancy can begin as early as 6-8 weeks of gestation, potentially resulting in a rapid decline in RV function, turning into right heart failure.[2,5]

Right-sided heart failure can cause inefficient pumping of blood through the pulmonary vasculature and into the left side of the heart, resulting in reduced cardiac output. This can be regulated through fluid administration, afterload reduction, and improved contractility. In cases where the patient experiences depleted intravascular volume due to excessive blood loss or insensible losses, the heart becomes incapable of maintaining cardiac output due to inadequate right-sided filling pressures.[6,8]

Ideally, the administration of anesthesia in pulmonary hypertension patients necessitates the utilization of sedation via rapid onset sedative agents including etomidate. To abate the pulmonary hypertensive response, inhaled treatments with prostanoids or nitric oxide might be employed, although there is dispute concerning their effectiveness as certain authors have reported a raised risk of hypotension due to vasodilation. To prevent hemodynamic imbalance, regional anesthesia is the preferred option for pregnant patients with pulmonary hypertension.[9,11]

Several authors recommend a balanced technique that utilizes both opioids and low-dose volatile anesthetic agents for anesthesia maintenance. All typical initiation agents, such as pentobarbital (2–5 mg/kgBW), propofol (1-2 mg/kgBW), and etomidate (0.2–0.4 mg/kgBW), can be employed alongside opioids (fentanyl 5–10 μg/kgBW and sufentanil 0.5–1 μg/kgBW) because they have no impact on pulmonary vascular resistance and oxygenation.[11,12,13] Gradual escalation of the local anesthetic dosage during the procedure may also reduce the likelihood of undesirable hemodynamic changes. Additionally, it is preferred to use low-dose bupivacaine due to a meta-analysis that shows that it reduces the incidence of intraoperative hypotension in contrast to a high-dose bupivacaine (HB) regimen. Therefore, in patients with pulmonary hypertension, the combination regimen of low-dose bupivacaine and opioids (LBO) is recommended as it significantly reduces the incidence of intraoperative hypotension.[8,11,13]

In our procedure, we used the LBO regimen on subarachnoid block, using bupivacaine 7.5 mg with a concentration of 0.5% combined with morphine 100 mcg and fentanyl 25 mcg, as also used by El Aidouni et al and Periambudi et al in their case on cesarean section of pulmonary hypertension patient.[7,8] The use of LBO regimen in our patient was successful with considerable stable hemodynamic vital signs as shown in the figure above. Milrinone was also administered continuously during and after the surgery and to lower PAP and risk of RV failure as also used by Olsson KM et al and Lertkovit et al.[9,10] This procedure highlights the use of loco-regional block with low dose anesthetic agents to prevent hypotension in the patient.

CONCLUSION

In rural areas with all its limitations, the management of anesthesia for surgery in patients with pulmonary hypertension is very challenging, regional anesthesia techniques, like subarachnoid blocks, are generally preferred over general anesthesia with low-dose bupivacaine combined with opioids, as they can reduce the risk of cardiovascular complications, particularly hypotension that may develop during the operation.

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EFFECTIVENESS OF BUPIVACAIN INFILTRATION AS A POST SURGERY ANALGESIC IN ENCHANCED RECOVERY AFTER CESAREAN SURGERY (ERACS) PROCEDURE

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ABSTRACT

Background:. *Caesarean section delivery can also influence postoperative pain. Efforts to shorten the length of care and healing of postoperative patients are currently being carried out with ERACS. Local infiltration and continuous infusion of the surgical wound under anesthetic are techniques that have recently been reintroduced as an integral part of multimodal analgesia schemes for postoperative pain control. Bupivacaine has a fairly high safety compared to other local anesthetic drugs.*

Objective*: Assess the infiltration effectiveness of 0.25% bupivacaine as an analgesic for pain scores and opioid requirements in post-cesarean section patients during the ERACS procedure at RSUP Dr. Kariadi Semarang.*

Methods: Research subjects were randomly divided into two groups. The first group was given bupivacaine 10 mg 0.25% 20 cc by wound infiltration method with adjuvant fentanyl 25 mcg and the second group was not given bupivacaine 10 mg 0.25% 20 cc. The data collected was in the form of a pain scale measured at 4, 6, 12, 24 hours postoperatively, the need for Opioids during the 24 hour PCA and the side effects that occurred. The data were then processed using the SPSS survival analysis followed by the Log-Rank (Cox Coat) test.

Results*: First time PCA in the bupivacaine infiltrated group had a longer duration than the group without bupivacaine infiltration. The bupivacaine infiltrated group had lower total morphine than the group without bupivacaine infiltration. The bupivacaine infiltrated group had a lower average NRS than the group without bupivacaine infiltration both at rest and on the move at 4,6,12 and 24 hours postoperatively. The difference in NRS scores was significantly different at 4, 6, 12 and 24 hours postoperatively. The incidence of PONV was found to be lower in bupivacaine infiltration and without bupivacaine infiltration*

Conclusion: *The use of infiltration bupivacaine 10 mg 0.25% 20 cc is effective in managing postoperative pain*

Keywords: *bupivacaine, ERACS, infiltration, caesarean section*

INTRODUCTION

Cesarean delivery is one of the most frequently performed surgical procedures. Cesarean delivery or cesarean section is an operation to remove the baby through an incision in the abdominal wall. [1] Data in Indonesia shows births by cesarean section of 9.8%. [2] Caesarean section is a common method of ending pregnancy and there are many reasons to perform a cesarean section. , including birth at an older age, decreased birth rates, increased use of contraceptives, and so on.[2]

Some of the most common complaints found in post-cesarean section patients are nausea, vomiting and itching which can be exacerbated by the use of certain analgesia such as neuraxial opioids. Other complications such as chills are also commonly found in patients who undergo cesarean delivery, especially those who receive spinal anesthesia. The complaints mentioned above can increase hospitalization costs, reduce maternal satisfaction during the treatment process, and can be something traumatic for the patient. Therefore, ERACS was developed to treat perioperative complaints that have multifactorial causes. The ERACS protocol itself has been shown to be able to reduce the incidence of nausea, vomiting and pruritus and support maintenance of normothermia, such as by administering several additional drugs.

Postoperative care for cesarean section in developed countries is a very important problem. Efforts to shorten the length of care and recovery of postoperative patients are carried out so that the length of stay in the hospital is no more than 24 hours. At present, in Indonesia the ERACS technique has begun to be applied with an

emphasis on strong interdisciplinary collaboration in medical sciences. The ERACS technique allows the patient to be able to sit while breastfeeding two hours after surgery, early mobilization, eat and drink as usual and it is hoped that in less than 24 hours the patient will be able to return to activities. With ERACS, patients will feel comfortable and get a pleasant experience of excellent service.[4]

Caesarean section delivery can also influence postoperative pain. The pain felt by the mother who gave birth after cesarean section delivery is felt to come from the injury that occurred in the mother's abdomen. The best way to reduce pain is to provide analgesia that acts directly on the injured area. Treatment of pain associated with cesarean delivery involves different strategies. Nonopioid systemic analgesic agents are widely used in different regimens. Nonetheless, opioid-sparing agents are sometimes not potent enough to achieve adequate pain control after cesarean section and opioids are used universally. As a result, several studies have reported that excessive amounts of opioids are prescribed to women after cesarean delivery. These agents are associated with many side effects and the risks of chronic use after cesarean delivery are of great concern. [5]

Local infiltration (Local Infiltration Anesthesia, LIA) and Continuous Wound Infiltration (CWI) under anesthesia are techniques that have recently been reintroduced as integral parts of multimodal analgesia schemes for postoperative pain control. The two main end points for assessing the efficacy of LIA infiltration were decreased use of opioids and pain relief scores. Several studies have shown that wound infusion with LIA for post-cesarean analgesia is effective in reducing opioid consumption.[6]

Postoperative pain after caesarean section is caused by nociceptive receptors present in various layers, namely the peritoneal layer which carries the main visceral pain fibers, the musculofacial layer and the subcutaneous superficial layer and the skin which carries somatic pain fibers. Although various analgesic modalities are used to address this problem, multimodal analgesic techniques are frequently used to achieve satisfactory pain relief. One of the postoperative multimodal analgesic combinations used is a CWI catheter with local anesthetic along with IV nonsteroidal anti-inflammatory agents and opioids. The feasibility, efficacy and safety of infusion of local anesthetics through wound infiltration catheters for post-cesarean section analgesia have also been well proven by previous studies, namely consistently reducing postoperative opioid requirements, reducing postoperative nausea and vomiting, quicker return to normal body functions and ambulation. , reducing the length of stay in the hospital .[7]

This study aims to compare the analgesic drug bupivacaine 0.25% which is given by injection in the surgical wound. Previously there were several studies that compared the effectiveness of 0.25% bupivacaine with placebo and it was found that bupivacaine was more effective in reducing postoperative pain. [6] Wound infiltration with local anesthesia is a technique that has been used in various surgical procedures to control postoperative pain. This technique affects the somatic pain created by the surgical wound without producing major side effects. A meta-analysis of randomized clinical trials investigating the use of this technique during cesarean delivery demonstrated that wound infiltration with local anesthetic was associated with reduced postoperative opioid use.[5]

Local anesthetic surgical site infiltration can be practiced as a single shot infiltration either at the start or end of surgery. Catheter placement at the surgical site allows intermittent bolus administration or continuous infusion for prolonged effect. The LA continuous infusion technique at the surgical site has gained popularity due to the easy availability of multi-orifice catheters and portable elastomeric pumps. Thomas et al in their study compared the use of continuous wound infiltration of 0.25% bupivacaine in two different anatomic sites, subcutaneous and preperitoneal for postoperative analgesia. This is a prospective, double-blinded, randomized clinical trial, performed in 52 women undergoing elective lower segment caesarean section under spinal anaesthesia. The main objective was to compare postoperative morphine consumption in the first 48 hours. The secondary objective was to compare scores of pain at rest and on movement, adverse effects related to opioids, return of bowel movements and procedure-related complications such as local bleeding, wound discharge, and infection. This study concluded that there was no difference in the analgesic efficacy of continuous wound infiltration of LA based on the anatomic placement of the wound catheter (preperitoneal or subcutaneous) after cesarean section. Therefore this study is not helpful in resolving disagreements about the ideal anatomical placement of catheters in wounds. For the provision of post-cesarean analgesia, Kainu et al. found no advantage

of continuous infusion of LAs in the subfascial area, whereas according to O'Neil et al. it achieves better analgesia with lower side effects than epidural morphine. It is postulated that subfascial placement of a catheter is more efficacious because it can block visceral nociceptive input.[7]

In addition, the use of Bupivacaine 0.25% is also based on safety. Bupivacaine has a fairly high safety compared to other local anesthetic drugs. This can be seen from the low level of toxicity, as well as the ability of Bupivacaine to reduce the risk of harmful side effects for patients. [8] From this background, researchers were interested in examining the effectiveness of bupivacaine in post-cesarean section surgery at Kariadi General Hospital.

METHODS

Experimental study with a randomized control trial (RCT) design to determine the effectiveness of bupivacaine infiltration in the ERACS procedure. The sample is divided into two groups, namely K1 (group 1) and K2 (group 2)

P1 : Spinal bupivacaine 7.5 mg + fentanyl 25 mcg + intrathecal morphine 50 mcg + postoperative bupivacaine infiltration

P2: Spinal bupivacaine 7.5 mg + fentanyl 25 mcg + intrathecal morphine 50 mcg without postoperative bupivacaine infiltration

The reachable population is patients who undergo cesarean section surgery who undergo treatment at Dr. Kariadi Semarang who met the inclusion and exclusion criteria.

Inclusion Criteria

- Patients aged between 18- 35 years
- Gestational age 37 – 39 weeks
- Patients not morbidly obese (BMI 20 – 30 kg/m2)
- Undergoing elective caesarean section at dr. Kariadi Semarang with the ERACS procedure
- Physical statics ASA I-II
- Do not have psychiatric disorders
- No history of uncontrolled hypertension, diabetes, coagulation factor disorders, heart disease, respiration, liver, gastrointestinal or kidney disease.
- No previous history of drug abuse or chronic use of opioids
- Able to use NRS tools
- Willing to participate in research and sign informed consent

Exclusion Criteria

- Allergy to Bupivacaine and fentanyl
- Patients with Thrombocytopenia (platelets <100,000)
- Patients with Coagulation disorders
- Have a local infection in the blockade area
- Have a history of regular or long term use of analgesics

Sampling Method

- The selection of research subjects will be carried out on a non-probability basis with consecutive sampling according to the inclusion and exclusion criteria.

Procedure

- Patients who will undergo cesarean section are taken as research subjects.
- All subjects underwent anamnesis and examination to obtain research subjects who met the inclusion and exclusion criteria.
- History of the patient's previous medication and history of the patient's illness is asked and recorded.

- Subjects were selected based on the inclusion and exclusion criteria of the study. Subjects who were willing to participate in this study were asked to sign the informed consent form..
- • Prior to the operation, the research subjects were randomly divided into two groups. The first group was given bupivacaine 0.25% 20 cc infiltration using the wound infiltration method in the subcutis and the second group was not given bupivacaine 0.25% 20 cc infiltration
- At the end of the operation, the anesthetist will insert a 22 gauge infiltration and 1.5 inch needle. The needle is inserted 2 cm above the incision about 0.1-1 cm into the tissue. Then the local anesthetic is injected slowly while withdrawing the needle. This is used to prevent vascular injury. The volume of local anesthetic depends on the size of the incision. Infiltration can be given 1-1.5 ml for every 1-2 cm incision wound.
- Post-surgery patients are monitored in the recovery room.
- Monitors, PCA morphine and Stopwatch are installed on all patients in the recovery room
- PCA pump filled with morphine 1 mg/mL with Lockout period of 5 minutes without dosing continuous basal infusion
- The total administration of morphine is adjusted so as to provide a dose of 6 mg/hour
- The patient was previously equipped with knowledge about the operation of the PCA device
- The time of the first PCA request for morphine and the total amount of morphine injected for 24 hours were recorded. The data collected were the time of the first need for morphine PCA and the assessment of total morphine need by PCA from 0-24 hours.
- Time of first need for morphine is defined as the time needed by research subjects to suppress PCA so that they receive morphine for the first time, calculated from the time PCA was inserted in the recovery room. Total morphine requirement is the total amount of morphine needed by research subjects for 24 hours to reduce post-cesarean section pain.
- Recording of the PCA for the first time was carried out by the subject, while recording the total morphine requirement in 24 hours was carried out by the researcher
- Then check the NRS value, at 4, 6, 12, 24 hours in the ward. The recording of the NRS value was carried out by the researcher.
- Assess the side effects of bupivacaine infiltration that occurs within 24 hours

If toxicity occurs from the use of the drug bupivacaine with signs and symptoms such as a sudden change in mental status, severe agitation, decreased consciousness with or without seizures, and cardiovascular collapse occurs, management is carried out by:

- Stop injection
- Maintain the airway and if necessary intubate the patient with a tracheal tube
- Give 100% oxygen, and ensure adequate ventilation
- Seizure control with benzodiazepines, thiopental or propofol in gradual dosing
- If an arrest occurs, do cardiopulmonary resuscitation

Give a 20% lipid emulsion with an initial intravenous bolus dose of 1.5 ml/kg over 1 minute, followed by a maintenance dose of 15 ml/kg/hour

Data Analysis

The data collected will be checked for correctness and completeness of the data. The data is then tabulated, coded and entered into the computer via the Microsoft Excel for Windows program. Data analysis includes descriptive analysis and hypothesis testing. In descriptive analysis, categorical data will be expressed as frequency and percentage. Data that has a continuous scale will be expressed as the mean ± standard deviation (SB) if it is normally distributed or the median (range) if it is not normally distributed. The normality test for data distribution was carried out using the Shapiro Wilk test if the sample was < 50 and the Komolgorov Smirnov test if the sample was > 50. To see the differences in the duration of analgesia, first time mobilization, and PONV in the two groups,

a survival analysis was performed followed by a Log-Rank (Mantel Cox) test. The results will be compared between the 2 groups of research subjects. The p value is considered significant if p <0.05. Data analysis was performed using the computer program SPSS version 25 for Windows (IBM SPSS Inc, USA)

Research ethics

The research has obtained permission from the Health Research Ethics Commission (KEPK) RSUP Dr. Kariadi/FK Undip with EC number No. 1448/EC/KEPK-RSDK/2023

HASIL

5.1 Characteristics of the Research Sample

In this study, 36 patients underwent cesarean section with the ERACS procedure using spinal anesthesia. Of the 36 patients, randomization was carried out so that 18 patients received postoperative bupivacaine infiltration as the intervention group and 18 patients without postoperative bupivacaine infiltration as the control group. After the operation, NRS measurements were taken in stages at 4, 6, 12 and 24 hours postoperatively both while moving and resting

Table 3. Table descriptive data

Variable	Freq .	%	Mean ± SD	Median (min – max)
Group				
Treatment	18	50.0		
Control	18	50.0		
ASA				
I	16	44,4		
II	20	55,6		
Age			29.61 ± 2.10	30 (26 – 33)
Length of pregnancy			38.22 ± 0.42	38 (38 – 39)
BMI			27.69 ± 0.62	27.75 (26.4 – 28.9)
Clock pressing PCA button Ix			13.48 ± 5.39	11 (6 – 21)
Total 24- hour dose (mg)			2.45 ± 0.79	2 (1 – 4)
Symptom nausea and vomiting				
There is	12	33,3		
No	24	66,7		
Move				
4 hours			1.81 ± 0.40	2 (1 – 2)
6 hours			3.78 ± 1.33	4 (2 – 6)
12 hours			2.61 ± 0.69	3 (1 – 4)
24 hours			1.78 ± 0.68	2 (1 – 2)
Rest				
4 hours			1.72 ± 0.45	2 (1 – 2)
6 hours			3.03 ± 1.03	3 (2 – 5)
12 hours			2.14 ± 0.42	2 (1 – 3)
24 hours			1.78 ± 0.68	2 (1 – 3)

Table 4. Demographic characteristics of the data study

Variable	Group		p.s
	Treatment	Control	
ASA			
I	8 (44.4%)	8 (44.4%)	1,000 ¥
II	10 (55.6%)	10 (55.6%)	
Age	29.56 ± 2.09	29.67 ± 2.17	0.877 §
Length of pregnancy	38.28 ± 0.46	38.17 ± 0.38	0.429 ‡
BMI	27.69 ± 0.66	27.69 ± 0.60	0.994 §
Clock pressing first time PCA button	19.07 ± 1.28	8.83 ± 1.69	<0.001 § *
Total 24- hour dose (mg)	2.07 ± 0.46	2.78 ± 0.88	0.013 ‡ *
Symptom nausea and vomiting			
There is	3 (16.7%)	9 (50%)	0.077 ¥
No	15 (83.3%)	9 (50%)	

Description : * Significant ; ¥ Chi-square; § Independent t; ‡ Mann Whitney

Tables 5 and 6 present the characteristics of the research subject's numerical data in the form of age, gestational age, body mass index, and physical status of each subject group. The bupivacaine infiltration group had a slightly younger mean age of 29.56 ± 2.093 than the group without bupivacaine infiltration (27.33 ± 5.84). For gestational age, body mass index and physical status (ASA) in the bupivacaine infiltration group, the mean was not much different from the group without bupivacaine infiltration

From the normality test, it was found that only the age and body mass index variables had a normal distribution ($p > 0.05$), while the gestational age variable had an abnormal distribution.

Table 6 presents the physical status (ASA) of the bupivacaine infiltration group having 8 samples (44.4%) who have ASA I status, the same is the case with the group without bupivacaine infiltration having 8 samples (44.4%). The bupivacaine infiltration group had 10 samples (55.6%) who had ASA II status, similarly the group without bupivacaine infiltration had 10 samples (55.6%)

Table 5. Descriptive and normality of Mobile data

Move	Group	Mean ± SD	Median (min – max)	p.s
4 hours	Treatment	1.72 ± 0.46	2 (1 – 2)	0.000
	Control	1.89 ± 0.32	2 (1 – 2)	0.000
6 hours	Treatment	2.78 ± 0.88	2.5 (2 – 4)	0.000
	Control	4.78 ± 0.88	4.5 (4 – 6)	0.000
12 hours	Treatment	2.11 ± 0.47	2 (1 – 3)	0.000
	Control	3.11 ± 0.47	3 (2 – 4)	0.000
24 hours	Treatment	1.28 ± 0.46	1 (1 – 2)	0.000
	Control	2.28 ± 0.46	2 (2 – 3)	0.000

From the results of the normality test using the Shapiro-Wilk test, it was found that the data were not normally distributed.

Table 6. difference ' Moving ' based group treatment and control

Move	Group		p.s
	Treatment	Control	
4 hours	1.72 ± 0.46	1.89 ± 0.32	0.406 ‡
6 hours	2.78 ± 0.88	4.78 ± 0.88	<0.001 ‡ *
12 hours	2.11 ± 0.47	3.11 ± 0.47	<0.001 ‡ *
24 hours	1.28 ± 0.46	2.28 ± 0.46	<0.001 ‡ *
p.s	<0.001 § *	<0.001 § *	

Description : * Significant ; ‡ Mann Whitney; § Friedman

From the results of the unpaired different test between the treatment and control groups using the Mann Whitney test, it was found that at 4 hours there was no significant difference, at 6 hours, 12 hours and 24 hours there were significant differences. From the results of the paired difference test using the Friedman test between 4 hours, 6 hours, 12 hours and 24 hours, it was found that there was a significant difference in the treatment group and the control group.

Table 7. Difference test results between time

Time		Group	
I	II	Treatment	Control
4 hours	6 hours	0.002*	<0.001*
	12 hours	0.038*	<0.001*
	24 hours	0.021*	0.020*
6 hours	12 hours	0.015*	<0.001*
	24 hours	<0.001*	<0.001*
12 hours	24 hours	0.001*	0.001*

Remarks : * Significant

From the results of the paired difference test using the Wilcoxon test in the treatment group between 4 hours against 6 hours, 12 hours and 24 hours there was a significant difference, between 6 hours against 12 hours and 24 hours there was a significant difference, and between 12 hours against 24 hours there was a difference meaning. In the control group between 4 hours against 6 hours, 12 hours and 24 hours there was a significant difference, between 6 hours against 12 hours and 24 hours there was a significant difference, and between 12 hours against 24 hours there was a significant difference.

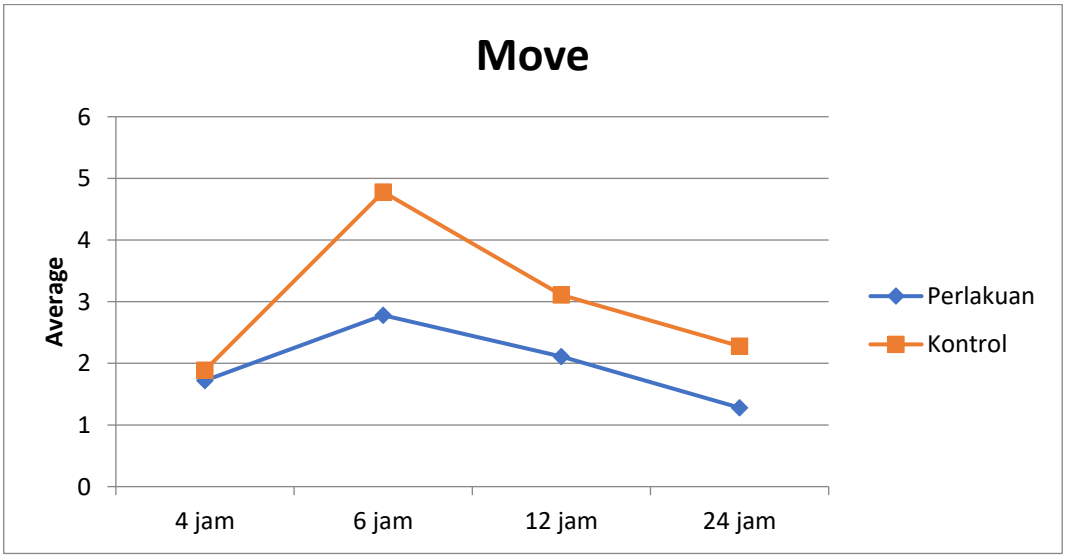

Figure 3. Current NRS graph mov

Table 8. Descriptive and normality difference ' Moving '

Difference Move	Group	Mean ± SD	Median (min – max)	p.s
4 – 6 hours	Treatment	1.06 ± 0.94	1 (0 – 3)	0.013
	Control	2.89 ± 0.90	3 (2 – 4)	0.000
4 – 12 hours	Treatment	0.39 ± 0.70	0 (0 – 2)	0.000
	Control	1.22 ± 0.55	1 (0 – 2)	0.000
4 – 24 hours	Treatment	-0.44 ± 0.71	-1 (-1 – 1)	0.000
	Control	0.39 ± 0.61	0 (0 – 2)	0.000
6 – 12 hours	Treatment	-0.67 ± 0.97	-1 (-2 – 1)	0.036
	Control	-1.67 ± 0.97	-2 (-3 – 0)	0.036
6 – 24 hours	Treatment	-1.50 ± 0.92	-1 (-3 – 0)	0.024
	Control	-2.50 ± 0.92	-2 (-4 – (-1))	0.024
12 – 24 hours	Treatment	-0.83 ± 0.71	-1 (-2 – 0)	0.002
	Control	-0.83 ± 0.71	-1 (-2 – 0)	0.002

Dari hasil uji normalitas dengan menggunakan uji Shapiro-wilk didapatkan data berdistribusi tidak normal.

Table 9. Difference ' Moving ' based group treatment and control

Difference Move	Group		p.s
	Treatment	Control	
4 – 6 hours	1.06 ± 0.94	2.89 ± 0.90	<0.001 ‡ *
4 – 12 hours	0.39 ± 0.70	1.22 ± 0.55	<0.001 ‡ *
4 – 24 hours	-0.44 ± 0.71	0.39 ± 0.61	0.001 ‡ *
6 – 12 hours	-0.67 ± 0.97	-1.67 ± 0.97	0.007 ‡ *
6 – 24 hours	-1.50 ± 0.92	-2.50 ± 0.92	0.004 ‡ *
12 – 24 hours	-0.83 ± 0.71	-0.83 ± 0.71	1,000 ‡

Description : * Significant ; ‡ Mann Whitney

From the results of the unpaired difference test between the treatment and control groups using the Mann Whitney test, it was found that there was a significant difference in moving 4-6 hours, in moving 4-12 hours there was a significant difference, in moving 4-24 hours there was a significant difference, on the difference between 6 – 12 hours there is a significant difference, on the difference between 6 – 24 hours there is a significant difference, and on the difference between 12 – 24 hours there is no significant difference.

Table 10. Descriptive and normality of Rest data

Rest	Group	Mean ± SD	Median (min – max)	p.s
4 hours	Treatment	1.56 ± 0.51	2 (1 – 2)	0.000
	Control	1.89 ± 0.32	2 (1 – 2)	0.000
6 hours	Treatment	2.28 ± 0.46	2 (2 – 3)	0.000
	Control	3.78 ± 0.88	3.5 (3 – 5)	0.000
12 hours	Treatment	2.17 ± 0.38	2 (2 – 3)	0.000
	Control	2.11 ± 0.47	2 (1 – 3)	0.000
24 hours	Treatment	1.28 ± 0.46	1 (1 – 2)	0.000
	Control	2.28 ± 0.46	2 (2 – 3)	0.000

From the normality test results with using the Shapiro-Wilk test, the data is distributed abnormal .

Table 11. Difference ' Break ' based group treatment And control

Rest	Group		p.s
	Treatment	Control	
4 hours	1.56 ± 0.51	1.89 ± 0.32	0.028 ‡ *
6 hours	2.28 ± 0.46	3.78 ± 0.88	<0.001 ‡ *
12 hours	2.17 ± 0.38	2.11 ± 0.47	0.730 ‡
24 hours	1.28 ± 0.46	2.28 ± 0.46	<0.001 ‡ *
p.s	<0.001 § *	<0.001 § *	

Description : * Significant ; ‡ Mann Whitney; § Friedman

From the results of the unpaired different test between the treatment and control groups using the Mann Whitney test, it was found that at 4 hours there was a significant difference, at 6 hours there was a significant difference, at 12 hours there was no significant difference and at 24 hours there was a significant difference. From the results of the paired difference test using the Friedman test between 4 hours, 6 hours, 12 hours and 24 hours, it was found that in the treatment group and the control group there was a significant difference.

Table 12. Difference test results between time

Time		Group	
I	II	Treatment	Control
4 hours	6 hours	0.001*	<0.001*
	12 hours	0.002*	0.102
	24 hours	0.096	0.020*
6 hours	12 hours	0.414	<0.001*
	24 hours	0.001*	<0.001*
12 hours	24 hours	0.001*	0.317

Remarks : * Significant

From the results of the paired difference test using the Wilcoxon test in the treatment group between 4 hours against 6 hours and 12 hours there was a significant difference, between 6 hours against 24 hours there was a significant difference, and between 12 hours against 24 hours there was a significant difference. In the control group between 4 hours against 6 hours and 24 hours there was a significant difference, and between 6 hours against 12 hours and 24 hours there was a significant difference.

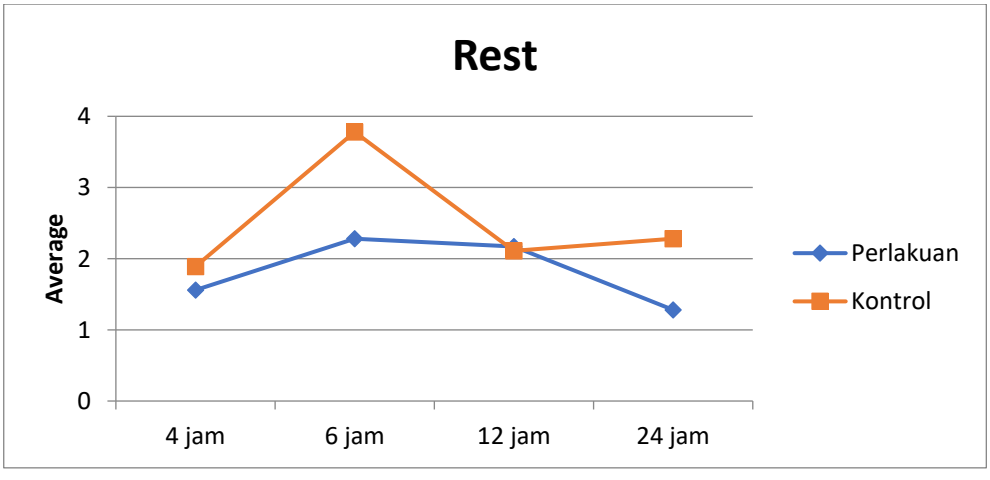

Figure 4. NPRS graph at rest

Table 13. Descriptive and normality difference ' Break '

Difference Rest	Group	Mean ± SD	Median (min – max)	p.s
4 – 6 hours	Treatment	0.72 ± 0.58	1 (0 – 2)	0.000
	Control	1.89 ± 0.90	2 (1 – 3)	0.000
4 – 12 hours	Treatment	0.61 ± 0.61	1 (0 – 2)	0.000
	Control	0.22 ± 0.55	0 (-1 – 1)	0.000
4 – 24 hours	Treatment	-0.28 ± 0.67	0 (-1 – 1)	0.001
	Control	0.39 ± 0.61	0 (0 – 2)	0.000
6 – 12 hours	Treatment	-0.11 ± 0.58	0 (-1 – 1)	0.000
	Control	-1.67 ± 0.97	-2 (-3 – 0)	0.036
6 – 24 hours	Treatment	-1.00 ± 0.69	-1 (-2 – 0)	0.002
	Control	-1.50 ± 0.92	-1 (-3 – 0)	0.024
12 – 24 hours	Treatment	-0.89 ± 0.68	-1 (-2 – 0)	0.002
	Control	0.17 ± 0.71	0 (-1 – 1)	0.002

From the results of the normality test using the Shapiro-Wilk test, it was found that the data were not normally distributed.

Table 14. Difference ' Break ' based group treatment And control

Difference Rest	Group		p.s
	Treatment	Control	
4 – 6 hours	0.72 ± 0.58	1.89 ± 0.90	<0.001 ‡ *
4 – 12 hours	0.61 ± 0.61	0.22 ± 0.55	0.053 ‡
4 – 24 hours	-0.28 ± 0.67	0.39 ± 0.61	0.005 ‡ *
6 – 12 hours	-0.11 ± 0.58	-1.67 ± 0.97	<0.001 ‡ *
6 – 24 hours	-1.00 ± 0.69	-1.50 ± 0.92	0.100 ‡
12 – 24 hours	-0.89 ± 0.68	0.17 ± 0.71	<0.001 ‡ *

Description : * Significant ; ‡ Mann Whitney

From the results of the unpaired different test between the treatment and control groups using the Mann Whitney test, it was found that there was a significant difference between 4-6 hours of rest, there was no significant difference at 4-12 hours of rest, there was no significant difference at 4-24 hours of rest , on the difference between 6 – 12 hours of rest there is a significant difference, on the difference of 6 – 24 hours of rest there is no significant difference, and on the difference of 12 – 24 hours of rest there is a significant differences.

5.2 Secondary Research Output

Table 15. PONV comparison between groups K1 and K2

PONV	Infiltration Bupivacaine	Without Infiltration Bupivacaine	p.s	IK95% OR (Min – Max)
Yes	3 (33.3%)	9 (66.7%)	0.034 C	5 (1.07 – 23.47)
No	15 (62.5%)	9 (37.5%)		

Chi- Square Test * p<0.05

In the incidence of PONV, there was a significant difference between bupivacaine infiltration and without bupivacaine infiltration ($p < 0.05$). A total of 3 patients from the bupivacaine infiltration group and 9 patients from without bupivacaine infiltration experienced postoperative symptoms. Based on the Chi-square test, there was a significant difference between the two groups.

DISCUSSION

Cesarean delivery is often performed in high-risk pregnancies to reduce the morbidity and mortality of high-risk mothers and newborns. However, the procedure is invasive and is often associated with severe postoperative incision pain, which can impact maternal endocrinology and postoperative recovery. Postoperative pain is caused by a surgical wound, so inhibiting pain signals at the surgical site will help reduce pain severity. Infiltration of local anesthetic into the subcutaneous tissue inhibits pain transmission by binding to fast sodium channels in the axons of nociceptive afferent neurons, preventing propagation of action potentials across them. By reducing the local inflammatory response to injury, local anesthetics also prevent activation of pain fibers. Local anesthetics are a useful alternative for the treatment of pain after cesarean section as they have fewer side effects such as drowsiness, nausea and vomiting. This is because the mother is expected to feed the baby and take care of other parts of the newborn quickly after the surgery. Bupivacaine is a long-acting local anesthetic. Nerve blocks, epidural anesthesia, and caudal anesthesia all involve bupivacaine. It is used for epidural anesthesia in obstetrics because it has a more selective effect on sensory nerve fibers than motor nerve fibers.

Intrathecal morphine provides prolonged postoperative analgesia and reduces the amount of postoperative intravenous analgesics, and also significantly reduces the incidence of chronic pain and postpartum depression after cesarean delivery. Intrathecal morphine has dose-limited effects, and a safe dose is 50-200 ug.[36] Adverse effects are dose related, particularly respiratory depression, hypotension, nausea and vomiting, skin pruritus, etc. Therefore, to reduce the side effects of both intrathecal and intravenous morphine, other analgesic methods such as bupivacaine infiltration are often required. This study was designed to compare the use of bupivacaine infiltration together with intrathecal morphine with intrathecal morphine alone in post-cesarean section patients undergoing ERACS procedures.[35,36]

The results of this study indicated that the administration of postoperative bupivacaine infiltration after cesarean section that had previously been given intrathecal morphine could significantly increase the duration of postoperative analgesia seen from the first time the patient pressed PCA morphine compared to the group not given bupivacaine infiltration with a p value <0.001. The mean duration of analgesia in the intrathecal morphine group with 20.9 hours was 19.07 ± 1.28 hours, while in the intrathecal morphine group without bupivacaine infiltration it was 8.83 ± 1.69 hours with a p value <0.001.

The results of this study also showed that the use of a combination of intrathecal morphine and bupivacaine infiltration significantly reduced pain scores on movement at 6, 12, and 24 hours after surgery with a p value <0.001 at 6 hours; $p < 0.001$ at 12 hours and $p < 0.001$ at 24 hours

The addition of bupivacaine infiltration in this study also significantly reduced the total PCA morphine requirement in 24 hours with a p value <0.013. Sibilla et al noted that only 30% of women who received intrathecal morphine required additional analgesia during the first 12 hours after cesarean section, whereas 60% of women who received fentanyl and intrathecal morphine required additional analgesia at the same time interval. [37] This observation can be explained by acute spinal opioid tolerance. It has been reported that small doses of intrathecal fentanyl during cesarean section may result in increased postoperative demand for intravenous opioids. [37,38] Other mechanistic theories for this phenomenon include the widely held assumption that while the action of intrathecal fentanyl is rapid, the onset of action of morphine administered via the intrathecal route is slow. (which is debatable), so fentanyl binds to a proportion of spinal opioid receptors before morphine can reach them. By the time fentanyl is released from this receptor, the proportion of morphine molecules that could potentially bind with it have been absorbed into the systemic circulation. 38 The concentration of morphine remaining is therefore lower than if morphine was the only substance in solution from the start.[38]

The phenomenon of increased opioid demand after intrathecal fentanyl is seen also in the effective analgesic duration, which decreases from about 12 to 8 hours when opioids are combined. Although this difference was not significant, the trend was clear and the results approached statistical significance (P=0.07).[38] Equally short (4–14 hours) effective analgesic duration when using fentanyl and morphine in combination has been observed in other studies.[40] In contrast, average duration of effective analgesics was 18 to 22 hours in studies when 100 μg morphine was used alone.[39]

This theory can explain why in the results of this study the bupivacaine infiltrated group had lower total morphine than the group without bupivacaine infiltration even though both groups used intrathecal morphine with an analgesic duration of up to 24 hours.

There was a significant difference in the incidence of PONV in the group with bupivacaine infiltration and without bupivacaine infiltration ($p < 0.05$). A total of 3 patients from the group with bupivacaine infiltration and 9 patients in the group without bupivacaine infiltration experienced symptoms of postoperative nausea. Based on the Chi-square test, there was a significant difference between the two groups. Intrathecal and intravenous morphine has advantages but also has disadvantages such as postoperative nausea and vomiting (PONV) is one of the complications. The mechanism of intrathecal opioid-induced PONV is thought to involve cephalad migration of opioids in the cerebrospinal fluid to opioid receptors in the area postrema. The likelihood of PONV after intrathecal administration of fentanyl or morphine alone for obstetric purposes has been reported to be relatively low in previous studies, and is consistent with our findings.

Qualitative analysis of subgroup trials demonstrated that all trials assessing the incidence of PONV reported a reduced incidence in patients receiving bupivacaine infiltration. This might be because the group with bupivacaine infiltration consumed lower intravenous PCA morphine than the group without bupivacaine infiltration.

CONCLUSION

Based on this research it can be concluded that:

a. First Time PCA in the bupivacaine infiltration group had a longer duration than without bupivacaine infiltration
b. The total need for morphine in 24 hours in the bupivacaine infiltration group was lower than the group without bupivacaine infiltration
c. The NRS score moved at 4, 6, 12 and 24 hours postoperatively in the bupivacaine infiltration group which was lower than the group without bupivacaine infiltration
d. The difference in the moving NRS score at 12 - 24 hours was not significantly different, but at 4 - 12 hours, 4 - 24 hours, 6 - 12 hours, 6 - 24 hours postoperatively in the bupivacaine infiltration group was significantly different compared to the group without bupivacaine infiltration
e. NRS resting scores at 4, 6, 12 and 24 hours postoperatively in the bupivacaine infiltration group were lower than the group without bupivacaine infiltration
f. The difference in resting NRS scores at 4-12 hours and 6-24 hours was not significantly different, but at 4-6 hours, 4-24 hours, 6-12 hours and 12-24 hours postoperatively in the bupivacaine infiltration group was significantly different compared to the group without bupivacaine infiltration
g. The side effects of nausea and vomiting in the bupivacaine infiltration group were minimal compared to the group without bupivacaine infiltration

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INTUBATION MANAGEMENT IN ANKYLOSING SPONDYLITIS PATIENTS AND ADENOMATOUS GOITTER DEXTRA

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ABSTRACT

Introduction: Difficulty securing the airway is a common problem found by anesthesiologists. The anesthesiologist must be able to perform a difficult airway assessment before the anesthesia procedure and prepare measures to achieve successful endotracheal intubation with existing tools. The main outcomes related to airway difficulties include death, brain damage, pulmonary cardiac arrest, unnecessary tracheostomy, airway trauma, and tooth decay. The study conducted is a case report.

Case Illustration: The patient is a 64-year-old male who comes complaints of a lump in the neck since 5 years ago, the lump has been getting bigger since 2 years until now. History of neck stiffness since 6 years and sleep is always propped up by 2 pillows. Patients have problems in airway management, namely not being able to do neck extension and difficulty in intubation. We do induction using spontaneous intubasion using C-MAC video laryngoscope. Preoperative, intraoperative, and postoperative management makes the success of airway handling and surgery better. One of the ways of intubation that can be used when there is difficulty securing the airway is spontaneous intubation using C-MAC video laryngoscope because it is beneficial and safe.

Conclusion: C-MAC video laryongoscope can be used for handling in patients with difficult airway, such as patients with ankylosing spondylitis or bamboo spine.

Keywords: Airway management, ankylosing spondylitis, bamboo spine, C-MAC

INTRODUCTION

Airway management is one of the most important aspects of anesthesiology, whereas difficult airway assessment prior to anesthesia action contributes to successful airway management and reduces airway-related morbidity. A difficult airway is a clinical situation of anticipated or unanticipated difficulty or failure experienced by a physician trained in anesthetia care.[1] Difficult airways occur in 1 case in 1 to 2000 cases in elective surgery and 1 case in 50 to 100 cases in the emergency department, intensive care unit (ICU), and pre-hospital settings.[1,2] This can be predicted if there is difficult bag-mask ventilation, difficult laryngoscopy and intubation, difficult extraglottic devices, and difficult cricothyrotomy.[1] Difficult bag-mask ventilation consists of Mask seal (M), Obesity / Obstruction (O), Age (A), No teeth (N), and Sleep apnea/Stiff lungs (S). Difficult laryngoscopy and intubation consists of Look externally (L), Evaluate (E), Mallampati score (M), Obstruction/Obesity (O), and Neck mobility (N). Difficult extraglottic devices consist of Restricted mouth opening (R), Obstruction (O), Disturbed or distorted airway (D), and Stiff lung or cervical spine (S). Difficult cricothyrotomy consists of Surgery or other airway obstruction (S), Hematoma (includes infection/abscess) (H), Obesity (O), Radiation distortion (and other deformity) (R), and Tumor (T). This difficult airway condition can be treated with an awake or post-induction airway strategy. Almost all areas/hospitals with anesthesia practice can provide difficult airway management equipment such as gum elastic bougie, supraglottic airway, cricothyrotomy set, fiberoptic/fiberscope device, and video laryngoscope to assist in treating patients with difficult airways either anticipated or unanticipated. One of the causes of difficult airway is a patient with ankylosing spondylitis.[3]

Ankylosing spondylitis, also known as bamboo spine, is an inflammation that can cause several vertebrae to fuse over time.[3] This fusion makes the spine less flexible and can result in a stooped posture or unable to extend and difficult to intubate, so diffuclt airway management is required. Difficult airway management refers to the practice of ensuring and securing a patent airway and is a cornerstone of anesthetic practice. Difficult airway

management can be done in 3 parts, the first part is the pre-airways management decision making tool (planning), the results of the first part will be directed to the second and third parts.[1] The second part is awake airway management, this technique includes inserting tracheal tubes in patients who are awake and breathing spontaneously, most often with flexible bronchoscopy or videolaryngoscopy, while the third part is difficult airway management with anesthetia induction.

The incidence of difficult laryngoscopy or intubation varies depending on visualization of the larynx. Visualization of grades 2 or 3 requiring repeated attempts or a different blade (and including external laryngeal pressure), is quite common and occurs in 1% to 18% of cases. Grade 3 visualization that continues until successful intubation is said to be found in 1% to 4% of cases. When finding a patient with difficulty in intubating, a supporting tool is needed to visualize the larynx for facilitate intubation. In patients with ankylosing spondylitis, C-MAC is needed to facilitate intubation. C-MAC is a videolaryngoscope using a modified Macintosh blade, making it a useful alternative for both routine and difficult airway management and for educational purposes.[4] Therefore, we report a case of a patient who has difficulty breathing due to neck mobility, so C-MAC videolaroscope is needed for intubation.

CASE ILLUSTRATION

The patient complained a lump in the neck since 5 years before admitted to hospital, the lump has been getting bigger since 2 years before admitted to hospital until now. Complaints are accompanied by painful swallowing and sometimes shortness of breath after physical activity. The patient has complaints the upper spine to the neck feels stiff since 6 years before admitted to hospital.The patient has a history of working as a porter at a rice sales place and denies history of trauma. Because of this complaint, he needs 2-3 pillows to fall asleep. History of previous surgery, no allergies to drugs and food, no history of high blood pressure and diabetes.

General condition looks mildly ill, body weight 50 kg, awareness GCS E4M6V5, pulse 72x/minute, respiration 20x/minute, body temperature 36.4ºC, 99% oxygen saturation with free air, limited neck mobility cannot be extended, symmetrical lung shape and motion, regular pure heart sound, warm axillary extremities. Assessment of the LEMON airway with limited neck movement and malampati 2 (Figure 1).

Figure 1. Clinical photo of the patient

Anesthesia was performed by spraying 10% lidocaine spray on the base of the tongue. Preoxygenation with 100% oxygen. Administered Propofol 50 mg intermittently, and when the patient was asleep, a C-MAC video laryngoscope was inserted to see the patient's epiglottis, when the epiglottis was visible and could be intubated, preoxygenated again and given fentanyl 100 mg and propofol 100 mg after that a 7.5 size ETT was inserted using

C-MAC video laryngoscope (Figure 2). After it was confirmed that the ETT was in, 25 mg of atracurium was given with maintenance anesthesia using 2-3 vol% sevoflurance. During the operation, hemodynamic stability was obtained with systolic blood pressure of 110-122 mmHg and diastolic blood pressure of 62-78 mmHg, pulse rate ranging from 72-88 beats per minute. Oxygen saturation 98-99%, urine output 50-50cc per hour. Bleeding was 200cc. Maintenance fluid with crystalloid 500cc/2 hours. Operation was sucessfully done in 2 hours then patient was admitted for hemodynamic monitoring for 2 hours in the recovery room. After that the patient transferred to the postoperative treatment room.

Figure 2. Intubation with C-MAC **video laryngoscope**

DISCUSSION

The problem in this patient is difficulty in managing the airway, namely not being able to extend the neck (neck mobility problem) and Malampati 2, so difficult in intubating. Some forms of difficult airway management according to the degree of Cormack and Lehane. Difficult laryngoscopy can be defined as grade 3 or 4 visualization on laryngoscopy. Several maneuvers can help improve visualization of the larynx via laryngoscopy, but poor visualization can contribute to greater difficulty in achieving successful tracheal intubation.[5]

In poor visualization condition, increasing the anterior thrust of the laryngoscope blade, improving the optimal sniffing position, repeated attempts, external manipulation of the larynx, or even trying another tool or another operator is sometimes necessary to achieve intubation.[5,6] Sometimes poor visualization of the larynx can improve with more experienced or skilled operator and also with the use of a different blade. Sometimes grade 3 or 4 visualization can be resolved with “blind” intubation, but more often this visualization results in unsuccessful intubation. Therefore, early assessment of difficult airway management and the availability of skilled assistance personnel and more sophisticated equipment are important components in difficult airway management. The patient in this case underwent a LEMON airway assessment with limited neck movement and Malampati 2. This limited neck movement was an indication for a video laryngoscope to make intubation easier. This is consistent with the difficult airway management algorithm (Figure 3), which describes management selection based on predictors.

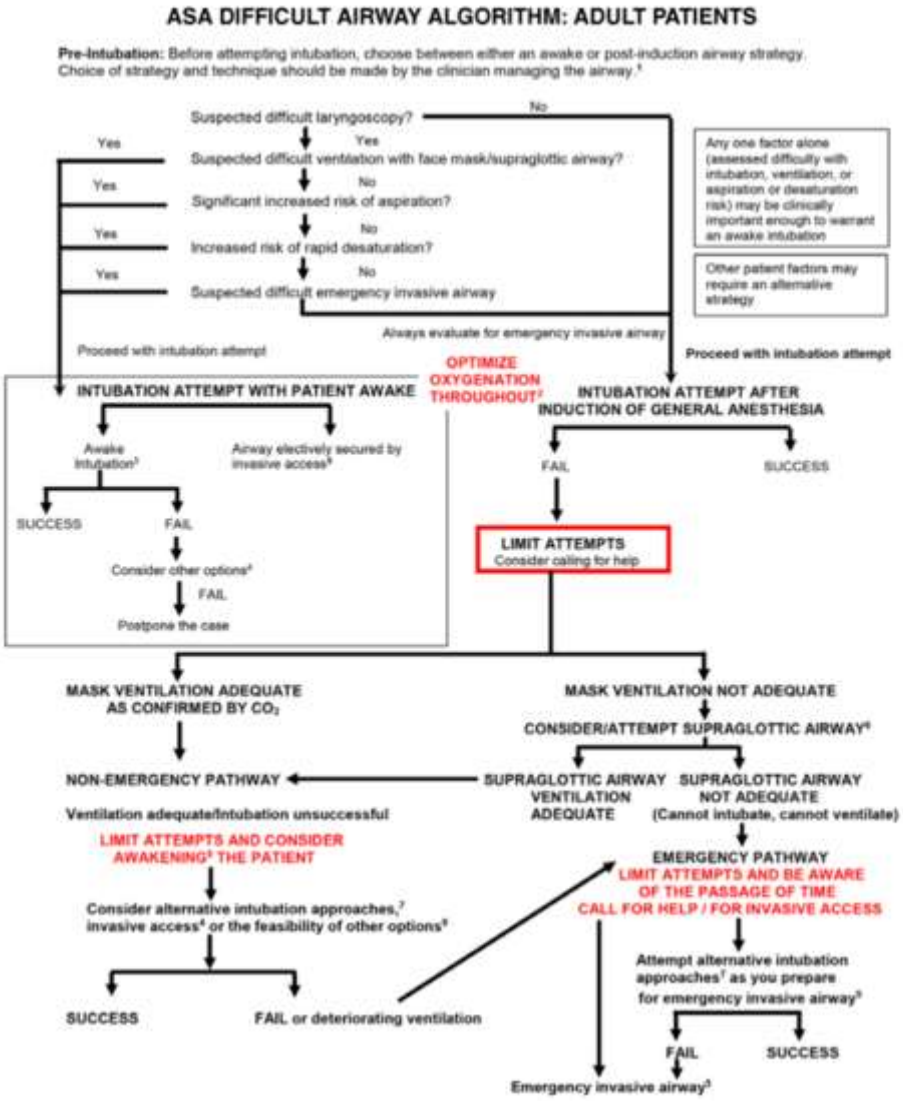

Figure 3. ASA *Diffcult Airways* Algoritm

The components of intubation equipment and best laryngoscopy performance are needed, that consist of optimal sniffing position, good muscle relaxation, good anterior traction of the laryngoscope, and, if necessary, external manipulation of the larynx (Table 1).[6] In doubtful cases, the anesthesiologist, while performing laryngoscopy with the left hand, quickly applies external pressure on the hyoid, thyroid, and cricoid cartilages with the right hand. The pressure point that determines the best laryngeal visualization can be determined in a matter of seconds and the pressure point can be forwarded by the assistant.[7] The occurrence of desaturation at the time of induction is very likely to occur. Then 100% preoxygenation can be given using a face mask for 3-5 minutes.

Table 1. Intubation equipment

Monitoring	Electrocardiography, noninvasive blood pressure, peripheral oxygen saturation, and capnography
Airway equipment	Video laryngoscope, laryngeal Mask Airway, apparatus for performing emergency access in front of the neck
Intubation equipment	Endotracheal Tube, bougie
Oxygen equipment	Bagging, facemasks, and nonrebreathing masks

Drugs	Lidocaine nebulization 1-2%, lidocaine spray 10%, drugs to facilitate induction of anesthesia and muscle relaxation, drugs to manage the systemic toxicity of local anesthetics (Intra-Lipid and adrenaline), and antagonist drugs relevant to sedation agents (e.g.: naloxone and flumazenil)
Suction	Two suction devices should be available if the airway is dirty with vomit, blood, or pus

Spontaneous intubation is a method of intubation using sedation and analgesic agents without using muscle relaxants.[8] The patient can breathe on his own without ventilation assistance, when we intubate and it fails, the patient can still breathe on his own without having to be helped. In this case, the use of the spontaneous intubation technique requires good preparation, starting from explaining to the patient about the steps of the intubation procedure, taking into account the patient's anxiety, discomfort, as well as the risk of aspiration and the possibility of failure that occurs if we are unable to intubate.[9] This patient was subjected to topicalization of the airway with 10% xylocaine spray. Topicalization should focus on the base of the tongue (the pressure receptors here act as the afferent component of the gag reflex), the oropharynx, hypopharynx, and laryngeal structures.

In this patient, the first thing to do was to spray 10% lidocaine spray on the base of the tongue so there was no gag reflex when inserting the C-MAC video laryngoscope, after that, 100% oxygen was pre-oxygenated for 3 minutes with a face mask, then given propofol sedation with a dose of 1 mg/kg is given intermittently until the patient falls asleep. After the patient is asleep and it is confirmed that there is no gag reflex, coughing, and agitation, a C-MAC video laryngoscope was inserted in size 4 to see the epiglottis and it can be seen that the vocal cords can open clearly, then the laryngoscope is pulled back and pre-oxygenated for 3 minutes, given fentanyl with dose of 2 mcg/kgbb and a size 7.5 ETT was inserted, after the ETT was confirmed and the breath sounds were the same on the right and left, the muscle relaxant atracurium

CONCLUSION

Handling the airway in patients who have a difficult airway, such as patients with ankylosing spondylitis or bamboo spine, is to find out whether the patient can be intubated or not by trying to see the airway area by giving sedation first and looking at the epiglottis using a C-MAC video laryngoscope without giving muscle relaxants. If we know that the patient cannot be intubated using a video laryngoscope, we can use other methods or tools such as retrograde intubation and fiber optics. Spontaneous respiratory intubation is a profitable and safe option for securing a difficult airway.

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"CAN HIGH FLOW NASAL CANNULA PREVENT INTUBATION IN STATUS ASTHMATICUS?" : A CASE REPORT

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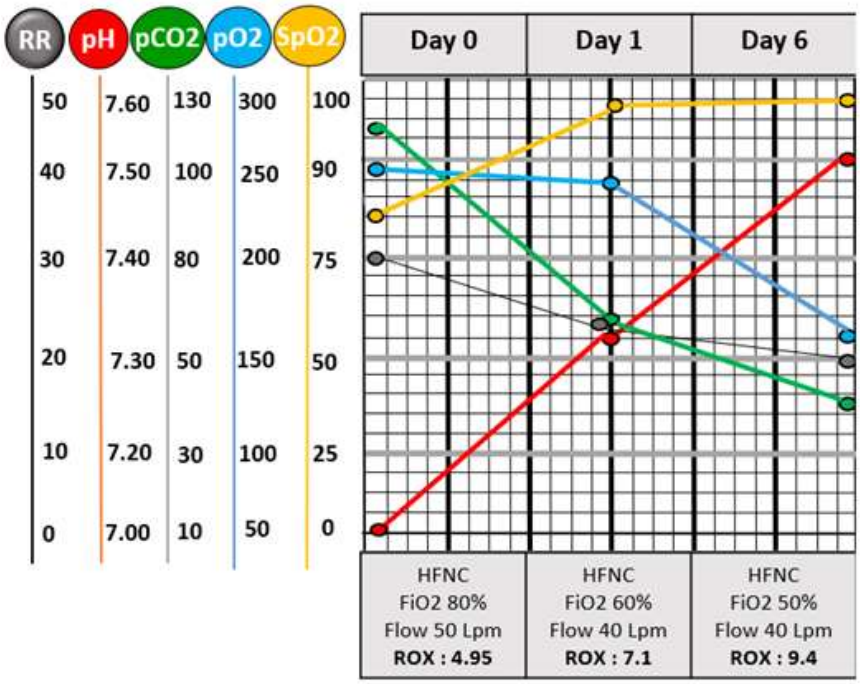
Objective : to discuss about the role of high flow nasal cannula (HFNC) in management of severe attack status asthmaticus

Case Report

A 29-year-old male presented to the emergency room with severe dyspnea. He had a history of uncontrolled asthma since childhood. Physical examination revealed a Glasgow Coma Scale score of 14, respiratory rate of 30 breaths per minute, peripheral oxygen saturation of 88% on room air, tachycardia at 112 beats per minute, normal blood pressure, and expiratory wheezing in both lungs. Early blood gas analysis showed severe respiratory acidosis (pH 7.00, pCO2 124 mmHg, pO2 249 mmHg).

Treatment in the emergency room involved HFNC (High Flow Nasal Cannula) oxygenation, salbutamol + ipratropium bromide nebulization, intravenous drip of aminophylline, and intravenous dexamethasone. The patient's peripheral saturation reached 99% with a flow rate of 50 liters per minute and FiO2 of 80%. Respiratory rates and wheezing improved after several hours, and subsequent blood gas analysis showed an improvement in acidosis (pH 7.32 | pCO2 61 mmHg | pO2 240 mmHg).

The next blood gas analysis on day 6 showed improvement (pH 7.48 | pCO2 33 mmHg | pO2 157 mmHg). The patient remained stable during monitoring in the intensive care unit for six days, the ROX index improves, and HFNC could be weaned. Subsequently, the patient was safely moved to the general ward.



Picture 1. Graphic of patient's laboratory progress

DISCUSSION

High flow nasal cannula (HFNC) is a therapeutic technique that delivers heated and humidified gas at a rate greater than the patient's inspiratory flow. The HFNC device operates by delivering high fractions of oxygen, offering various advantages, including nasopharyngeal dead space clearance, increased expiratory volume and functional residual capacity, provision of appropriately humidified air to the respiratory tract, and reduced inspiratory resistance. The mechanisms through which HFNC enhances ventilation efficiency encompass:[1]

- Reducing respiratory effort by minimizing inspiratory airway resistance and nasopharyngeal resistance.
- Decreasing energy expenditure as HFNC adequately humidifies, thus diminishing water loss on the respiratory mucosa and metabolic work.
- Enhancing lung compliance and mucociliary function by providing warm and moist air.
- Clearing the nasopharyngeal dead space to augment alveolar ventilation.
- Generating distending pressure, as HFNC generates positive pressure.

This method has several beneficial mechanisms for patients with status asthmaticus. First, it reduces anatomical dead space by flushing the nasopharyngeal cavity, potentially improving CO2 clearance. Additionally, HFNC provides a certain level of positive end-expiratory pressure (PEEP), which can range from 2 to 7 cm H2O depending on the flow rate used, to gain the maximum benefit of PEEP from high-flow nasal cannula therapy. The approximate magnitude of PEEP generated with a closed mouth is about 1 cm of water pressure for 10 liters flow. This external PEEP may reduce airway resistance and work of breathing. HFNC may help reduce the metabolic cost of breathing by supplying adequately warmed and humidified gas. It can effectively reduce dynamic hyperinflation in patients with obstructive lung disease, thus breaking the vicious circle associated with asthma exacerbation.[2,3]

A method for evaluating high flow nasal canula is ROX index. The ROX index is the ratio of SpO2/FIO2 to respiratory rate is used to predict outcome of Nasal High Flow Cannula therapy (HFNC). ROX score greater than or equal to 4.88 measured at 12 hours predicts lower risk of progressing to mechanical ventilation. The cut-off score to predict the failure of HFNC are ROX < 2.85 at 2 hours, < 3.47 at 6 hours, < 3.85 at 12 hours.[4]

The study reviews the use of HFNC for status asthmaticus, mostly applied to pediatric patients. The study by Baudin et al. (2017) stated that Nasal High Flow (NHF) therapy has been shown to be effective in managing children with status asthmaticus, as evidenced by a retrospective observational study conducted in a pediatric intensive care unit (PICU). It found that NHF therapy improved physiological parameters within the first 24 hours of treatment and significantly improved clinical parameters and blood gas levels. Only a small percentage of patients required alternative respiratory support, suggesting that NHF may be a feasible and safe option for managing severe asthma exacerbations and potentially preventing the need for intubation.[5]

The study by Pilar et al. (2017) reviews the comparison between HFNC and Non-invasive positive pressure ventilation (NIPPV) in asthma exacerbation management. They performed a retrospective analysis enrolling 42 children with severe acute asthma exacerbations admitted to the PICU. Twenty children received HFNC, and eight of them required NIPPV as escalated respiratory support. Twenty-two children received NIPPV without treatment failure and demonstrated significant differences compared with the HFNC group ($p < 0.001$); none of these children required intubation. They suggested that HFNC should be used cautiously as the initial noninvasive respiratory support in cases of severe acute asthma exacerbation because of the risk of delay in escalating the respiratory support.[6]

From this case, the patient's response to HFNC therapy was remarkable, with his peripheral oxygen saturation reaching a satisfactory level, and respiratory parameters significantly improving over time as shown on picture 1 above. The case report demonstrated that HFNC, when combined with standard asthma management, proved to be a promising option in the management of severe asthma exacerbations. The ability to adjust the flow rate and FiO2 of HFNC allowed for precise oxygen titration, preventing hypoxemia while avoiding the complications associated with higher oxygen concentrations.

The patient's stable condition and successful weaning from HFNC after six days of intensive care monitoring, highlight the potential of this therapy in facilitating a smoother transition from critical care to the general ward. This case report suggests that HFNC can be a valuable addition to the good option for managing severe asthma exacerbations and may play a significant role in preventing the need for more invasive respiratory support.

CONCLUSION

The use of HFNC, when combined with standard asthma management, has proved to be a promising option in the management of severe asthma exacerbations. However, it should be used cautiously as the initial noninvasive respiratory support in cases of severe acute asthma exacerbation due to the risk of delaying the escalation of respiratory support.

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Case Report

DIFFICULT AIRWAY MANAGEMENT IN AN OBESE PATIENT WITH SUBMANDIBULAR ABSCESS: UTILIZING AWAKE FIBREOPTIC INTUBATION

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ABSTRACT

Background: Difficult intubation accompanied by difficult invasive airway is challenging for an anesthesiologists in airway management. In sedated patients with obesity and mouth-opening limitations, intubation can be impossible. The risk of respiratory failure is a possibility if intubation failure occurs. The mastery of various difficult airway management techniques is essential, particularly in challenging cases. This case report aims to detail the airway management strategy employed in an obese patient with submandibular abscess.

Case Ilustration: A 21-year-old male presented himself at the emergency room with a referral letter for surgery from an oral surgeon. He experiences difficulty in opening his mouth and has hardened tongue, but there is no difficulty breathing. Upon examination, it was found that there was swelling in the cheeks and chin which felt hard and warm on touch. The patient's blood pressure was 140/90 mmHg, the pulse rate was found to be 88 beats per minute, respiratory frequency was 19 breaths per minute, temperature was measured at 38.3°C, and their saturation level was 97% with free oxygen. The patient weighed 150 kg and was 170 cm tall, resulting in a body mass index of 51.9. He was planned for odontectomy and abscess drainage with general anesthesia.

Pre-operative assessment concluded the physical status of ASA III, along with complicating factors of morbidly obese and a difficult airway. The airway is managed through awake fibreoptic intubation with a flexible fibreoptic bronchoscope, and muscle relaxants are not used to prevent hypoxia in case of intubation failure.

Conclusion: This case report outlines the successful management of an obese patient with submandibular abscess, classified as difficult for laryngoscopy, supraglottic airway device, and cricothyroidotomy, achieved through awake fibreoptic intubation.

Keywords: awake fibreoptic intubation; difficult airway; obesity; odontectomy; submandibular abscess

INTRODUCTION

An abscess refers to a sac in the tissues filled with pus caused by an infection[1]. A Submandibular abscess is defined as the formation of an abscess in a potential space in the submandibular region that is accompanied by throat pain, fever, and restricted mouth opening. Submandibular abscesses form part of deep neck abscesses. Deep neck abscesses form in the potential space between the deep neck fascia as a result of an infection spread from various sources, including the teeth, mouth, throat, paranasal sinuses, middle ear, and neck.[2]

In the submandibular space, infections usually originate from dental problems, infections in the floor of the mouth, pharynx, submandibular lymph nodes, trauma or infected areas in other deep neck spaces. The majority of submandibular abscesses, around 70% to 85%, are caused by dental infections. The remaining cases are caused by sialadenitis, lymphadenitis, oral wall laceration or mandibular fracture.

Submandibular abscess infection is capable of spreading to other deep neck spaces and potentially affecting vital neurovascular structures, such as the carotid artery, internal jugular vein and the vagus nerve (Nerve X). Infection transmission to the carotid sheath area may lead to erosion of the carotid sheath or result in thrombosis of the internal jugular vein. The infection has the potential to spread to the bones and lead to osteomyelitis of both the mandible and cervical vertebrae. The infection may result in upper airway obstruction, inflammation of the mediastinal chest cavity (mediastinitis), dehydration, and sepsis[3].

Management of abscesses may require drainage to evacuate pus and incision of the abscess.[4] Appropriate management of abscesses requires the use of antibiotics. Bacterial culture and antibiotic susceptibility tests of the abscess-causing bacteria are essential for selecting effective antibiotics for the patient.[5]

Submandibular abscess is typically not considered a serious condition. However, it may pose a life-threatening risk if complications leading to airway obstruction occur.

A difficult airway is a clinical situation in which a healthcare provider who is skilled at airway management encounters difficulty with one or more standard methods of airway management. The definition is not standardized in the literature and there are some variations between national expert guidelines. The American Society of Anesthesiologists defines a difficult airway as existing when "a conventionally trained anesthesiologist experiences difficulty with facemask ventilation of the upper airway, difficulty with tracheal intubation, or both".[6] Similarly, the Difficult Airway Society in the United Kingdom cites it as: “unsuccessful bag-valve mask (BVM) ventilation, direct laryngoscopy, SGA placement, and/or endotracheal intubation”.[7]

In emergency cases, predicting the incidence of a difficult airway is challenging, therefore, factors that may cause difficult ventilation, intubation, and cricothyrotomy should be meticulously evaluated.[8]

Although there are several approaches for airway evaluation, most predictions for a difficult airway still lack scientific validation. Nonetheless, there exist various approaches for evaluating the airway.

Screening for potentially difficult airways based on a patient’s presentation and/or anatomy can be performed using a multitude of assessments to include the LEMON acronym (Look externally - Evaluate 3 3 2 - Mallampati score – Obstruction - Neck mobility) to predict difficult direct laryngoscopy[9], MOANS acronym (Mask seal-Obstruction/Obesity – Age - No teeth - Stiffnes) to predict difficult bag valve mask ventilation[10], RODS acronym (Restricted mouth opening – Obstruction - Disrupted or Distorted airway - Stiffnes) to predict difficult supraglotic airway, and SHORT acronym (Surgery - Hematoma includes abscess or mass – Obesity - Radiation distortion and other deformity - Tumor)[10] to predict difficult cricothyroitomy.

This report describes the management of a difficult airway in an obese patient with submandibular abscess utilizing awake fiberoptic intubation.

CASE ILLUSTRATION

A 21-year-old male identified as MYM presented himself at the emergency room with a referral letter for surgery from an oral surgeon. The patient reported experiencing dental pain accompanied by a swollen cheek extending to the chin for approximately seven days. The pain was described as throbbing and accompanied by fever.

The physical examination revealed that the patient's cheek and chin were swollen, firm, and warm.

The patient experiences difficulty in opening their mouth and has hardened tongue, but there is no difficulty breathing.

The vital signs examination recorded a Glasgow Coma Score of E4V5M6, blood pressure of 140/90 mmHg, pulse rate of 88 beats per minute, respiratory frequency of 19 breaths per minute, temperature of 38.3°C, and oxygen saturation of 97% with free space air. The patient weighed 150 kg and was 170 cm tall, resulting in a body mass index of 51.9.

Fig 1. The physical examination revealed that the patient's cheek and chin were swollen, firm, and warm.
(source: author’s documentation)

Laboratory tests indicated levels of HGB at 15 g/dL, PLT at 251000/mm³, and WBC at 23220/mm³, and electrolyte levels of K^+ at 3.4 mmol/L and Na^+ at 133 mmol/L. Additionally, fasting glucose was measured at 113 mg/dL.

Soft tissue swelling was observed bilaterally in the submandibular, colli, and paravertebral regions that caused slight rightward displacement of the trachea at the level of corpus C5, accompanied by spondylosis cervicalis, paracervical muscle spasm, and

degenerative disc disease of the spine on the x-ray scans taken in AP and lateral positions.

The panoramic radiograph revealed reversible pulpitis in tooth 37, periapical abscess with gangrene in tooth 46, Class B vertical impaction of tooth 18, Class B distorted impaction of tooth 28, class II A impaction in vertical position of tooth 38 with dilaceration of mesial to distal root tip, class II A impaction in mesioangular position of tooth 48.

The patient was diagnosed with multiple impacted teeth and a submandibular abscess with obesity. The patient was scheduled to undergo odontectomy and abscess drainage.

Fig 3. Panoramic radiograph
(Source: author's documentation)

Preoperative screening examination conclude that the patient had an ASA (American Society of Anesthesiologist) III physical status by considering morbidly obese patients, and difficult airway management. The patient was planned to receive general anesthesia.

The patient was prepared for intubation based on predictors of difficult airway management. The LEMON acronym, which is used for direct laryngoscopy, predicted difficult intubation due to a large tongue, incisor distance of less than 3 finger breadths, a Mallampati score of greater than or equal to 3, and an obstructed airway caused by an abscess. The MOANS acronym, which is used for bag valve mask ventilation, predicted difficulty in obese patients. The RODS acronym, which is used for supraglottic airway, predicted difficulty in cases of restricted mouth opening and a disrupted airway. The SHORT acronym, which is used for cricothyrotomy, predicted difficulty in cases of haematoma in the anterior neck, including abscess and obesity.

Fig 2. spine x-ray in AP and lateral position
(source: author's documentation)

The airway management utilized was awake fiber-optic intubation (AFOI) via the nasal passage using nasal RAE endotracheal tube no. 7.

The standard preoperative preparation included the anaesthetic machine, standard monitors, end-tidal carbon dioxide (EtCO2) monitoring and required emergency medications.

The patient was positioned in a reverse trendelensburg posture and administered pre-medication with intranasal and oropharyngeal lidocaine 10% spray. Subsequently, translaryngeal block was carried out by injecting 80 mg lidocaine 2% through cricothyroid membrane to blunt cough reflexes.

Endotracheal intubation was carried out via the left nostril with direct visualization of the vocal cord and epiglottis using a fiberoptic bronchoscope. After visualising the vocal plate, an endotracheal tube (ETT) was inserted into the trachea until its cuff passed through the vocal plate. The ETT position must be confirmed by listening to balanced pulmonary vesicular sounds in both right and left chest fields. Once the ETT position was confirmed in the trachea above the carina, it was secured to the patient's forehead using a plaster. Subsequently, it was connected to the ventilator.

DISCUSSION

The presence of obesity with a submandibular abscess can create challenges in airway management since the patient may have difficulty opening their mouth, making direct laryngoscopy for intubation difficult. A significant submandibular abscess precludes the performance of cricothyroidotomy or tracheostomy procedures.

Airway management of an anticipated difficult airway consists of interventions addressing awake tracheal intubation, anesthetized tracheal intubation, or both awake and anesthetized intubation[11].

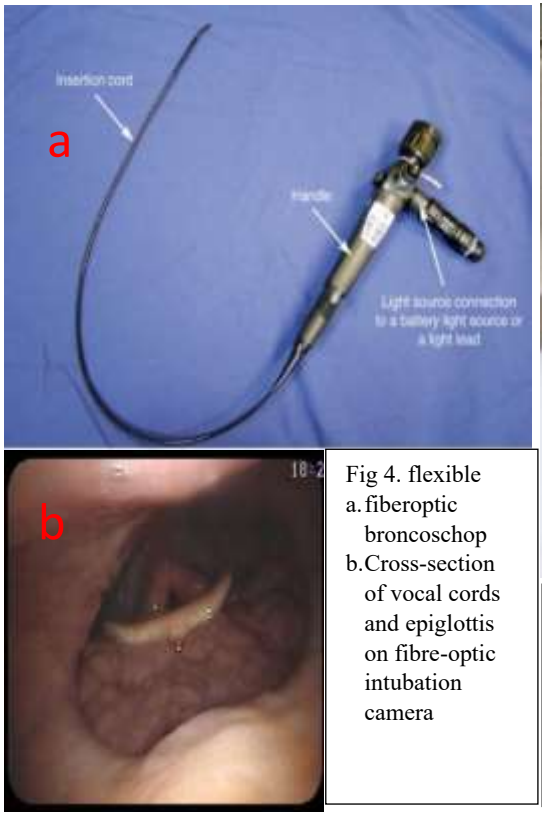

Fig 4. flexible
a. fiberoptic broncoschop
b. Cross-section of vocal cords and epiglottis on fibre-optic intubation camera

Fig 5. ETT inserted from the left nostril and fixated to the patient's forehead (source: author's documentation)

The recommendations is to perform awake intubation, when appropriate, if the patient is suspected to be a difficult intubation and difficult ventilation (face mask/supraglottic airway), perform awake intubation, when appropriate, if the patient is suspected to be a difficult intubation and increased risk of aspiration, perform awake intubation, when appropriate, if the patient is suspected to be a difficult intubation and the patient is likely incapable of tolerating a brief apneic episode, and perform awake intubation, when appropriate, if the patient is suspected to be a difficult intubation and difficulty with emergency invasive airway rescue[11].

Applying predictors of difficult airway management, this patient was categorised as difficult laryngoscopy, difficult supraglottic airway device, and difficult cricothyrotomy.

According to the ASA 2022 algorithm, patients who experience difficult laryngoscopy and difficult cricothyrotomy are recommended to undergo airway management through awake intubation.

Fiberoptic intubation can be performed nasally or orally in awake patients with topical or regional anesthesia alone, or in sedated or anesthetized patients.

Awake fiberoptic intubation that performed nasally is particularly useful in patients with a large tongue, limited mouth opening, receding lower jaw, or tracheal deviation or in cases in which an unobstructed surgical field is beneficial (eg, dental surgery). This approach is also anatomically favorable in that the laryngeal opening is more easily seen with the fiberscope as it courses past the nasopharynx with less obstruction by the tongue. In difficult airway cases, muscle relaxants are not administered during intubation due to the risk of hypoxia in the event of intubation failure.

CONCLUSION

The recommended intubation procedure for patients with difficult airway conditions, such as difficult laryngoscope cases accompanied by difficult cricothyroidotomy, such as in patients with submandibular abscess, obesity, or neck trauma, is awake fibreoptic intubation.

There are minimal airway risks when a patient is awake, and the benefit of placing the endotracheal tube in a difficult airway patient while the patient is awake is immense. In contrast, inducing general anesthesia prior

to intubation in these patients can lead to a "Can't intubate-can't oxygenate" emergency, which can lead to a cardiac arrest and possible anoxic brain damage.

After all, difficult airways are not an everyday occurrence, but their occurrence is unpredictable. As an anesthesiologists we need to be prepared for the possibility of a difficult airway and mastery of difficult airway management is crucial.

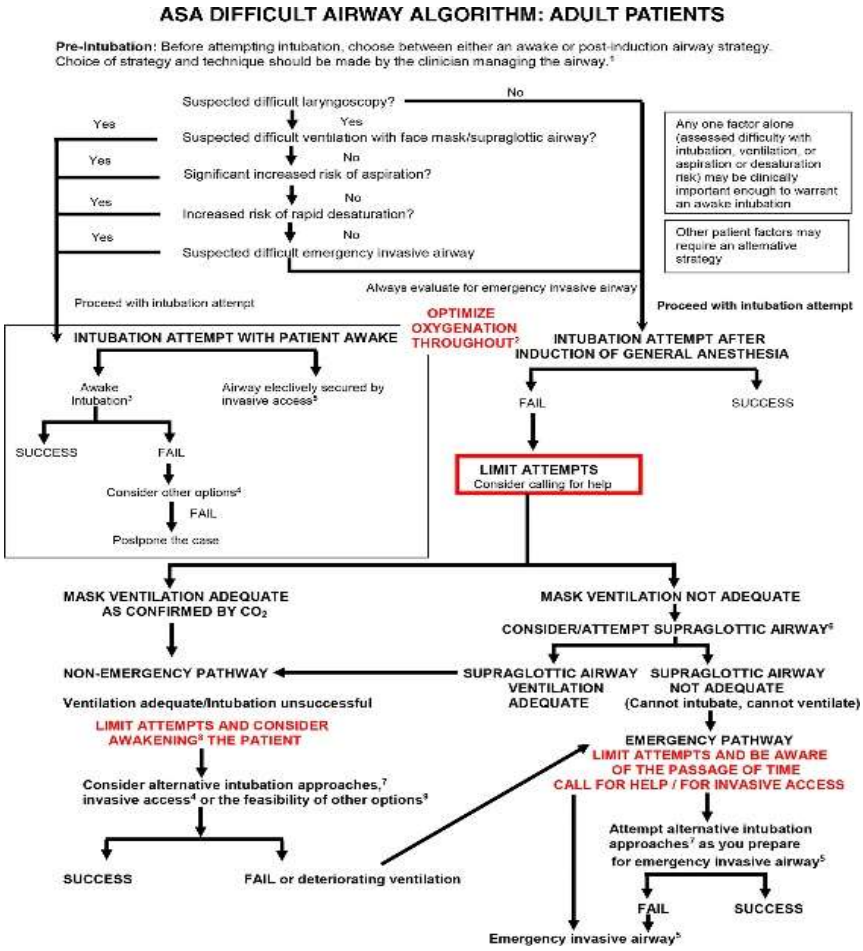

Fig 6. ASA 2022 Difficult airway alogarithm
(source: ASA publication, January 2022, Vol. 136, 31–81)

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CASE REPORT

A 39-YEAR-OLD MALE WITH BILATERAL SCROTAL MASSES ET CAUSA ELEPHANTIASIS

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ABSTRACT

Background : *Combined epidural-general anesthesia (GA Epidural) is an alternative to the neuraxial block for postoperative pain in excision and reconstruction of scrotal masses patients. We report a-39-year-old male patient with Bilateral Scrotal Masses et Causa Elephantiasis with Combined epidural-general anesthesia (GA Epidural)*

Case Illustration*: We reported a 39-year-old with Bilateral Scrotal Masses et Causa Elephantiasis with GA Epidural. Patient came with an enlarged scrotum in the last 7 months. The general condition of the patient appeared to be moderately ill. BP: 120/80 mmHg, HR:110x/minutes, SpO2:97% room air. Conjunctiva anemis (+/+), Mallampati II open mouth with 3 fingers, missing teeth (-), Lungs discovered SD vesicular (+/+) Rh (-/-), Wh (-/-) Abdomen suprapubic bulging (-) tenderness (-). Urological status of the scrotal region discovered a mass with a diameter of 70 cm is visible, the color is the same as the surrounding skin, no surgical scars are visible, no open wounds are visible, no active bleeding is visible, tenderness (-). Patient physical status assessed with ASA III. The diagnosis is based on anamnesis, physical examination and investigations. The patient with Bilateral Scrotal Masses et Causa Elephantiasis with GA Epidural. The patient was followed up at the ICU.*

Conclusion : *Combined epidural-general anesthesia (GA Epidural) during excision and reconstruction of scrotal masses patients shows no complications and a high success rate associated with continuous local anesthetic administration or catheter placement. replacing the use of an epidural catheter.*

Keywords*: combined epidural-general anesthesia, scrotal mass*

INTRODUCTION

Elephantiasis is a condition where chronic lymphoedema progresses to dermatosclerosis, deep skin folds and papillomatous lesions and is one of the extreme forms of clinical manifestation of lymphatic filariasis caused by parasitic worms of the roundworm family. The parasites lodge in the lymphatic system leading to chronic obstruction and subsequent oedema. Lymphoedema, hydrocele, Lymph scrotum, chyluria etc can be various other clinical manifestations of lymphatic filariasis.[1]

Scrotal massive lymphedema, also known as scrotal elephantiasis, is a rare event. The main etiology is the occurrence of venereal lymphogranuloma or penoscrotal filariasis. Mostly, clinical measures are not able to solve the problem and functional surgeries are not indicated to these cases, once the skin and subcutaneous are at an advanced degree of involvement. The treatment of this type of lesion is eminently surgical, requiring ablative surgery (complete surgical resection of the lesion) but many of these cases have bad outcomes, without good functional results.[2]

Clinical indications for epidural anesthesia and analgesia have expanded significantly over the past several decades. Epidural analgesia is often used to supplement general anesthesia (GA) for surgical procedures in patients of all ages with moderate-to severe comorbid disease; provide analgesia in the intraoperative, postoperative, peripartum, and end-of-life settings; and can be used as the primary anesthetic for surgeries from the mediastinum to the lower extremities. In addition, epidural techniques are used increasingly for diagnostic

procedures, acute pain therapy, and management of chronic pain. Epidural block may also reduce the surgical stress response, the risk of cancer recurrence, the incidence of perioperative thromboembolic events, and, possibly, the morbidity and mortality associated with major surgery.[3]

The objective of this study was to report the surgical strategies to treat a localized massive lymphedema of the penoscrotal region and show de long-term follow up, with good outcomes

CASE ILLUSTRATION

History Taking

A 39-year-old Bilateral Scrotal Masses et Causa Elephantiasis. He reported that the scrotum began to swell in 7 months ago, slowly and progressively,to a massive injury, depriving him of physical and sexual activities. Although he denied urogenital infections, he reported that he had recurrent episodes of scrotal erysipelas. There was no fever, cough, shortness of breath, and runny nose. The patient has not comorbidity The history of asthma, allergy, diabetes, heart disease, sedation/surgery was denied.

Physical Examination

From the physical examination, we found GCS E4V5M6, the patient's condition appears moderately ill, and his body mass index was 42.9 kg/m^2 (normoweight). Clinical condition of the patient can be seen in (Figure 1). Blood pressure: 160/90 mmHg, HR:112x/minutes, SpO2:95% room air. Other vital signs were within normal limits. On examination of the eyes, conjunctiva anemis (+/+), mouth examination discovered Mallampati II open mouth with 3 fingers, missing teeth (-), Lungs discovered decreased SDV in the right hemithorax /+, wh -/-, dull in the right hemithorax (SIC V down). In the abdomen, there was suprapubic bulging (+) tenderness (+). Other examinations were within normal limits. Urological status of the flank region found on inspection there is a lump on the right flank, the skin color is the same as the surroundings, palpation feels a solid lump fixed to the touch CVX pain (+/-). Patient physical status assessed with ASA III.

Supporting Examination

Preoperative laboratory examination (07/06/23) showed haemoglobin (10.3), haematocrit (32.4), leukocytes (7.1), platelets (256.000). Clinical chemistry examination (07/06/23): blood sugar (86), Urea (28), Creatinine (1.5), Sodium (137), Potassium (4.0) , Chloride (113). Clinical chemistry examination (07/06/23): total Cholesterol (134), Triglycerides (82), HDL Cholesterol (25), LDL Direct (115), Sodium (129), Potassium (4.4), Chloride (95). Coagulation Study Examination (07/06/23): PPT/K (14.3/15.0), APTT/K (26.6/ 32.3). Chest X-Ray examination (08/06/23) showed no cardiomegaly, Pulmo showing no spots or nodules, and no pleural effusion (Figure). The echocardiography examination revealed normal sinus rhythm (Figure). MSCT Abdomen with contrast (08/06/23) showed very large scrotal structure with diffuse soft tissue swelling in the scrotal region, prone to scrotal lymphedema. Dilation of the venous structures in the scrotal region. The normal structure of the right and left testicles is not visualized. No nodules were seen in the liver or spleen. Multiple lymphadenopathy in the intraaortocava, right and left common parailiac, right and left external parailiac and right and left inguinal (largest size ± 2.2 x 0.8 cm in intraaortocava) Right kidney cyst (size ± 5.8 x 5.6 x 5.9 cm) (Figure).

Figure 1. Clinical condition

Patient was diagnosed with Bilateral scrotal masses suspect et causa elephantiasis. The patient was scheduled for monoblock scrotal resection under combined spinal epidural anesthesia with removal of all of the tissue affected by the lymphedema around the testicle which were covered using the remaining skin and of the penis which was skin grafted using thin skin. The treatment aimed to ensure penis function and to manage the disfiguration. Conservative treatment based on lymphovenous bypass surgery or on the dilation of lymph vessels is no longer performed. Treatment is based on surgery. Surgery is avoided when there are absolute contraindications.

Postoperative laboratory examination (11/06/23) showed haemoglobin (10.3), haematocrit (32.4), leukocytes (7.1), platelets (256.000). Clinical chemistry examination (11/06/23): blood sugar (152), lactate acid (2.7), SGOT (11), SGPT (9), Urea (79), Creatinine (2.41), Magnesium (0.65), Calcium (1.74), Sodium (131), Potassium (3.8), Chloride (98). Blood gas analysis examination (11/16/23) revealed pH (7.28), pCO2 (53.7), pO2 (147.1), FiO2 (40), HCO3- (24.4), BE(B) (-2.1), ScO2 (98.6), AaDO2 (79.6), PFR (367.75).

Chest X-Ray examination (11/06/23) showed the endotracheal tube was attached with the distal end at the level of the body of the Th vertebra. 2, Chest X-Ray examination (08/06/23) showed no cardiomegaly, pulmo showing no spots or nodules, and no pleural effusion

Anesthesia Management

Preoperative Management

The patient's preoperative prepare was done with a cleaning of the inguinoscrotal region for three consecutive days with chlorhexidine, 3 times a day. The patient, when in decubitus, wasmaintained with continuous elevation of the lower limbs. Ciprofloxacin was used as prophylactic antibiotic. The preoperative surgical demarcation consisted of marking the midline and the transition between healthy skin and diseased skin, circumferentially, aiming to involve the entire areas with lymphedema. In addition, an anesthetist evaluated the patient in preoperative and considerated his surgical risk as moderate, indicating general anesthesia, thrombosis prophylaxis in postoperative as recommended in Novo et al.

Patients with ASA III physical status are planned to undergo regional anesthesia with spinal – epidural combined regional anesthesia. Patients and families are given education and also receive approval for action. The patient was then fasted for 6 hours preoperatively, given fluid maintenance with Ringer Lactate infusion at a rate of 20 drops/minute.

As actual problems and potential problems that can be found in patients include the following:

- Potential Problems :
    - ICT enhancement
    - Respiratory failure
    - Risk of bleeding
    - Big Massa
- Before performing anesthesia, preparations include the following:
    - Administer Regional anesthesia
    - Anesthesia machine

At the beginning in the operating room, the patient's preoperative vital signs were measured. After that, premedication was carried out using 3 mg of midazolam intravenously. The patient slowly moves to a sitting position and then recognizes the area where the spinal-epidural needle is inserted through the Tuffiers imaginary line at the level of the L3-L4 vertebrae. Furthermore, an aseptic procedure was performed by cleaning the injection point and the surrounding area with 70% alcohol and povidone iodine. There were difficulties during the insertion with an epidural needle until it was decided to use spinal anesthesia without an epidural combination using a local anesthetic drug 12.5 mg bupivacaine 0.5% isobaric without adjuvant.

Surgical Technique

An incision was made in the marked area, beginning with the supra-pubic region; a careful dissection was carried out within the infiltrated and hardened tissue that occupies the entire mass; as the dissection progressed, the skin incision is continued throughout the circumference of the mass. Meticulous dissection allows preservation of the penile body and the elements of the spermatic cord, resecting the skin of the penis superficial to the Buck's fascia. During the resection ofthe lesion (sentto anatomopathological study), we preserved two posterolateral healthy skin flaps in the perineal region, which were used for reconstruction of the scrotum. The tunica albuginea was opened, to avoid hydrocele, and bilateral orchidopexy was made to avoid testicular torsion.

Subsequent coverage with the aforementioned flaps was then performed . Forpenile coverage, split-thickness skingraft (removed from the left thigh) was fixed between the glans and the base of the penis. To avoid contracture of the graft and retraction of the penis, a broken line suture (Z plasty) was used in the topography of the median raphe.

During the operation, the patient was given supplemental oxygen by nasal cannula at 3 liters per minute, finger oxygen saturation fluctuated between 97 – 100%. Intraoperative hemodynamics were relatively stable with systolic blood pressure variations of 105 – 145 mmHg and diastolic 75 – 95 mmHg. Bleeding amount of 400 ml and urine production of 100 ml was replaced by 1500 ml of Ringer lactate crystalloid fluid. Also given ondansetron 4 mg intravenously intraoperatively.

Epidural General Anaesthesia Technique

Epidural anesthesia is a technique for perioperative pain management with multiple applications in anesthesiology. It is useful as a primary anesthetic, but most commonly, it is used as a pain management adjuvant. It can be a single shot or a continuous infusion for long-term pain relief. Aside from the benefit of potentially providing excellent analgesia, its use reduces the exposure to other anesthetics and analgesics, decreasing side effects. It has also shown to decrease cortisol levels, expedite the return of bowel function, decrease the incidence of PE and DVT in the postoperative period, and shorten lengths of in-hospital stay.

In the ICU, vital sign recorded: BP: 115/74 mmHg; HR: 112 x/min, RR 14 x/min, temperature 36.3^{O}C, SpO2: 99% with ETT KK number 7 with depth 19 cm. The operation was performed in 150 minutes, with anesthesia being administered for 180 minutes. The patient was given 1000 cc ringer lactate, 500 cc Gelofusine), 2 PRC fluids. Bleeding was 2500 cc.

Postoperative Management

The skin graft was kept occluded with a dressing adapted for medium compression and held for 5 days to avoid local traumas and consequent loss of it. The bladder catheter was maintained for the same period and the hygiene of the genital area was performed daily by the nursing team, avoiding manipulation by the patient. Graft opening was performed on the 5th postoperative day, with total graft integration. The patient was discharged on the 7th postoperative day, with local care guidelines. Anatomopathological exam confirmed chronic lymphedema. The mass weighted 9,9 kg.

In ICU, patient was in good general condition, with BP 120/80 mmHg, HR 85x/min, RR 18x/min, T 36,5 C, and administered with Paracetamol 1000 mg/8 hours intravena, Ketorolac 30 mg/8 hours intravena, Metoclopramide 10 mg in 8 hours intravena, and continuous bupivacaine 0.25% rate 3cc/hour via a catheter that has been placed.

DISCUSSION

It is presented a case of idiopathic massive localized penoscrotal lymphedema (MLL) . In the literature, MLL cases are most related to obese patients and usually are seen at the abdomen or lower limbs. This case contrast with that evidence, since it involved the penoscrotal region and the patient never had a BMI higher than 40.

Clinical measures were the main treatment over 7 months, without improvement in the quality of life ofthis patient. The poor response of the clinical treatment was the main motivation for the surgical treatment. Functional operations (lymph node transplantation and lymphaticovenous anastomosis) were not indicated since it was an advanced case, with a thick and fibrotic skin and subcutaneous.

Epidurals are useful for surgical anesthesia of thoracic surgery, major intra-abdominal surgery, or spine surgery, granted that muscle relaxation is not needed. This technique may also be for intra-op or post-op pain management. It may decrease the surgical risk and morbidity of certain patient populations, for example, patients with ischemic cardiac disease. It also has been shown to decrease post-op lung complications and increase the intestinal return of function after abdominal surgery.[4]

Medial (midline) and Paramedian Approaches In the medial approach, the site of the insertion of the needle is between the spaces created by the vertebral spinous processes. Upon locating the desired spot, lidocaine 1% must be injected into the skin and underlying tissues to decrease the discomfort with the advancement of the epidural needle. Once achieving local anesthesia, the epidural needle must be advanced with its stylet in place and with its bevel point cephalad; this will ultimately contribute to the proper location of the epidural catheter. The epidural needle must be advanced through the skin, subcutaneous tissue, supraspinous, and interspinous ligaments. Once there, the stylet must be removed, and the Loss of Resistance syringe (filled up with saline, air, or both) must be attached to the needle. The needle must be advanced while applying pressure to the plunger. Once the ligamentum flavum is pierced, a loss in resistance will be noted; this is the epidural space, and 5 to 10 cc of saline may be injected to expand the epidural space; this may decrease the risk of vascular injury.[5]

In the paramedian approach, the insertion site of the needle is 1 cm lateral to the vertebral interspace. Local anesthetic must be administered as described for the medial approach. The epidural needle must then be advanced through the paraspinal tissues. Given this location, the needle will not transverse the supraspinous or interspinous ligaments. The advancement of the needle must stop upon feeling the engagement in the ligamentum flavum. The loss of resistance syringe must be then attached, and the epidural space must be located as described for the median approach.[6,14]

Once either the midline or paramedian approach locates the epidural space, the epidural catheter must be advanced inside the needle after removing the loss of resistance syringe. The epidural catheter must be advanced to the 20 cm mark. The epidural needle is then removed, paying attention to the depth of the epidural space as indicated by the marks in the epidural needle. The epidural catheter is then withdrawn, aiming to leave its tip 5 to 6 cm into the epidural space; achieved by adding 5 to 6 to the depth of the epidural space. The resulting number is the mark at which the epidural catheter must be withdrawn.[6]

Once the catheter is in its final position, a 3 cm syringe may be used to gently aspirate and rule out CSF leakage. If CSF is detected, the epidural catheter may be in the intrathecal space and must be relocated.[7]

A test dose to rule out the intravascular position of the catheter is then performed, done by injecting 3 mL of 1.5% lidocaine with epinephrine (1 to 200000). An increase in HR of 20 to 30 bpm or 15 to 20 mmHg in systolic blood pressure may indicate intravascular injection.[8]

Caudal Anesthesia

Caudal anesthesia is a variation of epidural anesthesia widely used in childhood. It is useful for interventions under the umbilicus line (circumcision, herniotomy, orchiopexy). The indications and contraindications match the ones described above.[9]

The patient positioning is in lateral decubitus, fetal position, the area sterile prepped, and the hiatus sacralis located at the vertex of the sacrum, between the cornua sacra. The sacrococcygeal membrane must be pierced with a 22 to 25 G venous catheter at a 45-degree angle relative to the body's longitudinal axis. The catheter must be advanced until the loss of resistance is felt. No additional advance must be attempted since the distance between the sacrococcygeal membrane and the caudal end of the dural sac may be less than 10 mm. If CSF or blood is noted, the catheter must be repositioned. Once properly located, a test dose with Epinephrine 0.5 mcg/kg may be performed to rule out an intravascular injection.[10,11]

The mechanisms by which combined epidural-general anesthesia (and epidural analgesia) provides protection for perioperative patients may include the following. Firstly, it is more effective in relieving acute pain and pain-related harmful effects. Secondly, thoracic epidural anesthesia may improve the balance between myocardial oxygen consumption and supply, and relieve gut injury. Thirdly, it relieves the over activation of neuroendocrine, metabolic and inflammatory response after surgery. Lastly, epidural blockade in addition to general anesthesia may prevent the fluctuation of hormone levels in patients undergoing adrenalectomy for adrenal functional tumors.[12,13]

Anesthesia technique is a key factor for surgical stress.[14-16] Common anesthesia techniques include general anesthesia and radical anesthesia. Epidural anesthesia belongs to commonly used radical anesthesia. Published clinical trial demonstrated that general anesthesia combined with epidural anesthesia mitigated surgical stress-related impairment of antitumor immune responses and hastened the recovery of intestinal function.[17] Appropriate anesthesia may help relieve surgical stress. Anesthesia depth also affects surgical stress. Currently, such depth could be monitored through perioperative clinical signs. Usually, it is difficult to detect most clinical signs; moreover, surgery and anesthesia will make clinical signs complicated, which in turn makes the monitoring more difficult.[18] Certainly, intraoperative monitoring of anesthesia depth is vital to maintain signs, preserve stable hemodynamics, reduce side effects, achieve optimal anesthesia, and realize favorable analgesic and muscle relaxing.[19]

Surgical treatments may have the risk of surgical incision infection, severe postoperative pain, stress response and various postoperative complications. [20,21] Serious stress reaction will cause damage to tissues and organs, so reduction of the stress reaction of patients after anesthesia has become a topic of concern to clinical anesthesiologists in recent years. In Lia et al study, the cognitive function of patients was evaluated, and the results showed that compared with general anesthesia, the effect of combined anesthesia on cognitive function of patients was significantly reduced. [22] At present, general anesthesia and epidural anesthesia are widely used in clinical surgery. General anesthesia can make more drugs enter the central nervous system, while epidural anesthesia can block afferent nerves, thus reducing postoperative neuroendocrine stress substances and the impact on the center nervous system.[23,24]

CONCLUSION

The epidural technique is one of the earliest ones in the field of anesthesia. Properly performed, it is a safe technique that provides multiple benefits. It is usable as a sole anesthetic for surgical procedures, decreasing the need for general anesthesia and airway management, with the risks that this implies. It also reduces the exposure to volatile anesthetics and may potentially decrease the opioid requirement during or after a procedure, lowering the incidence of the side effects associated with these drugs. This is particularly relevant in pediatric anesthesia since there is controversy regarding the potential negative impact of certain anesthetic drugs on neurodevelopment. The epidural technique is also highly valuable for postoperative pain management as part of a multimodal approach.

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ENHANCED RECOVERY AFTER SURGERY (ERAS) IN HERNIA SURGERY: A LITERATURE REVIEW

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ABSTRACT

INTRODUCTION

Hospital quality indicators often include the length of stay (LOS), representing the time from admission to discharge. Enhanced Recovery After Surgery (ERAS) protocols aim to accelerate postoperative recovery, leading to reduced LOS and cost containment. The implementation ERAS in colorectal surgery at dr. Cipto Mangunkusumo General Hospital and dr. Zainoel Abidin General Hospital reduced length of stay (LOS) by several days. Therefore, our discussion aims to explore how ERAS can enhance hernia repair recovery.

DISCUSSION

ERAS, Enhanced Recovery After Surgery, involves a multimodal care program for optimal hernia surgery outcomes. Protocols focus on preoperative preparation, intraoperative stress reduction, and early postoperative recovery that include the optimal pain management that can decreased opioid consumption, resulting in reduced opioid-related adverse outcomes. Hernias, categorized as groin or ventral, often necessitate surgical repair. Options include tissue and tension-free repairs (Lichtenstein), preperitoneal, laparoscopic, and robotic approaches. Laparoscopic techniques offer quicker recovery and lower chronic pain risk. There are some elements that can be used in ERAS protocol. The combination of implementing all these elements is responsible for the improved clinical outcomes for patients in the ERAS group. ERAS implementation in ventral hernia repair leads to reduced recovery length of stay (LOS), reduced complications, reduced surgical site infections and improved the outcomes of the patients.

CONCLUSION

ERAS protocols optimize patient care through multimodal approaches. Their success spans various surgical subspecialties, offering potential benefits in ventral hernia repair. Establishing a culture of enhanced recovery is crucial, and further studies on the economic impact of ERAS protocols are ongoing.

Keywords: Hernia surgery, ERAS, Enhanced Recovery After Surgery

INTRODUCTION

The length of stay (LOS) is one of the quality indicators for a hospital, referring to the duration of time a patient spends in a hospital from admission to discharge. Patients undergoing surgical procedures typically experience a longer LOS.[1] Enhanced Recovery After Surgery (ERAS) is a perioperative protocol that fosters accelerated postoperative recovery, leading to a reduction in the length of stay (LOS) and cost containment.[2,3,4]

At Dr. Cipto Mangunkusumo General Hospital, the implementation of the ERAS protocol in colorectal surgery demonstrated a reduction in patient LOS by five days, from 8-9 days.[5] Similarly, at Dr. Zainoel Abidin General Hospital, patient LOS was reduced by 4.6 days compared to cases without ERAS.[1] Hernia repair is a common surgery in the United States, with an estimated 800,000 surgeries being performed annually.[6] Therefore, our discussion aims to explore how ERAS can enhance hernia repair recovery.

DISCUSSION

Enhanced Recovery After Surgery (ERAS)

ERAS is an acronym for Enhanced Recovery After Surgery. The term ERAS is often used to describe a multimodal perioperative care program. Some authors use terms such as Enhanced Recovery Programs (ERP), and previously, fast-track surgery was commonly used for the latter, especially in North America. These programs all consist of several evidence-based perioperative care elements that have individually shown to be beneficial. When used together in a protocol, they have been demonstrated to result in substantially improved outcomes. A recent meta-analysis shows that ERAS protocols in major surgery reduce recovery time and length of stay by 2–3 days and complications by 30%–50%.[7,8]

All ERAS protocols share the same objectives: preoperative patient optimization, a decrease in perioperative stress, maintenance of postoperative physiological function, and accelerated recovery time after surgery. This is achieved by a multidisciplinary team providing multimodal perioperative patient care. The multidisciplinary team includes outpatient clinical staff, pre-operative nurses, anesthesiologists, operative nurses, postoperative recovery staff, floor nurses, dietitians, physical therapists, social workers, and surgeons. The multidisciplinary efforts focus on the preoperative, intraoperative, and postoperative phases of care.[9]

Preoperative

In the preoperative setting, ERAS care elements are further subdivided into pre-admission and post-admission elements. In the pre-admission setting, the focus of care is on patient optimization, including the management of comorbidities, surgical information/counseling, nutritional assessments/supplementation, abstinence from excessive alcohol consumption, and smoking cessation. Studies show that amino acids such as arginine, glutamine, omega-3 fatty acids, and ribonucleic acid modulate the immune system and regulate inflammatory responses. Arginine protects against ischemia and reperfusion injury, promotes T-cell maturation, and increases nitrogen balance. Glutamine supplies energy for gut mucosa and is used in the metabolic processes of immunological cells. Omega-3 fatty acids modulate the production of lipids and proteins as well as reduce systemic inflammation. Nucleotides serve in protein synthesis, facilitate intestinal cell maturation, and regulate T-cell immune response. Since the first clinical study of immunonutrition by Daly in 1992, the formulation of immunonutrition has been altered to optimize nutritional support. Previously, teaching focused on a minimum of 6 hours of fasting to decrease gastric residuals and limit the risk of aspiration with the induction of anesthesia and intubation. Strong recommendations now support the intake of clear liquids (including immunonutrition) up to 2 hours before surgery, with no increased risk of aspiration.[7,9]

Furthermore, it has been shown that fasting leads to a catabolic metabolic state that results in reduced liver glycogen stores, as well as increased insulin resistance and post-operative stress. It has been well-documented that postoperative hyperglycemia is associated with increased morbidity (i.e., infections, neuropathy, renal failure) and mortality. Thus, strict glycemic control is a critical component of post-surgical care. Even in patients with type 2 diabetes, the administration of a carbohydrate-rich drink likely induces endogenous insulin release before the onset of surgery, thus promoting an anabolic rather than a catabolic metabolic state. When patients were given a 12.5% carbohydrate-rich drink, there was no evidence of delayed gastric emptying, and glucose concentration returned to baseline, making it safe for the administration of clear liquid immunonutrition up to three hours before anesthesia. Another advantage of using a preoperative low osmolar carbohydrate-rich drink is to decrease overall gastrointestinal discomfort, leading to a reduction in postoperative nausea and the use of antiemetics. Other preoperative recommendations include bowel preparations, thromboembolic prophylaxis, nausea prophylaxis, and skin preparation/antimicrobial prophylaxis.[9]

Intraoperative

Intraoperative ERAS protocol guidelines focus on minimizing the stress of surgery by promoting minimally invasive techniques/incisions, avoiding hypothermia, maintaining fluid euvolemia, ensuring strict glycemic control, and reducing the utilization of surgical drains and nasogastric tubes (10). Neuraxial anesthesia and anatomical anesthetic blocks are also valuable intraoperative components of ERAS protocols aimed at minimizing narcotic usage. A meta-analysis of randomized controlled trials demonstrates a significant reduction in narcotic use among patients receiving peripheral nerve blocks (PNB). Patients receiving PNBs report less pain at rest and during movement 72 hours postoperatively, leading to a shorter hospital stay and increased engagement in physical therapy. Other forms of regional pain control, such as the transverse abdominis plane (TAP) block (with either liposomal bupivacaine or bupivacaine), also contribute to decreased narcotic usage. Preventative blocks have demonstrated benefits not only in the perioperative period but also in long-lasting effects. Establishing adequate afferent blockade prior to surgical incision reduces the nociceptive barrage that leads to central sensitization and the subsequent development of chronic pain.[9,10]

Perioperative pain control is highly variable and individualized because not all patients respond similarly to pain medications. Senagore and colleagues investigated the impact of genetic variants on medication responses in hernia patients. Patients underwent pharmacogenetic testing before the procedure, and based on the findings of specific genes, the analgesic selection was adjusted. The specific genes analyzed included the cytochrome P450 family, COMT, ACCB1, and OPRM1. The use of pharmacogenetics in this population resulted in a 50% reduction in opioid consumption and a decreased incidence of analgesic-related side effects.[10]

Postoperative

Postoperative recommendations focus on achieving early return to function, with immediate mobilization and prompt resumption of oral nutritional intake. These objectives are accomplished by emphasizing multimodal pain control while minimizing the use of narcotics, thereby reducing postoperative nausea, vomiting, and the potential for ileus. This is further reinforced by multimodal nausea prophylaxis and the use of gastrointestinal mu-receptor antagonists, allowing for increased early oral intake. The traditional practice of keeping patients nil per os (NPO) and gradually advancing their diet is rooted in concerns about complications such as nausea, vomiting, aspiration, and anastomotic breakdown. A growing body of evidence supports the notion that postoperative nutrition, as early as 24 hours, is associated with reduced mortality and poses no harm related to anastomotic leaks. In addition to administering glucose, ensuring sufficient protein intake is crucial for achieving anabolic metabolism to support post-surgical recovery. For patients meeting clinical criteria for malnutrition, enteral feeding within 24 hours is recommended, and nutritional support should be maintained for at least 4 weeks. Among elective surgery patients, those receiving a high-protein diet (> 60% of daily protein requirements) in the first 3 postoperative days have been shown to experience a reduced length of hospital stay.[9,11]

Optimal pain management through a multimodal approach can lead to decreased opioid consumption, resulting in reduced opioid-related adverse outcomes. These outcomes include nausea, vomiting, sedation, respiratory depression, ileus, and dependence. Medications that should be continued in the postoperative setting to decrease opioid use include nonsteroidal anti-inflammatory drugs, acetaminophen, gabapentin, long-acting anesthetic blocks, and potentially ketamine.[10,11] Sustained postoperative intravenous infusion of lidocaine can significantly diminish postoperative morphine consumption and enhance pain scores. Intravenous acetaminophen has been studied in patients undergoing laparoscopic abdominal procedures, including hernia repair, with significantly superior pain relief over a 24-hour period compared to placebo. It has a more rapid and predictable onset, a 70% higher peak plasma concentration compared to equivalent oral and rectal doses, and can be administered to patients who are unable to tolerate oral medications. As part of a hernia ERAS protocol, its administration has typically been limited to the initial postoperative 48 hours or until diet tolerance is achieved, and subsequently transitioned to oral medication.[10]

Hernia

Hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls, with a hernia sac covering its contents. Hernias can occur at various sites in the body, but these defects most commonly involve the abdominal wall, particularly the inguinal region. Abdominal wall hernias occur only at sites where the aponeurosis and fascia are not covered by striated muscle.[12]

A hernia is reducible when its contents can be returned within the surrounding musculature, and it is irreducible or incarcerated when it cannot be reduced. Strangulation occurs more often in large hernias with small orifices. The small neck of the hernia obstructs arterial blood flow, venous drainage, or both to the contents of the hernia sac.

Abdominal wall hernias can be classified into groin and ventral hernias based on anatomical location. Groin hernias are situated in the lower half of the body and include inguinal hernias and femoral hernias. Inguinal hernias are categorized as direct (medial) or indirect (lateral). The sac of an indirect inguinal hernia extends from the internal inguinal ring obliquely toward the external inguinal ring and ultimately into the scrotum. The sac of a direct inguinal hernia protrudes outward and forward, medial to the internal inguinal ring and inferior epigastric vessels. Distinguishing between indirect and direct inguinal hernias can sometimes be challenging, as indirect hernias may enlarge.[12,13]

Ventral hernias encompass other types, including umbilical, epigastric, Spigelian, lumbar, and incisional hernias.[13,14] In general, internal organs protrude through a hole in the abdominal wall, causing discomfort or pain in that area. Inguinal hernias are almost always symptomatic, and surgery is the only cure. Management of inguinal hernia involves surgical repair regardless of symptom presence. Surgery for asymptomatic inguinal hernia prevents complications such as incarceration or strangulation.[15]

Operative approaches for inguinal hernias include tissue repairs, tension-free anterior inguinal hernia repair (Lichtenstein), preperitoneal repair, laparoscopic repair (posterior surgical approaches), and robotic repair.[12]

Tissue repairs have largely been abandoned due to high recurrence rates, but they remain useful in certain situations such as strangulated hernias with bowel resection. In most situations, mesh repair is preferred. Mesh-based techniques, also known as tension-free repairs, have a lower recurrence rate than tissue repairs.[16,17]

The most common operative approach for inguinal hernias is anterior repairs using Lichtenstein's technique. The European Hernia Society guidelines state that Lichtenstein repair is preferred for large scrotal, irreducible inguinal hernias.[18] The basic principle of Lichtenstein's technique involves opening the inguinal canal, identifying some or all of the three nerves (iliohypogastric nerve, ilioinguinal nerve, and the genital branch of the genitofemoral nerve), the spermatic cord and vessels, and subsequently the hernia. A mesh is inserted after repositioning the hernia and is fixed with sutures to the inguinal ligament and surrounding tissues, ensuring overlap with the pubic tubercle medially.[12,13]

The open preperitoneal approach is useful for repairing recurrent inguinal hernias, sliding hernias, femoral hernias, and some strangulated hernias. A new technique called the Onstep procedure involves an open posterior approach. This technique places the mesh in the preperitoneal space medially and between the internal and external oblique muscles laterally.[12]

Laparoscopic repair is another tension-free mesh repair method based on a preperitoneal approach. The most popular techniques are the transabdominal preperitoneal approach (TAPP) and totally extraperitoneal (TEP) approach. The main difference between these two techniques is the sequence of gaining access to the preperitoneal space. In the TAPP approach, a mesh is placed preperitoneally through a peritoneal incision from the abdominal cavity, sealing the hernia site internally. In the TEP approach, the mesh is placed externally without entering the abdominal cavity, sealing the hernia sites externally.[12,15,19]

The TAPP technique can also be performed robotically, with a similar trocar configuration, similar dissection steps, mesh positioning, and outcomes comparable to laparoscopy. An advantage of the robotic approach is the three-dimensional optics and wristed instrumentation, providing improved visualization of the anatomy compared to the two-dimensional view of laparoscopy.[12]

ERAS in Hernia Operation

The ideal operative technique should possess the following attributes: low risk of complications (pain and recurrence), rapid recovery, reproducible outcomes, and cost-effectiveness. The decision also depends on various factors such as hernia characteristics, type of anesthesia, mesh fixation techniques, surgeon experience, and logistical considerations.[12,15]

Lichtenstein and laparoscopic repair are the most widely evaluated techniques. Lichtenstein repair is likely the primary choice in the majority of cases. It is a very effective technique, but its outcomes may be surpassed by a more complex technique like the TEP, especially when considering early postoperative recovery and the occurrence of chronic pain. Laparoscopic techniques result in faster recovery times, lower risk of chronic pain, and are cost-effective. Open preperitoneal repairs result in less acute and chronic pain when compared to the Lichtenstein procedure.

Laparoscopic techniques show a lower incidence of wound infection, hematoma formation, and an earlier return to normal activities or work compared to the Lichtenstein technique. Laparoscopic techniques have a longer operative time and a higher incidence of seroma formation than the Lichtenstein technique, but a lower incidence of chronic pain/numbness.[13]

The intrinsic characteristics of the meshes used by surgeons are associated with postoperative pain. Low-weight mesh may provide slight short-term benefits such as reduced postoperative pain and shorter recovery, but it is not associated with better long-term outcomes like recurrence and chronic pain.[15]

The most common causes of prolonged hospitalization after open incisional hernia repair were pain, lack of mobilization, and lack of bowel function. There were significant differences in the causes of prolonged hospitalization after repairing small, medium, and large incisional hernias. Open incisional hernia repair in medium and large hernias is a comprehensive intervention that causes severe postoperative pain. The introduction of ERAS was linked to earlier removal of the epidural catheter and a reduction in length of stay (LOS) without negatively affecting postoperative early mobilization, bowel function, or readmission.[20,21]

Repairing large ventral hernias with abdominal wall reconstruction often requires the use of component separation techniques and placement of large mesh materials. Patients undergoing abdominal wall reconstruction face a high risk of postoperative complications. The use of ERAS reduced complication rates, attributed to reduced catabolism, muscle mass loss, and muscle function loss due to the prompt removal of drains, early oral feeding, and mobilization.[21]

Abdominal wall hernias represent a wide spectrum of diseases, ranging from clinically asymptomatic to potentially life-threatening. While the spectrum of hernia disease includes inguinal, femoral, ventral, incisional, parastomal, and recurrent hernias, most ERAS protocols in hernia surgery should primarily focus on surgical repairs associated with longer hospital stays. This would include primary and recurrent ventral, incisional, and parastomal hernias. There is limited literature supporting the identification of appropriate patient populations for enrollment in ERAS hernia protocols. In studies examining hernia-specific ERAS protocols, it is not entirely clear which patient populations are suitable for enrollment in ERAS pathways.[10] Prior to implementing ERAS for ventral hernia repair, some elements of the protocol were performed, although not standardized for all patients. Elements such as deep venous thrombosis prophylaxis and antibiotic prophylaxis were routine, while others such as multimodal pain management, the use of bowel-enhancing medications, preoperative MRSA eradication, preoperative nutritional supplements, and goal-directed intraoperative fluid management were not consistently employed. Assessing the benefits of each element of the protocol is not feasible based on the current study design. While some elements may offer greater benefits than others, we believe that the combination of implementing all elements is responsible for the improved clinical outcomes in the ERAS group.[3]

Table 1 Key care components of ERAS for VHR protocol and historical controls experience[3]

No	Key Elements	Historical controls	ERAS expectations/guidelines
1	Preoperative risk stratification/counseling	● BMI<40 kg/m2 while preferred was not systematically required ● Smoking cessation was not systematically expected ● No routine A1c testing preoperatively ● No protocol counseling	● BMI no greater than 40 kg/m2 ● For smokers, notation that the patient has ceased smoking × 4 weeks prior to surgery ● For diabetic patients and/or patients with BMI≥30 kg/m2 A1c≤8.0% ● Counseling about the protocol was provided
2	Preoperative bowel preparation	● Generally was followed in historical control patients	● Bowel preparation (clear liquids × 2 days prior to surgery) recommended only to patients with colostomy
3	Prophylaxis against thromboembolism	● VTE prophylaxis was hospital policy prior to ERAS implementation	● Preoperative and postoperative prophylaxis and intraoperative and postoperative sequential compression devices ordered and utilized
4	Methicillin-resistant Staphylococcus Aureus (MRSA) prophylaxis	● Not done with control patients	● Mupirocin intranasal ointment BID × 5 days preoperatively
5	Nutritional preparation	● Not done with historical control patients	● Three servings of Impact AR™ to be taken for 5 days preoperatively
6	Preoperative fasting and carbohydrate treatment	● Not done with historical control patients	● Gatorade (or diabetic alternative) 400 mL 4 h prior to arrival time. No solid foods after midnight
7	Perioperative fluid management	● Not done with historical control patients	● <5 cc/kg/h or <2 l of IVFs intraoperatively
8	Postoperative nausea and vomiting	● No systematic plan	● Use of prophylactic antiemetics as appropriate
9	Nasogastric intubation	● No systematic plan	● NG tube placed in the OR removed prior to leaving OR
10	Urinary drainage	● No systematic plan	● Removal of Foley catheter by POD #2
11	Prevention of intraoperative hypothermia	● Historical control patients had warmers in the OR	● Temperature≥36 °C intraoperatively
12	Multimodal pain management	● Some patients had epidurals, and generally relied on opioids. Little multimodal	● No scheduled narcotics ● Multimodal therapy (Epidural with hydromorphone and bupivacaine,

		therapy in place	scheduled acetaminophen (IV transitioning to po), ketorolac transitioning to ibuprofen, and oxycodone prn after discontinuation of epidural)
13	Acceleration of intestinal recovery	● Not in place for historical control of patients	● Alvimopan, preoperatively as appropriate, and BID postoperatively until bowel function ● Clear liquids with quick advancement to the regular diet
14	Early mobilization	● While it was the expectation, not systematically followed or enforced	● Patient to be out of bed evening of surgery and ambulating by POD #1
15	Postoperative glucose control	● Hospital policy prior to protocol implementation	● Blood glucose was checked and sliding-scale insulin was utilized per hospital protocol

Ventral and incisional hernias commonly occur following abdominal operations and are linked to significant costs. The costs associated with ventral hernia repair (VHR) are further elevated due to not infrequent hospital readmissions and surgical site infections. In a tertiary care setting, VHR has been reported to lead to substantial financial losses because costs surpass revenue. Factors contributing to these increased costs include the American Society of Anesthesiologists (ASA) Class, the Centers for Disease Control and Prevention (CDC) Wound Class, and postoperative complications. Enhanced Recovery after Surgery (ERAS) protocols are evidence-based quality improvement pathways associated with enhanced clinical outcomes. The clinical and economic benefits of enhanced recovery after surgery (ERAS) protocols are well-documented, with lower costs and fewer complications achieved through care standardization. A meta-analysis examining outcomes after abdominal operations performed with an ERAS protocol in place revealed a consistent reduction in length of stay (LOS) and costs. Using an enhanced recovery after surgery (ERAS) protocol for VHR, Stearns et al. demonstrated benefits to patient outcomes, including a shorter duration for return of bowel function, a decrease in overall wound complications, and a reduction in superficial surgical site infections.[4] Patients treated with the ERAS for VHR protocol experienced a significantly reduced incidence of superficial SSI compared to historical control patients. As SSIs significantly contribute to increased costs and hernia recurrence, a reduction of this magnitude in SSI incidence could potentially lead to decreased costs in the short term and a decreased incidence of hernia recurrence in the long term.[3]

Following the implementation of an ERAS protocol, wound complications were reduced by approximately 50%, and surgical site infections were reduced by nearly 75%, all without any incremental increase in costs.[4]

CONCLUSION

ERAS protocols employ multimodal and multidisciplinary approaches to optimize patient care in the preoperative, operative, and postoperative settings. These protocols have gained acceptance and utilization across all surgical subspecialties and are supported by an increasing amount of clinical outcome data, with continuous analysis of guidelines for quantifiable success. A comprehensive ERAS protocol for VHR was associated with a quicker return of bowel function and a decreased incidence of SSI, which is the most prevalent postoperative complication following VHR. Laparoscopic techniques result in a lower incidence of wound infection, hematoma formation, and an earlier return to normal activities or work, as well as a lower incidence of chronic

pain/numbness. Establishing a system-wide culture focused on enhanced recovery is essential to ensure improved patient outcomes. Implementation of ERAS protocols in ventral hernia repair may enhance value by reducing perioperative complications. Further studies assessing the economic impact of ERAS protocols are currently underway.

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ESP BLOCK ANESTHESIA IN SEPTIC PATIENT EC NECROTIC FLAP POST EXTENSIVE EXCISION OF LEFT PHYLLOIDES TUMOR

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ABSTRACT

Background: Under certain conditions septic and pleural effusion patient usually require intensive care postoperatively. When there is limited intensive room, general anesthesia is not the main choice for anesthesia. Regional anesthesia or peripheral nerve blocks are alternative anesthetic measures in these circumstances. ESP block is one of the options for thoracic area surgery, especially in patients with breathing problems who may have to do postoperative ETT retention. Besides anesthesia, ESP block also has the advantage of postoperative analgesia.

Case Illustration: A 38-year-old woman with sepsis due to necrotic flap of left phylloides tumor surgery area. The patient also suffers from left pleural effusion which has been placed on a chest tube thoracostomy but has not improved. The debridement surgery was performed as source control. Under this conditions genral anesthesia was not first choice and ESP block was an alternative as a technique anesthesia and analgesia postoperative. ESP was performed in the sinistra paravertebra using ultrasound guiding with 0.25% bupivacaine as much as 30 cc and achieved block as high as the T4-T7 segment. During the intraoperative duration of 1 hour, the patient's hemodynamics were stable with an VAS pain score of 0. Postoperatively, the block lasted for approximately 6 hours and then analgesic administration was continued with fentanyl 25 mcg / hour and a gram paracetamol every 8 hours.

Conclusion: Besides being used as postoperative analgesia, ESP block can also be used as intraoperative anesthesia on thoracal area, where it would be more dangerous if general anesthesia is performed when the availability of postoperative intensive rooms is not available.

Keywords: ESP Block, Septic, Pleural Effusion, Phylloides Tumor, USG Guiding

INTRODUCTION

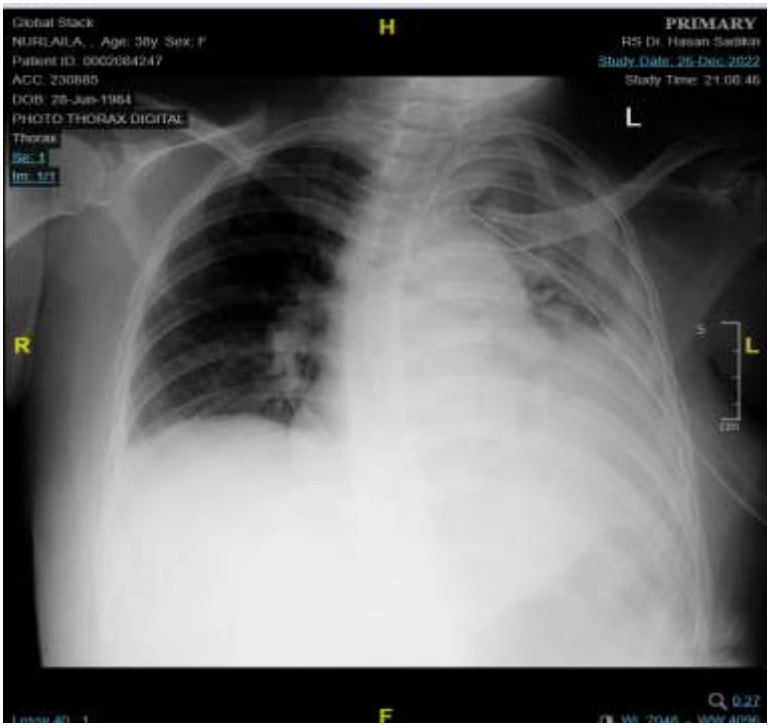
Erector spinae plane (ESP) Block is a new ultrasound-guided technique. It was initially used for the management of acute and chronic chest pain. Subsequently, various abdominal and thoracic procedures, such as hepatectomy, bariatric surgery, mastectomy, cardiac surgery, and chronic chest pain disorders, have been successfully performed using the ESP block technique. This technique is innovative, safe, and can provide good analgesia with reduced opioid requirements. We present the use of ESP block for analgesia in the case of a patient undergoing surgical debridement of the thoracic area.

CASE ILLUSTRATION

A 38-year-old woman with necrotic flap and left peluraleffusion underwent debridement surgery for source control. The patient had previously undergone radical mastectomy and flap closure for a left phylloides tumor. The wound from the flap became necrosis and caused the patient to become sepsis. The patient also had left pleural effusion due to the previous phylloides tumor. There was no history of other diseases in the patient. The patient was treated with meropenem 3x1 gram, ketorolac 3x30 mg iv, omeprazole 2x40 mg iv, and paracetamol 3x1 gram.

The physical examination found GCS E3 M6 V5, blood pressure 117/83 mmHg, heart rate 112 beats per minute, respiration 26 times per minute, oxygen saturation 96% with 3 liters/minutes nasal canule. On thoracic inspection there was a left hemithoracic CTT, percussion and auscultation of the left lung was faint at the 5th intercostal space.

Chest x-ray showed left pleural effusion and thoracic vertebrae scoliosis. Laboratory examination showed elevated lactate 3.4 and hypokalemia 3.0. The patient was diagnosed with Sepsis et causa necrotic flap with left pleural effusion in a patient with phylloides tumor post extensive excision. The patient was classified with ASA III. She underwent debridement with ESP Block, at which time the intensive care unit was not available.



Figeure 1. Chest X-ray showing left pleural effusion with thoracic vertebral scoliosis

During preparation, the patient was seated and oxygenated at 3 liters/minute, and intravenous fentanyl 25 mcg was administered. ESP block was performed with ultrasound guiding and 0.25% Bupivacaine 30 cc was injected. Sensory assessment was done until the onset of bupivacaine in 10 minutes post injection. The operation lasted for 1 hour, during which the patient's intraoperative hemodynamics were stable and there were no complications from the ESP block.

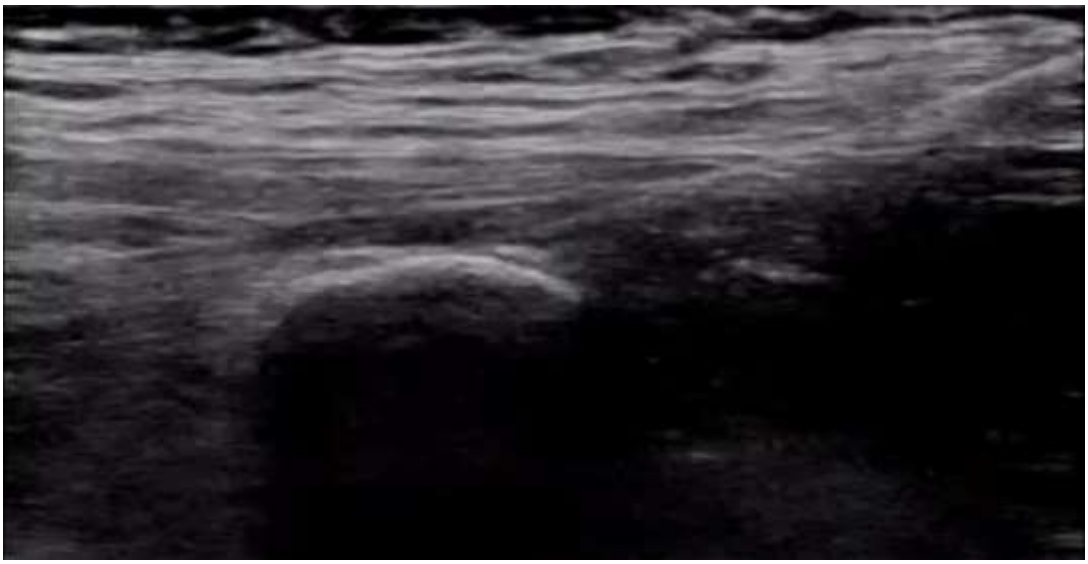


Figure 2. USG *Guiding* ESP

During 1 hours of intraoperative period, the observed systolic blood pressure was 113–125 mmHg, diastolic blood pressure was 62–78 mmHg, and the heart rate was 90–94 beats per minute. Oxygen saturation was 95–97%

with a nasal cannula 3 liters/minute. A total of 1000 ml of crystalloid fluid was administered during the surgery. We reported 100 cc of total urine output and 100 cc of total blood loss throughout the surgery.

In the postoperative period, the blood pressure was 148/82 mmHg, the heart rate was 89 beats per minute, the rate of respiration was 22 breaths per minute, the oxygen saturation was 96% with nasal cannula 3 liters per minute, and Visual Analogue Scale (VAS) was 0/10. In addition, postoperative analgesia with fentanyl 25mcg/hour after ESP block effect gone and paracetamol 4 x 1 g intravenously was given every 8 hours.

DISCUSSION

Regional anesthesia and pain management have progressed in recent years with the advent of fascial plane blocks. One of the newest techniques in this class is the erector spinae plane block. The erector spinae plane block (ESPB) was first introduced in 2016 as a regional block for the treatment of thoracic neuropathic pain and an alternative to neuraxial blockade for various surgeries. EPSB reduces the risk of direct spinal cord injury, epidural hematoma, and central infection.[1]

In relatively minor thoracic area procedures, general anesthesia is only administered with short-acting agents and without residual paralytic effects. Thoracic paravertebral block (TPVB) and thoracic epidural analgesia (TEA) are the gold standard techniques for pain control after major thoracic surgery but the treatment period is longer. TPVB, serratus plane block, intercostal nerve block, and ESPB have all been used successfully for analgesia in thoracic area surgery.[2] We chose to perform ESPB due to its simplicity and safety. The sonoanatomy to perform ESPB is easy to recognize, and vital structures such as the pleura and spinal cord are relatively easy to avoid with the needle.

It is essential to understand the anatomy and innervation of the chest wall in choosing a regional anesthesia technique. ESM is an anatomical term that describes the union of three muscles: iliocostalis lumborum, longissimus thoracis, and spinalis thoracis. These muscles originate from the ribs and thoracic and lumbar TP, then insert into the ilium and sacrum. The ESM is enveloped in a retinaculum that extends from the sacrum to the base of the skull; this columnar fascial sheath allows the fluid injected at the ESP plane to spread in a cranial-caudal direction from a single injection point, which is one of the unique characteristics of the ESP block.[3]

Each thoracolumbar spinal nerve divides into dorsal and ventral rami after emerging from the intervertebral foramen. The dorsal rami runs posteriorly and divides into medial and lateral branches that innervate the dorsal tissues. The ventral rami T1-T12 run along the inner aspect of the ribs in the intercostal space between the intercostal muscles; these rami branch into the muscles, the lateral cutaneous branch at the angle of the ribs, and end in the anterior cutaneous branch.[3]

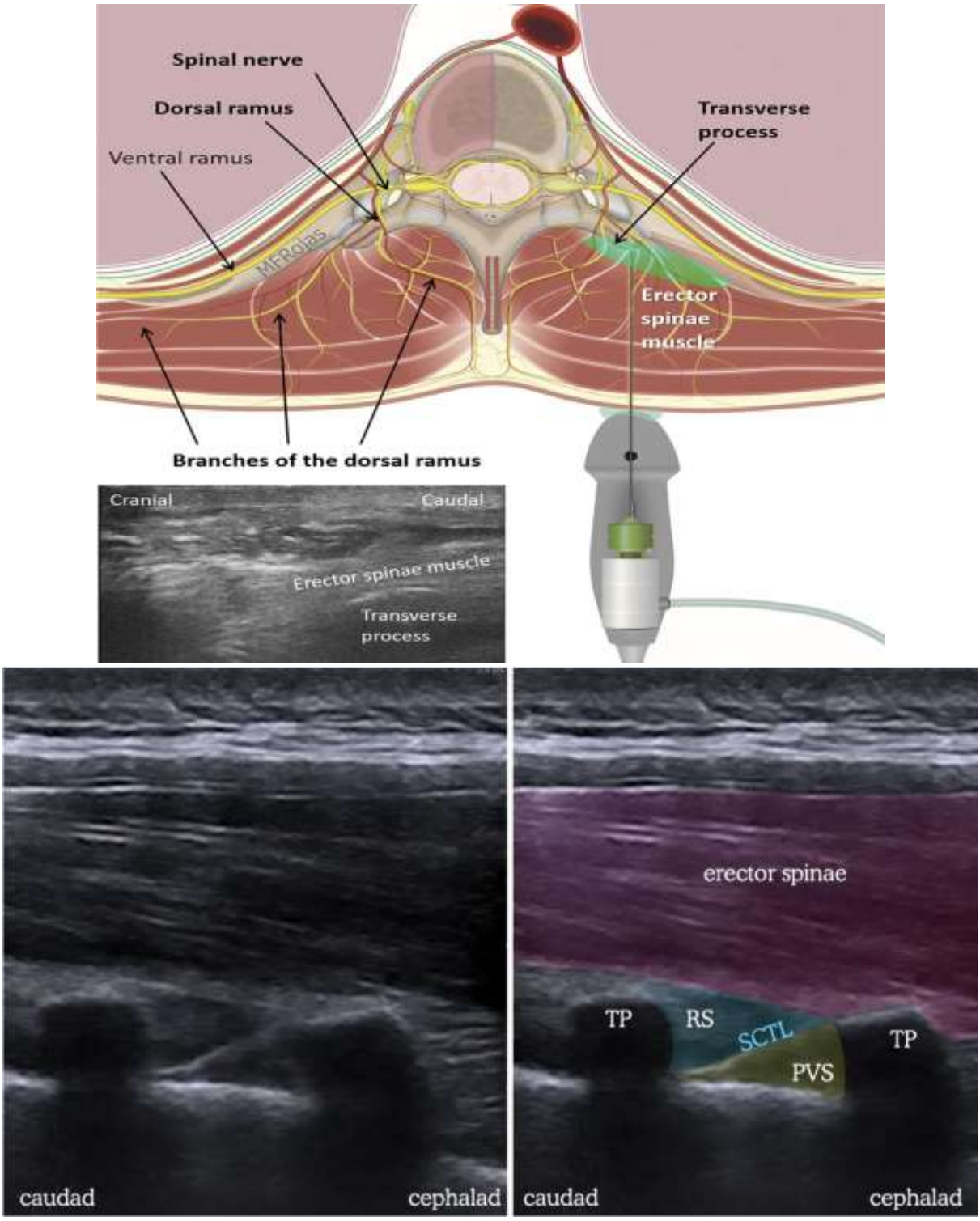


Figure 3. ESPB is performed by injection of a local anesthetic into the musculofacial plane between the inside of the erector spinae muscle and the transverse processus. This local anesthetic (green color) anesthetizes the dorsal rami branches of the spinal nerves running along this plane.[4]

ESPB is performed by first identifying the erector spinae muscle (ESM) right next to the spine under ultrasound guidance. The needle is advanced past the ESM towards the transverse process (TP). Upon contact with the TP, the ESM is separated from the TP through hydro-dissection to open the plane of the erector spinae interfascia. Injection of local anesthetic in this plane provides analgesia effect in multiple dermatomes equivalent to the injection level.[5] Cadaveric studies have shown that a single injection in the T5 TP produces craniocaudal

spreading between C7 and T8, which explains the extensive sensory block observed in patients undergoing ESPB.[6] For this patient, we were able to obtain a satisfactory anesthetic effect in the T5-T7 dermatome.

ESPB can provide analgesia effects at the cervical, thoracic, and lumbar levels for procedures such as pyeloplasty, lipoma excision, breast reconstruction, malignant mesothelioma, inguinal hernia repair, and hip reconstruction.[7]

CONCLUSION

Besides being used as postoperative analgesia, ESP block can also be used as intraoperative anesthesia where it would be more dangerous if general anesthesia is performed when the availability of postoperative intensive rooms is not available.

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IS OUR HANDLING CORRECT IN THE ICU? ON CASES OF CKD IN PREGNANCY: CASE SERIES

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ABSTRACK

Background : Hemodynamics and renal structure in the patient will determine how the kidney adapts to pregnancy. Pregnancy can cause major hemodynamic changes, in which there is an increase in blood volume and cardiac output in the body of the pregnant woman.

Case Illustration : A woman with the initials Mrs. R, 41 years old, came to a public hospital, Dr. Soekandar was a referral from a type C private hospital due to limited facilities, the patient complained of shortness of breath and headache for 3 days, the patient at that time was pregnant with G3P2A0. The patient previously had no history of routine ANC. A woman with the initials Mrs. T, 33 years old, from the type C general hospital on May 18, 2023 at 11.55 WIB, was referred with indications of improvement in general conditions and needed better facilities. the patient had received treatment for 3 days from the previous type c hospital after giving birth normally 2 months ago, the patient had several complaints such as shortness of breath since 1 week, was heavy for the last 3 days, there was a cough but not accompanied by a runny nose but phlegm for 1 week, body feeling weak, no appetite, eating and drinking only a little.

Conclusion : In the two cases above. The airway must be secured immediately because accumulation of interstitial fluid can cause pulmonary edema and can exacerbate hypoxemia from low cardiac output during "pump failure". Subsequent interventions in the care of critical patients should aim to initiate mechanical ventilation with sedation to optimize oxygen delivery.

Keywords : CKD, Pregnancy, ICU, ventilator

INTRODUCTION

In early pregnancy, the kidneys will adapt, both physiologically and anatomically. Hemodynamics and renal structure in the patient will determine how the kidney adapts to pregnancy. Pregnancy can cause major hemodynamic changes, in which there is an increase in blood volume and cardiac output in the body of the pregnant woman. A decrease in systemic vascular resistance is also found in pregnant women which can result in a decrease in the mean arterial pressure. In addition, an increase in vasodilator hormones, such as nitric oxide and relaxing, was also found in pregnant women.[1,2,3]

CKD in pregnant women can cause several complications for the mother. A meta-analysis study from China showed that pregnancy with CKD can increase the risk of preeclampsia up to 10 times.[4,5,6,7]

Study of Singh et al. also found that around 37% of pregnant women with CKD had preeclampsia. The occurrence of preeclampsia was found to depend on the type of kidney disease causing CKD, with the incidence occurring more frequently in women with IgA nephropathy, diabetic nephropathy, and lupus nephritis.[4,5,6,7]

In patients with preeclampsia, symptoms or signs that are typical before the occurrence of seizures are called prodromal signs. Preeclampsia accompanied by prodomal signs is known as impending eclampsia or imminent eclampsia. These signs include severe headache, visual disturbances, vomiting, epigastric pain and a progressive increase in blood pressure.[8]

CASE ILLUSTRATION

Case I

A woman with the initials Mrs. R, 41 years old, came to a public hospital, Dr. Soekandar was a referral from a type C private hospital due to limited facilities, the patient complained of shortness of breath and headache for 3 days, the patient at that time was pregnant with G3P2A0. The patient previously had no history of routine ANC. The patient also has other symptoms such as : cold sweat, bilateral leg oedema since 3 days ago. History of food and drug allergies was denied.

From the physical examination, the general condition Glasgow Coma Scale, somnolen, compos mentis consciousness, her height is 143cm, and her body weight is 52kg. For physical examination obtained airway inspection symmetrical chest wall movement, vesicular breath sound, B1: normochest, respiration rate 42x/minute, palpation palpable vibration in all lung fields, resonant percussion, auscultation of breath sounds there are rhonchi, B2: CRT < 2 seconds, warm acral palpation, heart rate 166 x/minute, no signs signs of cyanosis, conjunctiva not anemic, warm palpation, blood pressure 187/114 mmHg. B3: Glasgow Coma Scale somnolence, biceps and patella reflexes within normal limits, nerves 1 – 12 within normal limits. B4: inspection no leukorrhea, no hydrocele, palpation no bladder distension. B5: inspection of the abdomen is symmetrical, no abdominal distention, no ascites, auscultation of bowel sounds 20 x/minute. B6: Inspection for brown skin color, good joint movement, full muscle strength, no fractures, no lesions but edema on both lower legs, palpation of elastic skin turgor. Mrs. R also has a history of hypertension for 2 years and has never been treated, with a diagnosis from the previous hospital, namely Severe preeclampsia + ALO + CKD + metabolic acidosis.

Intubation and mechanical ventilation were decided immediately because persistent hypoxic conditions are the main causes of pulmonary vasoconstriction. If left untreated, it will cause an increase in right ventricular pressure and the burden on the heart will get heavier. Analgesics and sedation with fentanyl and midazolam are given to reduce oxygen consumption and promote better mechanical ventilation breathing. In cardiogenic edema, a high initial PEEP is given to reopen the alveoli. By using PEEP, the alveoli are kept distended and increase the surface area for gas exchange.

The patient had a caesarean section on the first day with a fetal heart rate of 110-113x per minute after which invasive ventilation was performed - PSIMV with PS 12, PEEP 7, FIO2 80%, I:E ratio: 1:1.5, Trigger 2lpm, with patient response SPO2: 97% from 73%, RR: 16, with enteral drugs amlodipine 2x5mg, dopamet 3x250mg, nabic 3x1, and for parenteral drugs use ODR 3x8mg, dexametasone 1x5mg, ranitidine 2x50mg, meroperem 3x1, furosemide 1x1mg, the transfusion fluid used is IVFD NaCl 0.9%, Fentanyl 1.5 cc / hour, syringe pump dopamine, syringe pump ISDN 1mg/hour, midazolam 1mg/hour. On this first day, the blood gas analysis results were obtained as follows, pH: 7.33, PCO2: 34, PO2: 249, BE: 7.4, HCO3: 18, Balance fluid / 6 hours urine: 350cc, IWL: 195 , fluxus not found, for a total of 545.

On the second day, the ventilation support mode invasive ventilation - PSIMV was increased gradually to PS 10, PEEP 8, FIO2 was reduced to 100%, I:E ratio 1:1.5 Triger 2 lpm, with patient response saturation of 98-99%. The results of arterial blood gas analysis showed pH 7.2, PCO2 31, PO2 58, BE 13.0, HCO3 13.4, routine blood tests were carried out on the second day with the results, namely, HB 10.5, leukocytes 11,800, random blood sugar 85, SGOT/SGPT 4/11, albumin 3.5, BUN 45, Cr 3.18, sodium 137, potassium 4.8, BT/CT 2/ 11, PCT 245, HCT 35.5, HbsAg -, for complete urine analysis obtained protein +2, leukocytes -, bacteria -, erythrocytes - . The patient also received enteral treatment in the form of amlodipine 2x5mg, prorenal 2x1, and for parenteral drugs given ondancentron 3x8mg, furosemide 2 ampoules, dexamethasone 2x5mg, meroperen 3x1, ranitiding 2x50 mg, there was also the use of a syringe pump with several drugs namely dopamine 3gr, miloz 1 mg / hour, fentanyl 1 ampoule + 20cc to 2.5 cc / hour, atracuntum 5mg / hour. some of the transfusion fluids used are astringent 40 cc/hour and continued 60cc/hour, drip ISDN 5 mg/hour, blood pressure was obtained 160/93. To rule out the diagnosis of PPCM, an echocardiography CITO ICU examination was performed, several presentations were obtained, such as: no abnormalities were seen, the dimensions of the heart chambers were normal, LV systolic function was normal (EF teich 85%), LV diastolic function was normal, RV function was normal (TAPSE 2.5). cm), normokinetic LV segmental analysis, there is no LVH, with these results it can be

concluded that Normal. calculated fluid balance per 18 hours obtained input: 1080 infusion, 97 drugs with a total of 1,177, for output obtained urine 1100, IWL 562, Fluxus 150 (50x3) with a total of 1,812, with a deficit of around 635cc

On the third day, the medication is still being continued, the ventilator is still being used, the volume control mode, TV: 550, PEEP 10, FIO2 100%, RATE 18, I:E ratio 1:1.5, Triger 2lpm. The blood gas analysis results obtained were pH 7.26, PCO2 29, PO2 89, BE 12.9, HCO3: 13.2 and fasting blood sugar obtained 126 mg/dL. In the morning at 06.00 the fluid balance was checked for 24 hours and the input was obtained from 1000 cc infusion, 254 drugs, 50 cc drinking, and for output obtained 2700 urine, IWL 780, Fluxus -, with an input and output deficit of 2176 cc.

Case II

A woman with the initials Mrs. T, 33 years old, from the type C general hospital on May 18, 2023 at 11.55 WIB, was referred with indications of improvement in general conditions and needed better facilities. the patient had received treatment for 3 days from the previous type c hospital after giving birth normally 2 months ago, the patient had several complaints such as shortness of breath since 1 week, was heavy for the last 3 days, there was a cough but not accompanied by a runny nose but phlegm for 1 week, body feeling weak, no appetite, eating and drinking only a little. The patient also has a history of confirmed COVID-19 in December 2021, never had routine ANC either in the midwife or at the obstetrician and gynecology specialist, before being referred the patient had received an infusion of 0.9% Nacl as much as 7 drops per minute followed by asering 13 tpm at 10.45 WIB, SYRINGE PUMP furosemide 10 mg/hour, ISDN 0.5 mg/hour, morphine 0.25 to 0.5 at 10.40 WIB, for injection drugs obtained in the form of Ranitidine 1 ampoule, and ODR 1x4 mg (07.45 WIB), ceftriaxone 1 gr (08.00 WIB), D40 2fl (09.35 WIB) and followed by D40 1 fls at 10.35 WIB, the patient also received oral medication spirinolactone 50 mg, 3x1 acetylcisteine, valsartan 2x80mg at 08.30 WIB. For urine output at 05.00 WIB obtained 1200 cc and in hours 11.50 WIB urine output 1600 cc.

From the physical examination, the general condition Glasgow Coma Scale Somnolen, compos mentis consciousness, her height is 155cm and her body weight is 55 kg. For physical examination obtained airway inspection symmetrical chest wall movement, vesicular breath sounds, 100% oxygen saturation with NRM. B1: normochest, respiration rate 39 x/minute, palpation palpable vibration in all lung fields, resonant percussion, auscultation of breath sounds there are rhonchi, B2: CRT < 2 seconds, warm acral palpation, heart rate 116 x/minute, no signs signs of cyanosis, conjunctiva not anemic, warm palpation, blood pressure 150/117 mmHg. B3: Glasgow Coma Scale somnolence, biceps and patella reflexes within normal limits, nerves 1 – 12 within normal limits. B4: inspection no leukorrhea, no hydrocele, palpation no bladder distension. B5: inspection of the abdomen is symmetrical, no abdominal distention, no ascites, auscultation of bowel sounds 20 x/minute. B6: Inspection for brown skin color, good joint movement, full muscle strength, no fractures, no lesions no edema on both lower legs, palpation of elastic skin turgor. Family history of the mother having type 2 diabetes mellitus. Arterial blood gas analysis obtained pH 7.34, PCO_2 26 mmHg, PAO2 68 mmHg (with NRM), HCO3 14,2, BE -10,5 mmol/L. with early diagnosis Alo + CKD.

On the first day, enteral drugs were given, namely spirinolactone 1x50mg, digoxin 1x1, Qten 2x1, valsartan 1x80mg, acetylcysteine 3x1, and for parenteral drugs given ceftriaxone 2x1, ODR 3x4mg, ranitidine 2x1, as a transfusion fluid used asering infusion 40cc/hour, use ISDN SYRINGE PUMP 0.5 mg/hour, furosemide 5 mg/hour. NIV - PSIMV ventilation machine installed with PS 12, PEEP 5-6, FIO2 80%, Triger 2lpm, I:E ratio 1:1.5 with patient response SPO2 100%, TV: 290-337. Lab tests were also carried out at the previous hospital (17.5.23) with the results of leukocytes 14,700, erythrocytes 3.9 million, platelets 500,000, random blood sugar 127, BUN 33.4, CR 1.7, sodium 147, potassium 4.3, chloride 110, SGOT/SGPT 41/ 22.

Urine is checked on the second day at 06.00 WIB, with fluid balance, every 17 hours for infusion input: 680 cc, medicine: 50, drink about 300cc, with a total of 1030 and urine output obtained 2500 cc, IWL 584 with a total of 3084cc. Deficit 2054 cc. For the second day of use D40 2 flash is stopped, spirinolactone, Qten, acetyl cysteine, valsartan is also stopped, for enteral drugs used is dogoxin, while for parenteral drugs ceftriaxone, ODR

3x4mg and Ranitidine 2x1 are also stopped, infusion of 40cc/hour continued, the syringe pump for morphine and ISDN was also stopped, but the syringe pump for furosemide 10 mg/hour was continued. for the second day, lab results were obtained, namely Hb 11.9, leukocytes 14,080, erythrocytes 3.96, hematocrit 35.2, platelets 378,000, for sodium, potassium and chloride also obtained normal results. With NIV - SIMV on the second day with PS 12, PEEP 8, rate 20, FIO2 100%, I:E ratio 1:1.5 and trigger 3 lpm.

The patient was still attached to NIV - SIMV on the third day with PS 12, PEEP 7, rate 20, FIO2 90%, I:E ratio 1:1.5 and trigger 1 lpm. In this patient, a complete urine examination was carried out and the results obtained were urine specific gravity 1010, pH 5.0, erythrocytes 250, leukocytes 1-3, negative ketones. For drug administration is still continued like the second day. Fluid calculation for 8 hours obtained fluid input from infusion of 333 cc, 26 cc of medicines, the patient is also allowed to drink around 50 cc with a total fluid input of 409, for urine output 950 cc, IWL 275 with a total of 1225 cc and fluid deficit in this patient is 816 cc.

DISCUSSION

Diagnosis can be made by history, physical examination and supporting examinations. These results already indicated the correct diagnosis, namely G3P2A0 37 weeks pregnant with PEB + partial HELLP single live fetal syndrome in head presentation. In the anamnesis, complaints of dizziness were found three days before admission to the hospital and on physical examination, an increase in blood pressure was found, namely 187/114 mmHg and presence of pretibial edema.

On the first case, severe preeclampsia is preeclampsia with systolic blood pressure ≥160 mmHg and diastolic blood pressure ≥110 mmHg accompanied by proteinuria of more than 5g/24 hours. The diagnosis of severe preeclampsia is found when one or more of the following symptoms are found: systolic blood pressure ≥160 mmHg and diastolic blood pressure ≥110 mmHg, proteinuria more than 5g/24hours or 4+ on qualitative examination, oliguria i.e. urine production less than 500cc/24hours, elevated levels Plasma creatinine, visual and cerebral disturbances: decreased consciousness, headache, scotoma and blurred vision, epigastric pain or right upper quadrant pain (due to stretching of Glisson's capsule), pulmonary edema and cyanosis, microangiopathic hemolysis, severe thrombocytopenia: <100,000 cells/ mm3 or rapid decrease in platelets, impaired liver function, namely increased SGOT and SGPT, stunted fetal growth, and HELLP syndrome.[9,10]

From the gestational age and the development of symptoms of severe preeclampsia during treatment, the attitude towards pregnancy is divided into 2, namely terminating the pregnancy or terminating simultaneously with the administration of medical treatment (active) or by maintaining the pregnancy together with the administration of medication (conservative). In this case, the gestational age more than 37 weeks with good fetal condition and partial HELLP syndrome and no signs of impending eclampsia so action was taken to terminate the pregnancy by Sectio Caesaria.[11]

First case a calculated alveolar arterial gradient of 447 mmHg (normally <15 mmHg) and a PaO2/FiO2 ratio of 558, and On the second patient arterial gradient of 435 mmHg (normally <15 mmHg) and a PaO2/FiO2 ratio of 543, There is a low cardiac output. Systolic dysfunction causes shunting of pulmonary blood into the circulation. Increased heart rate, increased blood pressure with diffuse crackles and shortness of breath are clinical signs that the systemic circulation is having problems with the pump. PaO2 / FiO2 examination is one of the tests that can be used to assess the lungs as a whole. Values will be lower in worse lung conditions, can be used to assess the development of lung function when there is interference.[12]

Fluid balance is kept negative to reduce fluid overload but is still carefully titrated while monitoring the patient's mental status and hydration. Intravenous antibiotics were given as prophylaxis for the patient's initial high leukocyte count

CONCLUSSION

In the two cases above. The airway must be secured immediately because accumulation of interstitial fluid can cause pulmonary edema and can exacerbate hypoxemia from low cardiac output during "pump failure". Subsequent interventions in the care of critical patients should aim to initiate mechanical ventilation with sedation

to optimize oxygen delivery. in the first case, termination was carried out considering that the condition of the fetus was still good, and the mother needed intensive care, for the second case, an echocardiography examination was needed to find out whether there was peripartum cardiomyopathy or not as a step for establishing a diagnosis.

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CASE REPORT

ANAESTHETIC MANAGEMENT FOR ELECTIVE LAPAROTOMY SURGERY ABDOMINAL AORTIC ANEURYSM REPAIR

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ABSTRACT

Background : Abdominal aortic aneurysms (AAAs) account for 65% of all aortic aneurysms, with 95% of them located below the renal arteries. In recent years, significant advancements have been made in aortic aneurysm repair techniques. Thorough preoperative assessment of patients undergoing vascular surgical interventions is of paramount importance, as this patient cohort exhibits an exceptionally high prevalence of concomitant medical conditions that often lead to unfavorable outcomes.

Case illustration : Mr. I (70 years old) went to our emergency department with complaints of throbbing sensation pain in the stomach around the umbilicus since 1 month before admission. MSCT Angio Aorta work-up with contrast showed a fusiform aneurysm of the abdominal aorta infrarenal to bifurcation aortae accompanied by mixed plaque on the wall of the aneurysm, ascending aortoectasia, ascending aortosclerosis, aortic arch, descending aorta, pars thoracalis, and abdominal aorta, with a fusiform aneurysm on bilateral common iliacs artery. Surgery was done with several caution.

Conclusion : Surgery for abdominal aortic aneurysm was initially linked to lower short-term mortality rates; however, this advantage did not persist in the medium and long-term follow-up. anesthesiologists are assuming an increasingly crucial role in the multidisciplinary management of such cases.

Keywords ***: aneursym abdominalis aorta, anesthetic procedure, surgery***

INTRODUCTION

Abdominal aortic aneurysms (AAAs) account for 65% of all aortic aneurysms, with 95% of them located below the renal arteries. They predominantly affect males with a male-to-female ratio of 4:1.[1] Smoking is the most significant risk factor for AAA, with approximately 90% of patients either being current or former smokers. Other risk factors include hypertension, hyperlipidemia, family history of aneurysms, inflammatory vasculitis, and trauma. Atherosclerosis is a common cause of AAA, and less frequently, genetic disorders such as Marfan's syndrome (defect in fibrin I) and Type-IV Ehlers-Danlos syndrome (causing changes in type-III pro-collagen) can also lead to aneurysm development.[2] Among diagnostic methods, ultrasonography is likely the most cost-effective tool for identifying an aortic aneurysm. However, angiography remains the gold standard for establishing a diagnosis, especially in patients with atherosclerotic and obliterative diseases affecting the aorta and iliac arteries.[3]

In recent years, significant advancements have been made in aortic aneurysm repair techniques. Thorough preoperative assessment of patients undergoing vascular surgical interventions is of paramount importance, as this patient cohort exhibits an exceptionally high prevalence of concomitant medical conditions that often lead to unfavorable outcomes. Traditional open reconstruction has been gradually replaced by less invasive approaches, including minimally invasive incisions and percutaneous techniques. These modern methods have potentially contributed to reduced morbidity and mortality rates when compared to the older open surgical techniques.[4]

Managing patients undergoing vascular surgery is among the most challenging and controversial domains within anesthesiology. The prevalence of concurrent diseases, the metabolic strain linked to the process of cross-clamping and unclamping, the ischemic insults impacting the brain, heart, kidneys, and spinal cord, collectively contribute

to a relatively heightened perioperative morbidity in this patient group. While these pathways are well understood in vascular surgery, effective tools to treat or prevent these issues are limited for the surgical team.[5] This case report will describe an anesthetic technique in order to repair surgery of aorta abdominalis aneurysm.

CASE ILLUSTRATION

Our patient, Mr. I (70 years old) went to our emergency department with complaints of pain in the stomach around the umbilicus since 1 month before admission. Pain is described as a throbbing sensation. Pain occurs throughout the day, does not improve with rest and is not aggravated by low impact activity. The patient has visit several medical departement but no improvement. When he visit Ponorogo Hospital it found that there is a large blood vessels that were thinning in his abdomen. He then referred to Dr. Sardjito Hospital for further treatment. There is no nausea, vomiting, fever, cough, shortness of breath. Patients can still carry out daily activities without any complaints, step on the ladder and walking > 200 meters without shortness of breath. The patient usually sleeps on his back without a pillow. Patients has hypertension comorbid since 5 years ago and do not routinely take medication. Smoking more than 20 years, 1 pack per day. There is no diabetes, allergies and asthma. Drugs he currently consumed are Candesartan 1 x 16 mg, Amlodipine 1 x 10 mg, Bisoprolol 1 x 5 mg, HCT 1 x 25 mg. He has history of ureteral stone surgery in 2019 with general anesthesia. similar complaints were denied. On physical examination it was found that the patient weighed 60 kg with a height of 161 cm, the patient's BMI was 23.1 Kg/m^2. The patient's blood pressure was 136/75 mmHg, with a pulse of 64 times/minute, breathing 19 times/minute, temperature 36.5 C and oxygen saturation of 98% room water. The general condition of the patient looks good with an E4 V5 M6 level of consciousness. There were no abnormalities in the head, thorax, heart, and lungs. However, on abdominal examination, palpable pulsation in the umbilical region was found. Examination of the patient's extremities was within normal limits with warm acral and CRT < 2 seconds. His laboratory investigations showed thrombocytopenia, while the chest x-ray found cardiomegaly with a CTR of 0.59, left ventricular hypertrophia with aortic elongation. The patient also performed MSCT Angio Aorta work-up with contrast (figure 1) and the results showed a fusiform aneurysm of the abdominal aorta infrarenal to bifurcation aortae accompanied by mixed plaque on the wall of the aneurysm, ascending aortoectasia, ascending aortosclerosis, aortic arch, descending aorta, pars thoracalis, and abdominal aorta, with a fusiform aneurysm on bilateral common iliacs artery.

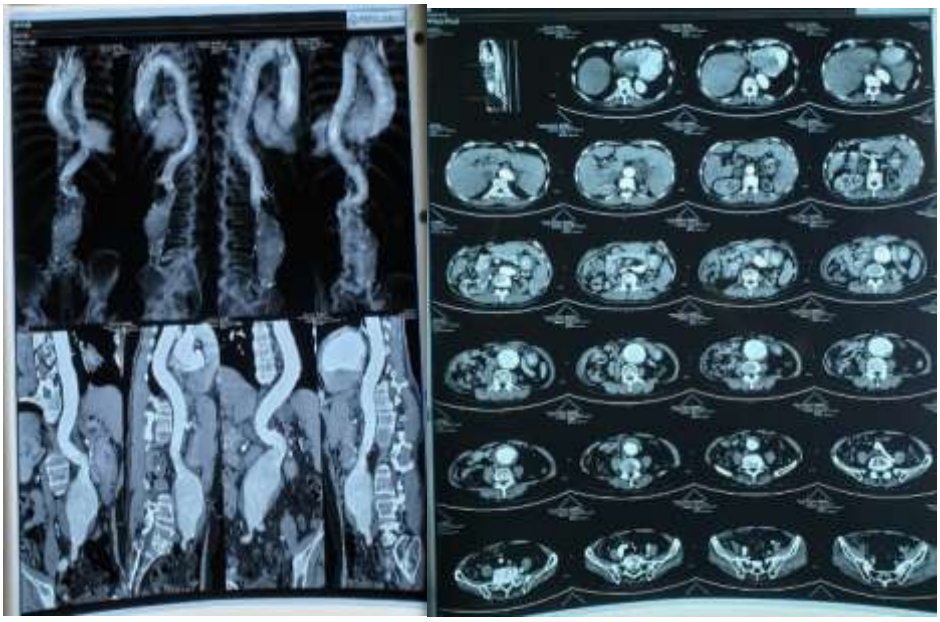

Figure 1. MSCT of angioaorta with contrast shown an aneurysm of the abdominal aorta

Our patient then underwent echocardiographic examination, it shown a concentric LVH, good global LV systolic function with EF 67%, LV gr I diastolic dysfunction, normal RV systolic function and MR Mild and AR

mild. Based on anamnesis, physical examination and support, the patient was then diagnosed with abdominal aortic aneurysm, hypertension St II On Therapy and thrombocytopenia (100,000). The patient was planned to undergo elective laparotomy for repair of abdominal aortic aneurysm. Surgery management has the following steps including GA Intubation, Monitoring of left radial artery and left dorsalis pedis and CVC on dextra subclavian vein, preparation of PRC/FFP/TC 10/10/10 pack, Fasting until surgery, Anesthesia with GA Intubation: lidocain 80mg IV, Fentanyl 200 mcg, Propofol 100mg,Rocuronium 50 mg, Ett no 7.5 cuff, Depth 20 Cm, semi closed system, controlled breathing, on ventilator, maintenance of general anesthesia done with Sevoflurane gas O2 : 2 liters of WATER : 2 liters, analgesia with continuous fentanyl. The duration of surgery was 4 hours, bleeding was 1200cc and 2 PRC transfusions were performed. (figure 2).

Figure 2. surgery on aorta abdominalis aneurism

Post operation our patient was sent to ICU.

DISCUSSION

According to the International Society for Cardiovascular Surgery and the Society for Vascular Surgery, an abdominal aortic aneurysm (AAA) is characterized as a localized expansion of the aorta resulting in a diameter that is at least 50% greater than the typical size. The typical diameter of a normal abdominal aorta falls within the range of 17 to 24 mm, although this can vary based on factors like age, gender, and body composition. An AAA is specifically identified when the aortic diameter exceeds 30 mm.[2]

Currently, surgical management options include open repair or endovascular stenting, which depends on the location and extent of the disease. Endovascular stents are employed when the aneurysm has a sufficient length of normal aorta, referred to as a 'neck,' allowing the stent to be placed without obstructing nearby blood vessels. Although the available data do not support open surgical repair for aneurysms smaller than 5.5 cm, the specific size threshold for considering endovascular stent placement has not been determined. Presumably, smal ler aneurysms may still benefit from endovascular stent placement.[3] Aneurysms of the thoracic aorta pose greater challenges in their management. If an open approach is chosen for repair, the extensive incision, the length of aorta to be resected, and the impact on multiple organs during the ischemic cross-clamp time make these aneurysms particularly difficult to treat. To reduce morbidity, a combined open and endovascular approach has been proposed as a viable option.[1]

On the anesthesia management for aortic aneurism, There are several critical considerations during abdominal aortic aneurysm surgery. Airway management may necessitate the placement of a tracheal tube. Patients undergoing these procedures are monitored using standard ASA guidelines, which include electrocardiography (ECG), noninvasive blood pressure monitoring, pulse oximetry, capnography, and temperature measurement. Additionally, invasive arterial blood pressure monitoring, central venous pressure (CVP) measurement, or pulmonary artery catheter (PAC) insertion are employed.[4] Urine output and transesophageal echocardiogram (TEE) are also used for comprehensive evaluation. In ECG monitoring, Lead V5 alone can detect about 75% of ischemic episodes. When leads II, V4, and V5 are combined, the sensitivity for detecting myocardial ischemia increases to 96%. Prior to anesthesia induction, arterial catheterization may be performed to monitor hemodynamic changes during induction. Particularly in patients with peripheral vascular disease, challenging arterial cannulation should be anticipated.[5]

In addition to routine monitoring, a radial artery catheter and a central venous line, with or without a pulmonary artery catheter (PAC), should be inserted. Two large-bore peripheral intravenous lines are required for intravascular volume management. The choice of anesthetic agents is determined by the anesthesiologist to maintain an appropriate oxygen supply-demand balance throughout the procedure. Various induction agents like Thiopental, propofol, and etomidate are used, while opioids such as fentanyl, morphine, and sufentanil are administered for analgesia. Isoflurane is the preferred inhalation agent. Neuromuscular blocking agents suitable for the patient's hepatic and renal functions are selected.[6] For patients with renal dysfunction, neuromuscular blocking agents not eliminated through the kidneys, such as atracurium or cisatracurium, are preferred. If pancuronium is used, prior administration of fentanyl is recommended to reduce its vagolytic properties. Hemodynamic response agents like esmolol, sodium nitroprusside, nitroglycerin, phenylephrine, and short-acting beta-blockers (e.g., esmolol) should be readily available for bolus and continuous infusion administration as needed to blunt hemodynamic fluctuations. The use of general anesthesia in combination with epidural anesthesia remains controversial.[7] Epidurals have been associated with more severe hypotension during cross-clamping, leading to a higher requirement for fluid and vasopressors. Some clinicians delay the administration of epidural local anesthetics until after cross-clamping, using only opioids before declamping. Studies have shown that patients with postoperative epidural anesthesia experience fewer cardiovascular and infectious complications, along with lower medical care costs, compared to those who receive only general anesthesia without postoperative epidural. However, using epidural anesthesia has been associated with earlier extubation and a reduced incidence of hypertension in the postoperative period. In summary, the management of patients undergoing abdominal aortic aneurysm surgery involves careful consideration of airway, intravascular access, anesthetic agents, and the use of epidural anesthesia, with the goal of optimizing patient outcomes and minimizing complications.[1,8]

Our patient using general anesthesia for the surgery. However, general anesthesia is often preferred over regional anesthesia for several practical reasons in patients undergoing aortic aneurysm surgery, such as, antiplatelet and anticoagulant medications: Many of these patients are on antiplatelet medications preoperatively and require intraoperative heparin. Regional anesthesia may present challenges due to the risk of bleeding and hematoma formation at the site of nerve blocks. Blood pressure control: General anesthesia allows for easier control of blood pressure through the titration of anesthetic agents and vasopressors. This control is crucial during the procedure to prevent potential complications. Secure airway in case of emergency: In the event of an aneurysm rupture during the procedure, patients under general anesthesia already have a secure airway, making transportation to the operating theater for emergency intervention less complicated. Breath-holding during imaging: Digital subtraction angiography requires clear and still images.[4,9] Under general anesthesia, patients can be easily placed on a ventilator and have their breath held, if necessary, to improve image quality. Complex procedures and prolonged surgery: Certain cases involve the use of iliac bifurcated devices, fenestrated grafts, or concomitant open surgery like femoro-femoral crossover grafting. These procedures may take a lengthy amount of time, and some patients may not tolerate such prolonged surgeries well, making general anesthesia a better option for managing their comfort and overall well-being during the procedure.[10]

Intravenous opioid patient-controlled analgesia (PCA) using hydromorphone or morphine is the conventional pain management approach after abdominal aortic surgery, against which other methods are compared. However, compared to intravenous opioids, epidural analgesia has demonstrated better pain control, a 20% reduction in tracheal intubation and mechanical ventilation duration, as well as lowered incidences of cardiovascular complications, acute respiratory failure, gastrointestinal issues, and renal insufficiency. Given that patients undergoing AAA resection often have coexisting thromboembolic and cardiovascular conditions and may be on antiplatelet agents and anticoagulants, it's crucial to assess medication history and preoperative coagulation studies, including platelet count, bleeding time, prothrombin time, and partial thromboplastin time, before the insertion of epidural catheters. In AAA surgery, lower thoracic epidural catheters are typically utilized.[1,3]

Postoperatively, out patient was sent to the ICU. Based on reference, Patients usually receive postoperative care in the intensive care unit (ICU) to enable close monitoring. The management of these patients encompasses several aspects, including monitoring and treating myocardial ischemia and ventricular dysfunction, managing hypertension by continuing preoperative antihypertensive regimens, often including beta-blocking agents, optimizing pulmonary function through measures such as inhaled bronchodilators, incentive spirometry, and facilitating early extubation, providing effective pain relief either through regional techniques or intravenous analgesia, vigilantly monitoring for bleeding, bowel complications, and renal dysfunction, and lastly, Treating renal dysfunction by avoiding nephrotoxic substances and ensuring sufficient renal perfusion via fluid management and possibly inotropic agents. While cardiovascular complications are the most frequent perioperative issues during AAA repair, a range of other complications can also arise.[8] These including renal, pulmonary neurological, gastrointestinal complications, hemorrhage, disseminated intravascular coagulation (DIC) and Limb ischemia. These complications collectively emphasize the complex nature of AAA surgery and the need for comprehensive monitoring and care to address potential challenges across various systems.[9]

CONCLUSION

Surgery for abdominal aortic aneurysm was initially linked to lower short-term mortality rates; however, this advantage did not persist in the medium and long-term follow-ups. Patients undergoing this surgery present a higher incidence of significant comorbidities, necessitating comprehensive preoperative assessment and optimization within a multidisciplinary framework. Anesthesia preparation must consider the possibility of substantial hemorrhage and the potential for transitioning to an open procedure at any stage. Effective teamwork and communication are pivotal during surgery, especially in emergency scenarios. Given the advancing complexity of these procedures, anesthesiologists are assuming an increasingly crucial role in the multidisciplinary management of such cases. A thorough grasp of these procedures is indispensable to deliver a high level of anesthetic care and ensure patient safety.

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INTERCOSTAL NERVE BLOCK FOR MANAGEMENT OF PAIN IN PENETRATING STAB WOUNDS OF THE CHEST

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ABSTRACT

Background: Thoracic penetrating trauma and tube thoracostomy can both result in severe pain. Ultrasound guided intercostal nerve block reported to be beneficial in achieving optimal pain control in the initial hours following chest tube insertion, while minimizing associated complication. We are reporting the use of intercostal nerve block in case of penetrating stab wound injury and tube thoracostomy procedure.

Case Illustration:A 17-year-old young man with penetrating stab wound of the chest reported severe pain after tube thoracostomy. Following the tube thoracostomy procedure, the patient reported severe pain, 9 on the Visual Analog Scale. We performed the ultrasound guided intercostal nerve block procedures using local anesthetic solution. Following the implementation of the ICNB, the patient's Visual Analog Scale score ranged between 1 and 2. The patient was discharged following a one-week period of hospitalization.

Conclusion: Intercostal nerve block can provide analgesia or augment anesthesia in various situations, including blunt thoracic trauma, chest wall operations, and postherpetic neuralgia. The procedure has a low complication rate and is generally well-
tolerated, especially when performed under ultrasound guidance. It can reduce patient opioid consumption during the perioperative period. The chest wall is strongly innervated by intercostal nerves, which can cause severe thoracic pain due to the chest wall's movement during respiratory effort. ICNB, with local anesthetic and steroid, is proven to be beneficial in relieving post-thoracotomy pain and maintaining hemodynamic stability post-injection. It is associated with simple administration, precise targeting, and patient satisfaction. Ultrasound-guided methods have enhanced the administration process and increased the efficacy of these techniques, making them advantageous in comprehensive multimodal anesthesia.

Keyword: Nerve block; Intercostal nerve block; Pain management; Penetrating stab wound

BACKGROUND

Stabbing injury comprise 13% of all thoracic trauma (1), while penetrating trauma of the thorax are 62.9% of all penetrating trauma (2). The chest wall is strongly innervated by a pair of intercostal nerves that run along the lower edge of each rib (3). So, injuries or irritations of the intercostal nerves can cause thoracic pain (4). On average, the VAS score for stabbing injuries ranged from 8.49 to 8.65, while tube thoracostomy (TT) as the most frequently performed procedure in thoracic surgery, can also cause high pain severity (5–8).

The use of intercostal nerve block (ICNB) with local anesthetic and steroid is proven to be beneficial in relieving post-thoracotomy pain (9). Despite the minimal need for additional opioid prescriptions, ICNB has been reported to be beneficial in achieving optimal pain control in the initial hours following chest tube insertion (9–11). This benefit is important because opioid can cause some effect on the lung, such as causing granulomatous changes as a direct effect, or indirectly causing respiratory depression by reducing peripheral chemoreceptor sensitivity to carbon dioxide and central respiratory center activity (12).

Using ultrasound while performing ICNB have some potential benefits, reduction of the risk for pneumothorax and the avoidance of arterial puncture, which complication can result in hemothorax (13). Ultrasound also provides greater accuracy and allows the use of smaller volumes of injectate to guide ICN injections in cadavers compared to using anatomical landmarks (14).

The combination of Ropivacaine, Lidocain and Dexamethasone for ICNB is rarely reported, we are reporting the use of this combination in case of post-TT procedure.

Case Illustration

A 17-year-old young man presents to the emergency room with pain in his right back and breathlesness. This patient is a victim of a scissors stabbing in his right back. A moment from the stabbing, he is able to run to chase the perpetrators, but in a short period of time he feels shortness of breath, then fell down limply. He feels a sharp pain originating from his back and breathlessness that keep getting worse. Bloods flowing from the wound and he transported to the hospital.

In the emergency room examination are performed, vital signs showed: 98x/min heart rate, 100/70 mmHg blood pressure, 32x/min respiratory rate with 98% oxygen saturation on RA. Asymetrical chest wall movement with right chest lag was observed along with decreased breath sounds in the lower two-thirds of the right lung. The wound on the posterior chest is 1.5 cm wide and 1 cm long (Fig 1). The patient is presenting with cold pale acres, but capillary refill time is still less than 2 seconds.

A chest X-ray was conducted, revealing a distinct area of lucency in the right half of the thoracic cavity, along with the presence of the visceral pleural line. This was accompanied by an area of increased density in the right half of the thoracic cavity, which

Figure 1

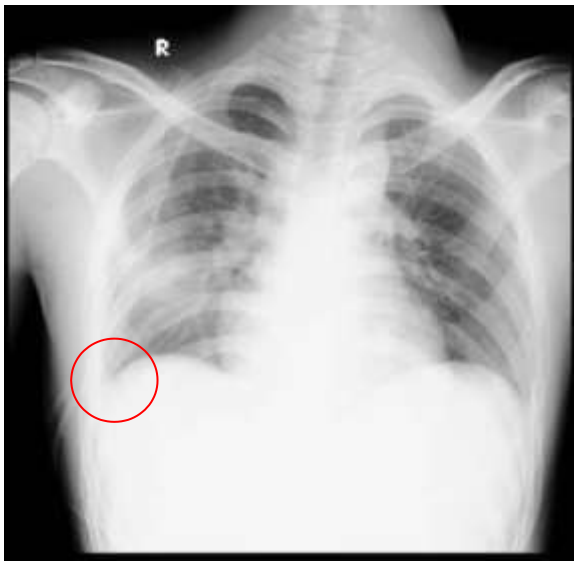

Figure 2

Figure 1. The wound on the posterior chest is 1.5 cm wide and 1 cm long;**Figure 2.**chest X-ray revealing a distinct area of lucency in the right half of the thoracic cavity, along with the presence of the visceral pleural line. This was accompanied by an area of increased density in the right half of the thoracic cavity, which extended to cover the right hemidiaphragm, and resulted in the obscuration of the right costophrenic angle
(Picture was taken independently by the author)

extended to cover the right hemidiaphragm, and resulted in the obscuration of the right costophrenic angle (Fig 2).

The surgeon performed a TT procedure on the right anterior axillary line and formed a connection between the tube and a water-sealed drainage system. A total of 70cc of hemorrhagic fluid was collected, and a following chest x-ray was obtained. The repeated chest X-ray reveals the presence of a chest tube connected to the right hemithorax, positioned at the level of the lateral costae 2, with the tip oriented cranially. Additionally, there is a decrease in the amount of liquid visible (Fig 3).

Following the TT procedure, the patient reported severe pain, 9 on the Visual Analog Scale (VAS). Ketorolac 3x30 mg is given as anagetic agent, but the patient still reported pain at 7 to 8 on VAS. The patient was briefed and gave consent on the ICNB procedures. The initial step in doing an intercostal nerve block (ICNB) involves placing the patient in a seated posture. Subsequently, the skin is disinfected using povidone iodine and 70% alcohol. The specific rib to be targeted for blocking is then determined using palpation. The affected rib is then followed in a posterior direction until it reaches the point where it takes a posterior angle. In this case, a sterile syringe with a capacity of 10 mL was utilized to drawn a combined volume of 5 mL of local anesthetic solution, consisting of Ropivacaine 0.25%, Lidocain 1%, and 7.5 mg of dexamethasone.

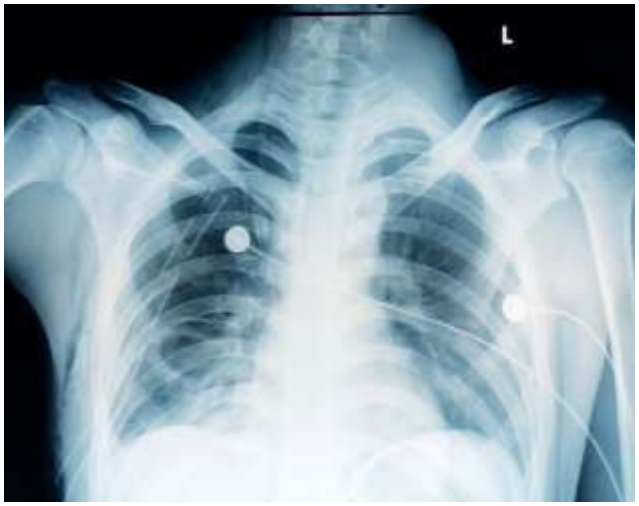

Figure 3

Figure 4

Figure 1. The repeated chest X-ray reveals the presence of a chest tube connected to the right hemithorax, positioned at the level of the lateral costae 2, with the tip oriented cranially. Additionally, there is a decrease in the amount of liquid visible**; Figure 2.**Sonogram shows the rib as a hyperechoic curvilinear line with an acoustic shadow below it
(Picture was taken independently by the author)

After positioning a high-frequency linear ultrasound transducer in the longitudinal plane, its superior aspect is laterally rotated by 15 degrees above the affected rib at the posterior angulation. This position facilitates sonograms. The rib is a hyperechoic curvilinear line with an acoustic shadow below it (Fig 4). The intercostal spaces between neighboring ribs resemble a "flying bat" appereance. The intercostal area between ribs provides a good acoustic window for pleura identification. A bright hyperechoic line above the lung is the pleura. During respiration, the parietal and visceral pleura slide. The lung looks like ultrasonic waves on a sandy beach and sometimes has comet tail artifacts. The outer, interior, and deepest layers of intercostal muscle are between nearby ribs.

Pleura depth is measured. Anesthetic solution is applied to the skin after a transverse ultrasound scan identifies anatomical structures. After that, an in-plane 1½- inch, 22-gauge needle is inserted from the lower border of the ultrasonic transducer. Under ultrasound guidance, the needle trajectory is changed in real time until the tip is in the intercostal muscle's interior layer. After careful assessment, a small amount of solution is injected under real-time ultrasound imaging to use hydrodissection to confirm the needle tip's placement. After verifying the needle tip position, the needle is carefully inserted into the innermost layer of the intercostal muscle, halting before reaching the pleura depth. After careful aspiration, a small amount of solution is given to help locate the needle tip, focusing on the bright hyperechoic pleura line. After careful aspiration, leftover solution is injected gradually. Injection resistance must be minimized. After removing the needle, an aseptic compression bandage and cold pack are applied to the injection site.

Following the implementation of the ICNB, the patient was given paracetamol injection 3x1 grams and metamizole 3x1 grams. After the procedure, the patient's VAS score ranged between 1 and 2. The patient was discharged in healty condition following a one-week period of hospitalization.

DISCUSION

Intercostal nerve blockade is a simple regional anesthesia technique that can be administered with or without ultrasound guidance at the bedside. Intercostal nerve blockade is a diagnostic and therapeutic procedure that can provide analgesia or augment anesthesia in a variety of situations, including blunt thoracic trauma, chest wall operations, and postherpetic neuralgia. The procedure has a low complication rate and is generally well tolerated, especially when performed under ultrasound guidance. In addition, intracostal nerve blockade can reduce patient opioid consumption during the perioperative period (15).

The barrel-like structure of the chest wall is created by the overlaying of skin and soft tissue over the musculature of the underlying bone structure. Intercostal muscles and the diaphragm aid in respiration and stabilize the chest wall, as do latissimus dorsi, serratus anterior, and pectoralis major and minor muscles. This design safeguards the thoracoabdominal viscera and permits efficient volumetric variations in chest size. The thoracic "cage" moves in tandem with the musculature of the chest wall (16). The chest wall is strongly innervated by a pair of intercostal nerves that run along the lower edge of each rib (3). Near the midaxillary line, the intercostal nerve sends out a branch called the lateral cutaneous branch. This branch goes horizontally through the internal and external intercostal muscles, where it splits into a dorsal and a ventral branch. Together, these nerves supply the skin and subcutaneous tissue of the side of the trunk and the upper belly with nerve impulses. Before each intercostal nerve ends, it sends out a branch called the anterior cutaneous branch. This branch splits into a lateral branch and a middle branch. These supply the skin and subcutaneous tissue of the front of the trunk and belly, including the skin over the sternum and rectus abdominis (17). So, injuries or irritations of the intercostal nerves or overlaying soft tissues and musculature of the chest wall can cause severe thoracic pain because the chest wall is always moving during the respiratory effort (4). On average, the VAS score for stabbing injuries ranged from 8.49 to 8.65, while tube thoracostomy (TT) as the most frequently performed procedure in thoracic surgery, can also cause high pain severity (5–8).

The primary objective of treatment for any patient with a chest wall injury is to minimize the consequences of compromised chest wall mechanics. Pain caused by fractures and muscular injury to the chest wall results in splinting, decreased capacity for inspiration, and decreased sputum clearance (16). In addition, post-procedural pain has the potential to cause significant impairment and result in unfavorable consequences. These may encompass respiratory complications, such as atelectasis and pneumonia, along with prolonged hospitalization, diminished quality of life, and the development of chronic persistent postoperative pain syndrome (18). In cases of significant severity, these complications have the potential to do more harm than the injury itself, resulting in posing a potential threat to the patient’s life.

The use of intercostal nerve block (ICNB) with local anesthetic and steroid is proven to be beneficial in relieving post-thoracotomy pain (9). Despite the minimal need for additional opioid prescriptions, ICNB has been reported to be beneficial in achieving optimal pain control in the initial hours following chest tube insertion (9–11). This benefit is important because opioid can cause some effect on the lung, such as causing granulomatous changes as a direct effect, or indirectly causing respiratory depression by reducing peripheral chemoreceptor sensitivity to carbon dioxide and central respiratory center activity (12). The use of ICNB also has demonstrated a notable benefit in maintaining hemodynamic stability post-injection, primarily attributed to its non- interference with the sympathetic nervous system (19). Compared to other popular technique, paravertebral block (PVB), it is worth noting that the visual score of INB has been empirically demonstrated to be notably superior to that of PVB (20).

Intercostal nerve block stands out as a preferred option to alternative postoperative analgesics. The safety and efficacy of intercostal nerve block have been well established in the medical literature. This technique has been found to be associated with simple administration, precise targeting, and a notable level of patient satisfaction

(21). To reduce potential risk, using ultrasound while performing ICNB are able to decrease the risk for pneumothorax and the avoid of arterial puncture, which complication can result in hemothorax (13). Ultrasound used to guide ICNB injection also reported to provides greater accuracy and allows the use of smaller volumes of injectate in cadavers compared to using anatomical landmarks (14).

In clinical practise, it is common to combine lidocaine and ropivacaine to achieve both a rapid onset and a prolonged duration of action. This combination has been reported as safe for the administration of locoregional anaesthesia (22). The addition of combined perineural dexamethasone to ropivacaine for ICNB appeared to be an attractive method for long-lasting analgesia with minimal adverse effects (23).

The utilization of regional anesthesia has become more prevalent in recent years. The implementation of ultrasound-guided methods has enhanced the administration process and increased the efficacy of these techniques, making them advantageous in the context of comprehensive multimodal anesthesia (24). In our patient, ketorolac injection did not seem to be adequate in reducing the pain from the puncture wound and the wound caused by the TT procedure as the patient's VAS of 9 only dropped to 7-8. However, after intergration of ketorolac as multimodal analgesia with ICNB implentation, the patient's VAS was able to drop to 1-2 which was adequate in providing pain management to prevent the complications previously described so that the patient discharged from the hospital in good condition on the first week of treatment. Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ketorolac, exert analgesic effects by diminishing the synthesis of prostaglandins via the inhibition of cyclooxygenase (COX). These medications can be employed as supplementary agents during the perioperative phase, offering the notable benefit of efficacious pain relief without of any respiratory depressive effects (25). Administration of paracetamol and metamizole after the procedure exhibits a beneficial opioid-sparing activity, which contributes to the reduction of adverse events and risks associated with the administration of high doses of opioids (26,27).

CONCLUSION

Intercostal nerve block can provide analgesia or augment anesthesia in various situations, including blunt thoracic trauma, chest wall operations, and postherpetic neuralgia. The procedure has a low complication rate and is generally well-tolerated, especially when performed under ultrasound guidance. It can reduce patient opioid consumption during the perioperative period. The chest wall is strongly innervated by intercostal nerves, which can cause severe thoracic pain due to the chest wall's movement during respiratory effort. ICNB, with local anesthetic and steroid, is proven to be beneficial in relieving post- thoracotomy pain and maintaining hemodynamic stability post-injection. It is associated with simple administration, precise targeting, and patient satisfaction. Ultrasound-guided methods have enhanced the administration process and increased the efficacy of these techniques, making them advantageous in comprehensive multimodal anesthesia.

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SUPRACLAVICULAR BLOCK AS THE PREFERRED APPROACH FOR UPPER LIMBSURGERY IN PATIENTS WITH METABOLIC SYNDROME

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ABSTRACT

Background: Technical challenges in providing anesthesia to metabolic syndrome patients include increasing complexities and potential risks. Utilizing regional anesthesiafor this type of patients can offer a multitude of potential advantages. In upper limbsurgeries below the mid-shaft of the humerus, the supraclavicular block (SCB) is one ofmost performed brachial plexus block procedure which is associated with its highly accessibility, reliability, and efficiency.

Case Illustration:A 57-year-old woman presented with fracture of the distal third of the left humerus involving the intra-articular according to AO/OTA type C2 classification. The preoperative screening examinations concluded that the patient had an ASA (American Society of Anesthesiologists) III. The patient was receiving supraclavicular block with Ropivacaine 0.5% + Dexametason 10 mg in 20 cc total volume. After the procedure, patient's Numerical Rating Scale at rest is approximately between 0 and 1, andat motion 1-2 score is noted.

Conclusion: Administering regional anesthesia, specifically ultrasound-guided supraclavicular block with Ropivacaine 0.5% and Dexamethasone 10 mg, can offernumerous advantages for individuals with metabolic syndrome undergoing upper limbsurgery. This approach can lead to a decrease in post-operative complications such asnausea, vomiting, and respiratory depression. It can also reduce opioid usage, shorten hospital stays, and provide effective analgesia with a lower volume of local anesthetic.The inclusion of dexamethasone in the block can further enhance the onset and durationof analgesia without undesirable effect. Overall, regional anesthesia with the specifiedtechnique and medications is a safe and effective option for anesthesia in this metabolicsyndrome population.

Keyword: Anesthesia; Nerve block; Supraclavicular block; Pain management; Intercondylar Fracture; Bupivacaine; Ropivacaine

BACKGROUND

The technical challenges associated with administering anesthesia to individuals with metabolic syndrome, this syndrome is associated with greater complexities and potentialhazards in the practice of anesthesia (1). Metabolic syndrome encompasses a number of metabolic dysregulations, like insulin resistance, atherogenic dyslipidemia, central obesity, and hypertension (2).

Utilizing regional anesthesia for patients with insulin resistance like diabetic patients can offer a multitude of potential advantages. The benefits of these approach arenumerous. They can lead to a decrease in post-operative nausea and vomiting, as well ashelp avoid any potential airway complications that may arise from general anesthesia. Additionally, they can contribute to a decrease in opioid usage and a shorter hospital stay(3). In hypertensive patient, regional anesthesia had less pronounced decreases in blood pressure in comparison to those who received central neuroaxial and general methods, ifachieving optimal blood pressure control is the objective for patients with hypertension, the preferred technique would be regional anesthesia (4).

The supraclavicular block (SCB) is one of most frequent brachial plexus block procedure in upper limb surgeries below the mid-shaft of the humerus which is a highly accessible, reliable, and efficient technique (5,6). Ultrasound guidance stated as safe andeffective method for SCB as the incidence of complications are less because ultrasound provides real-time visulaization of underlying structures and the spread of local anaesthetic (7). This technique also has been found to be effective in providing post- operative pain relief (6). The nerve in overweight

person is located more deep than normal person, SCB is avantagous in this situation because the brachial plexus is located superficially in the supraclavicular region (8).

We provide a case of A 57-year old woman with metabolic syndrome receiving SCB as regional anasthetic preference.

Case Illustration

A 57-year-old woman came with complaints of limited movement in the left elbow afterfalling slipped 1.5 months ago with the left hand resting on the body weight. After the fall, the patient sought treatment at 'Sangkal Putung' but there was no change.

On examination we found angular deformity with limited range of movement (active elbow flexion-extension: 0-20°) on left elbow. The computed tomograpy was conducted and showed fracture of the distal third of the left humerus involving the intra-articular according to AO/OTA type C2 classification with soft tissue swelling on the dorsal side of the left elbow region (figure 1).

Preoperative evaluation revealed that she has diabetes and and hypertension treated with 10 mg amlodipine, 100 mg acarbose three time a day, and 10 unit of insulin(Levemir©). Her antropometric measurement was 65 kg body weight and 153 cm tall and 27,8 body mass indexs. The airway patent with 17x normal breathing respiratory rate, good neck movement (flexion and extention), and Mallampati class is III. Blood preassure was 152/92 mmHg, regular pulse rate of 96 times. The EKG show normal sinus rhytm. The labolatorium finding show 143 mg/dL fasting blood sugar and 9.3% HBA1C, hemoglobin 13.3 g/dl, platelet count 302.000/dl, PT 9.9 seconds, APTT 24.4 seconds, urea 31,4 mg/dl, and creatinine 0.54 mg/dl. Chest X-ray showed normal heart and lung, but with aortasclerosis. The preoperative screening examinations concluded that the patient had an ASA (American Society of Anesthesiologists) III.

Figure 1

Computed tomograpy showed fracture of the distal third of the left humerus involving the intra-articular accordingto AO/OTA type C2 classification with soft tissue swelling on the dorsal side of the left elbow region

(Picture was taken independently by the author)

An intravenous line was set up, and the patient obeyed to a fasting period of 6 hours prior to the operation. During this fasting period, a continuous infusion of Ringer lactate at a rate of 100cc per hour is being administered. The hypertension and diabetes requiring a target diastolic blood pressure range of 80-110 mmHg and systolic blood pressure range of 110-180 mmHg. Additionally, the fasting blood sugar should be maintained between 80-180 mg/dl. Ibuprofen 400 mg is given as preoperative analgesia.Ropivacaine 0.5% + Dexametason 10 mg in 20 cc total volume prepared as injectate for SCB.

Figure 2

The needle tip is resting in the corner pocket between the artery and the first rib's superior border, near the brachialplexus

(Picture was taken independently by the author)

The patient positioned on supine position, the patient's head rotates away from the block location, while the operator stands by the bed. The anethesist asks the patient to elevate their head against their hand to identify the posterior boundary of the sternocleidomastoid muscle. The clavicle-sternocleidomastoid lateral border is then identified. A highfrequency linear ultrasound transducer is then put in the transverse planeto obtain a sonogram. The subclavian artery, brachial plexus, lung, and first rib are identified. Colour Doppler imaging can highlight the subclavian artery and other vascularfeatures. The angle or corner formed by the subclavian artery medially, the first rib inferiorly, and the brachial plexus superolaterally is then chosen for needle tip placementbecause injection into this location blocks the brachial plexus and ulnar nerve fibres. Thisultrasonography feature is called the corner pocket, and the ulnar nerve fibres from C8 are dubbed ‘the eight ball’.

When the corner pocket is found and the clinician confirms the relative locationsof the subclavian artery, lung, and first rib, a 22-gauge, 3.5-inch styletted needle is advanced in-plane under real-time ultrasound guidance until the needle tip is resting in the corner pocket between the artery and the first rib's superior border, near the brachial plexus (Figure 2). The solution is slowly administered in increments after cautious aspiration for blood or cerebrospinal fluid. Remove the needle and apply pressure to the injection site to prevent bleeding.

During the operation this patient is sedated with dexmedetomidine 0.3 mcg/kg/hour. The total elbow arthroplasty was suscesfully performed by the surgeon. Immediately we give ketorolac 3 x 30 mg and peroral Paracetamol 3 x 500 mg as post operative analgesia. The patient's Numerical Rating Scale at rest is approximately between 0 and 1, and at motion 1-2 score is noted. Post operative glucose evaluation alsonote a good level blood sugar at 143 mg/dL.

DISCUSION

The technical challenges associated with administering anesthesia to individuals with metabolic syndrome, this syndrome is associated with greater complexities and potentialhazards in the practice of anesthesia (1). Utilizing regional anesthesia for patients with insulin resistance like diabetic patients can offer a multitude of potential advantages. Thebenefits of these approach are numerous. They can lead to a decrease in post-operative nausea and vomiting, as well as help avoid any potential airway complications that may arise from general anesthesia. Additionally, they can contribute to a decrease in opioid usage and a shorter hospital stay (3).

Surgical procedures elicit a complex physiological stress response characterized by various consequences, such as the release of catecholamines and the development of insulin resistance. This condition may confer a predisposition to the development of hyperglycemia in individuals diagnosed with diabetes mellitus (9). This phenomenon hasbeen observed in a comprehensive meta-analysis comprising 11 randomized controlled trials. The findings indicate that patients who received a combination of general anesthesia and regional anesthesia experienced a reduced number of glucose excursions in comparison to those who solely underwent general anesthesia (10). In our patient, thiseffect reflected on post operative glucose evaluation noting a good level blood sugar at 167 mg/dL.

Promoting the restoration of function, particularly the resumption of a normal diet,is a crucial objective in the perioperative management of individuals with diabetes undergoing surgery (9). The findings of the study revealed that the implementation of opioid-free anesthesia exhibited a notable reduction in the occurrence of postoperative nausea and vomiting, in comparison to the utilization of an opioid-inclusive strategy (11).

The patient without nausea and vomiting are able to resumpt a normal diet. Our patient having no opioid as post operative analgesia, this is relevant with a study that found opioid consumption was significantly higher (32%) in the group of patients under general anesthesia undergoing upper extremity surgery than in the group of patients under regional anesthesia (0%), as was the use of anti-emetic drugs (21% vs 3%) (12).

Diabetes mellitus is an acknowledged predisposing factor for the occurrence of postoperative respiratory depression, which is also referred to as opioid-induced ventilatory impairment (13). The etiology of this phenomenon remains uncertain, with potential factors including neuropathy, obesity, obesity hypoventilation syndrome, or obstructive sleep apnea. Nevertheless, existing evidence suggests that regional anesthesiaexhibits a reduced prevalence of postoperative respiratory depression in comparison to general anesthesia (14).

In hypertensive patient, regional anesthesia had less pronounced decreases in blood pressure in comparison to those who received central neuroaxial and general methods, if achieving optimal blood pressure control is the objective for patients with hypertension, the preferred technique would be regional anesthesia (4).

Ultrasound-guided SCB presents a number of potential advantages. The patient inthis case present with overweight body mass, raising a concern that the nerve is located more deep than normal person, but the brachial plexus is located superficially in the supraclavicular region, even in individuals with obesity (approximately 1.5-2 centimetres), allowing for a clear visibility of the target structures (such as the subclavianartery, first rib, pleura, and injection needle) and the distribution of the local anaesthetic (8). The utilisation of ultrasound-guided procedures also associated with enhanced the accuracy of administering local anaesthetic, allowing operators to accomplish an effectiveblock using a lesser volume of injectate (15).

One notable limitation of the supraclavicular block is its close proximity to the pleura, which raises concerns regarding the potential occurrence of pneumothorax (16). But Gauss et al. shows that utilisation of ultrasound does seem to decrease the likelihoodof pneumothorax when performing SCB with risk of pneumothorax remains extremely low, at only 0.04%. (95% CI 0.0–0.075) (8). SBP also associated with phrenic nerve blockade associated with this technique, which may result in hemidiaphragmatic paresis (HDP) (15). However, in the subject population without of any respiratory disease, HDPwas well tolerated (17).

In this case we use Ropivacaine 0.5% + Dexametason 10 mg in 20 cc total volume. Alarasan et al. shows that A volume of 20 ml of the local anesthetic agent was consideredadequate to induce the formation of an observable "Halo" surrounding the brachial plexus.The appearance of “Halo” around the brachial plexus is a sign of effective volume (18).

Ropivacaine, in comparison to bupivacaine, has less lipophilicity, resulting in a notably elevated threshold for cardiovascular and central nervous system toxicity. Consequently, ropivacaine is commonly used for peripheral nerve blocks (19). The use ofRopivacaine in this case also suported by a randomize control trial showed that the recovery of motor functions was observed to be quicker in both the ropivacaine groups compared to Bupivacaine groups in SCB procedure, although sensory and motor block onset showed similarity in both agents. The trial also shows unnsucesfull attempt to enhance the onset and duration of action by raising the concentration of Ropivacaine from0.5% to 0.75% (20). That's why we conclude that Ropivacaine at 0.5% concentration thebest choice for SCB procedure.

The inclusion of dexamethasone in SCB results in quick onset and extended duration of analgesia with reduced amount of local anesthetic agent (18,21–23), which isrefelcted by the low NRS in this case. It is necessary to remember that one of the undesirable side effects of dexamethasone is a raise in glycemia (24,25), but it seems thiseffect have no impact in this case. The same effect also found in patients undergoing totaljoint arthroplasty which shows a lack of association between the administration of perioperative dexamethasone and the likelihood of experiencing postoperative glucose levels exceeding 200 mg/dl or reaching higher maximum glucose levels (26).

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A CASE REPORT : EPIDURAL TUNNELING FOR ANALGESIA IN PATIENTS WITH SEVERE CANCER PAIN

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ABSTRACT

Background
Pain is one of the most feared aspects of patients diagnosed with cancer. In most cases, oral opioids and adjunctive therapy are sufficient for this pain relief. Unfortunately, a minority of patients do not respond to conservative management and must undergo interventional procedures to maximize pain relief. This report will present case illustrations of Epidural Tunneling for Analgesia in Patients with cancer Pain.
Case Illustration
A 55 years old woman with worst cancer pain due to bone metastases to ca mamae and without any other significant medical history came with complaints of pain in the hips buttocks radiating to the feet feeling numb continuously since 3 months ago. The pain felt by the patient will improve by taking the drug, but the pain will recur so that the patient has difficulty sleeping. It is known that the worst pain with NRS score 10 that occurs in this patient is due to a process of bone metastases so that the patient will undergo an Epidural tunneling procedure. In this patient, the NRS score before the Epidural tunneling procedure was performed, the patient still felt pain with an NRS score of 9-10, but after the epidural tunneling procedure, the NRS score dropped to 1-2 NRS
Discussion
Cancer pain is a general term for various pain conditions, characterized by different etiologies, characteristics and pathological mechanisms in cancer. Although many types of cancer can be diagnosed and treated early, and more patients are being cured every year, statistics show that far too many cancer patients experience cancer-related pain.
A mechanism-based approach in pain therapy is essential for providing a more individualized and effective analgesia but in order to apply such approach it is important to recognize and classify the underlying pathophysiological processes.(2)
In this patient, we use multimodal analgesic. Epidural tunneling procedure could be done to decrease the opioid dosage. Epidural tunneling procedure also good and effective option because it can reduce the risk of catheter infection, so this procedure can be used longer when compared to epidural usual procedures.
Conclusion
The tunneling epidural catheter technique is safe and effective in patients with persistent worst cancer pain, especially patients in the final stages of terminal illness such as cancer,despite the general use of analgesic drugs which can be tiring for the patient.
Keyword: Anesthesia; Epidural; Epidural tunneling; Cancer Pain; NRS

BACKGROUND

Pain is one of the most feared aspects of patients diagnosed with cancer. In most cases, oral opioids and adjunctive therapy are sufficient for this pain relief. Unfortunately, a minority of patients do not respond to conservative management and must undergo interventional procedures to maximize pain relief. Some of the techniques used in the management of cancer-related pain include neurolytic blocks and spinal and epidural analgesia. [1,4]

Analgesics with antipyretic properties (eg acetaminophen, ibuprofen, etc.) and opioids (eg codeine, morphine, etc.) are the mainstay of pediatric pain therapy. For moderate to severe pain, continuous (intrathecal or epidural) spinal analgesia, using local anesthetic alone or in combination with opioids, is often used. Spinal analgesia provides deep analgesia with minimal systemic side effects (eg sedation, respiratory depression) by blocking nociceptive impulses from entering the central nervous system.[8–10] The use of percutaneously inserted epidural catheters in which a catheter segment is subcutaneously tunneled may permit the use of epidural catheterization for longer time periods It is a very effective method of pain control but can be difficult to administer and titrate on an outpatient basis.[1,4,9]

This report will present case illustrations of Epidural Tunneling for Analgesia in Patients with Severe Cancer Pain and discuss the pain that can arise in cancer patients, as well as the techniques and advantages that can be used in epidural tunneling.

Case Illustration

A 55 year old woman with Severe cancer pain due to bone metastases to ca mamae and without any other significant medical history came with complaints of pain in the hips buttocks of the legs radiating until the feet feel continuously numb. The pain has been felt since 3 months, with characteristics such as stabbing and radiating from the hip to the foot so that it feels numb. Pain is felt all the time so it is difficult for the patient to sleep if the pain recurs. The pain was felt to improve by taking the drug, the history of drugs used by the patient included 3x15mg MST, 4x500mg Paracetamol, 1x12.5mg amitriptyline, 25mcg/hour fentanyl syringe. The patient has a history of surgery and a history of chemotherapy. History of Mastectomy surgery in 2021 and history of Orif Femur 2022. The NRS value of the patient at rest is 2-3, and the NRS value when pain recurs is 5-6 (Figure 1). The severe pain that occurred in this patient was known to be due to a process of bone metastases, shown on the lumbosacral X-ray (figure 2) showing osteolytic-blastic lesions accompanied by compression of the L5 vertebrae >50%, osteolytic lesions on the left os ilium, left acetabulum, os sacrum, obscuration L4-L5 pedicles due to metastatic processes, Anterolisthesis and L5-S1 laterolisthesis grade 1. Due to the severe pain experienced by the patient, the patient will undergo an Epidural tunneling procedure. Preparations to be carried out include informed consent to the patient and family, installing a 1-way IV line and making sure it is running smoothly, the patient is fasted 6 hours before surgery, Premedication is given Ranitidine 50 mg IV and metoclopramide 10 mg 1 hour before the procedure, and the patient plans to have the procedure performed with GA Face mask.

Figure 1. Examination of the patient's NRS score after Epidural Tunneling

Figure 2. Examination of the patient's NRS score after Epidural Tunneling

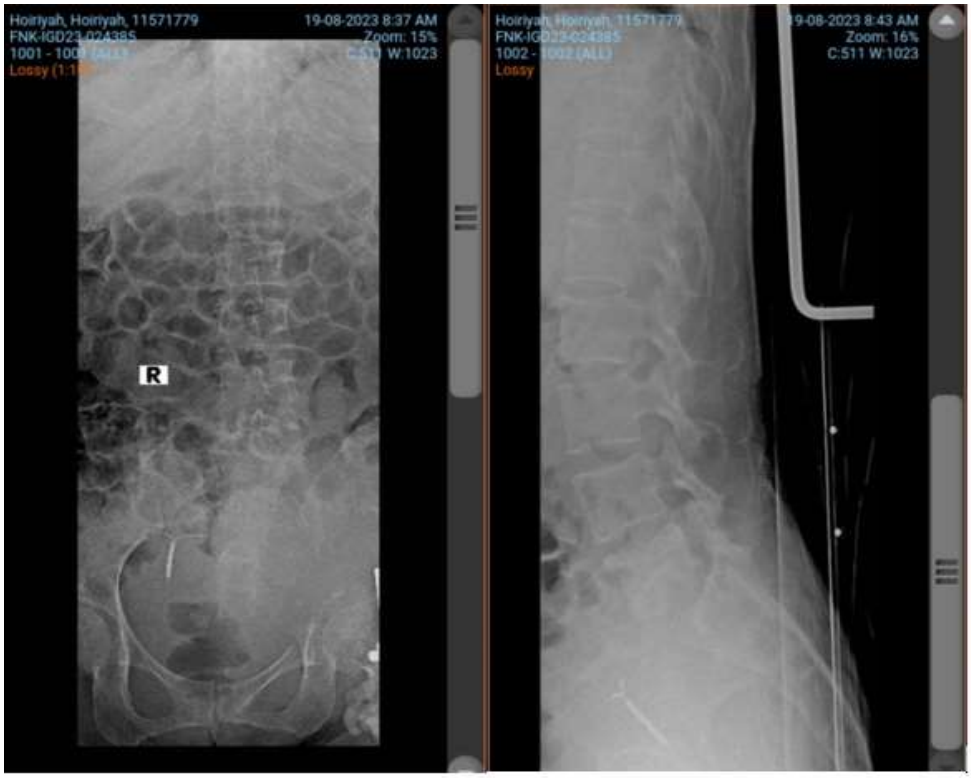

Figure 2. X-ray photo of AP/lateral lumbosacral patient

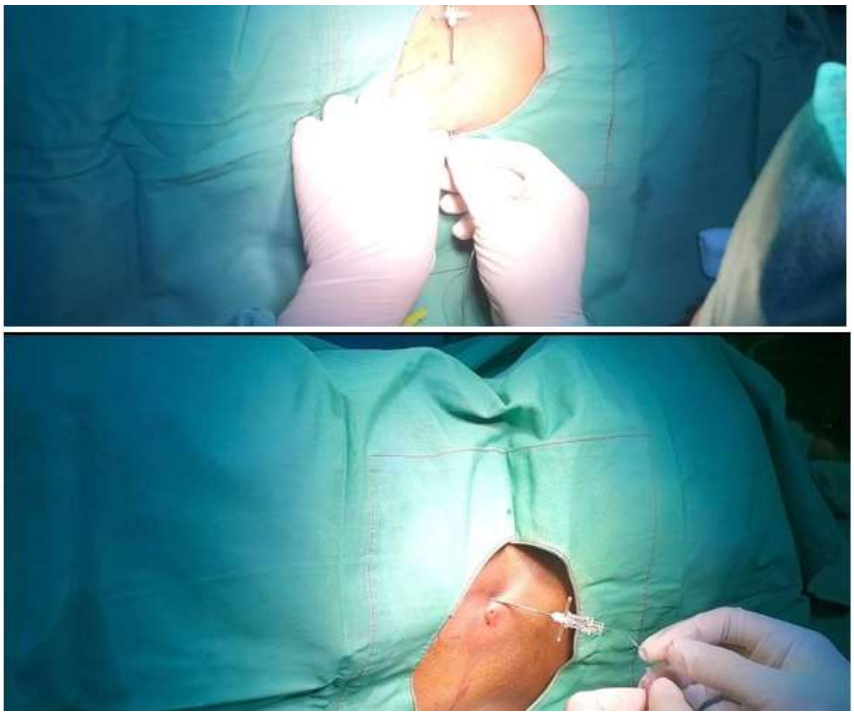

Figure 3. Epidural tunneling prosedure

DISCUSSION

Cancer pain is a general term for various pain conditions, characterized by different etiologies, characteristics and pathological mechanisms in cancer. Although many types of cancer can be diagnosed and treated early, and more patients are being cured every year, statistics show that far too many cancer patients experience cancer-related pain.

A mechanism-based approach in pain therapy is essential for providing a more individualized and effective analgesia but in order to apply such approach it is important to recognize and classify the underlying pathophysiological processes.(2)

Although inadequate epidural analgesia is relatively uncommon, and may be unilateral due to the unequal distribution of local anesthetics, we still need to be aware of the possibility and adjust for the potential problems, especially in patients with severe chronic pain. This is a very important consideration for achieving the best outcome for patients with cancer-related pain. There are many proposed mechanisms for the unequal distribution of local anesthetic causing unilateral analgesia including slow injection of small amounts of local anesthetic, acquired adhesions in the epidural space, misplaced catheters in the epidural space, and a dorsomedian septum in the epidural lumbar space and use of epidural tunneling.[1,6–9]

In our case report, patients benefited significantly from the tunneling catheter technique as determined by a substantial reduction in pain and by the elimination or reduction of the need for additional opioids. This method is used in two types of patients: patients with chronic pain, who experience failure of conventional analgesic therapy (eg, cancer patients with pathological fractures, pinched nerves, etc.), and patients with a need for prolonged acute analgesia who require opioids. -Induced side effects significantly affect quality of life. Although the patient groups are different, the analgesic technique is suitable for both.[4,9]

Epidural catheters can be inserted at tail, waist, or chest level. Because the toxicity of local anesthetics is directly related to the total amount of drug infused, catheter placement plays a very important role in the overall safety of this technique.[9] Epidural placement via caudal and lumbar approaches is most common, although thoracic placement may also be performed if indicated.[10]

Short-term studies have shown that epidural catheters can remain in place safely for up to 72 hours. Strafford et al. suggest that, for patients in the late stages of terminal illness, the risk of infection with long-term

epidural catheters appears acceptable. In this review, conditions associated with epidural abscess were immunocompromised, concomitant steroid use, trauma, diabetes, sepsis, or a distal site of infection..[7,10]

Insertion of an epidural or intrathecal catheter requires an anesthesiologist trained in regional anesthesia in children, repeated examination of the child and the location of the catheter, and close attention to infection prevention. With careful nursing care and supervision by a pain specialist, prolonged spinal analgesia can be performed and safely, and with proper teaching and home care, patients can be sent home with a tunnel catheter. This therapy offers pain relief in situations where conventional analgesic therapy has failed or is impractical, and it may be of benefit to children with pain.[8-10]

In this patient, we use multimodal analgesic. Epidural tunneling procedure could be done to decrease the opioid dosage. Epidural tunneling procedure also good and effective option because it can reduce the risk of catheter infection and also significantly reduced the incidence of catheter dislocation rates, so this procedure can be used longer when compared to epidural usual procedures.

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RIB FRACTURES PAIN MANAGEMENT WITH ERECTOR SPINAE PLANE BLOCK IN THE INTENSIVE CARE UNIT

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ABSTRACT

Background: Recent research on *Erector Spinae Plane Blocks* (ESPB) has focused on reducing pain levels by around 30-40% baseline scale and preventing respiratory problems in rib fracture patients. Despite the positive outcomes observed in studies, the efficacy of ESPB in the Intensive Care Unit (ICU) remains limited. However, numerous studies demonstrated that ESPB has simple and safer technique, effectively reduce pain scale, reduce work of breathing, lowers the need for opioids, decreases occurrences of nausea and vomiting and shorten ICU stays. Given this evidence, we used ESPB for pain management of rib fractures patient to prevent pulmonary complications in ICU.

Case Illustration: A 30-year-old man diagnosed with bilateral fractures of posterior ribs and lung contusions after a motorcycle traffic accident. Patient was intubated and admitted in the ICU for eleven days. The patient was extubated at day seventh then the patient experienced severe pain while breathing leading to desaturation. We performed ESPB on supine slight tilt position at transverse process thoracal level 5, single injection of 20 ml Bupivacaine 0.25% + adrenaline 5µ/ml on both sides, not exceed the maximum dose (180 mg). The patient then experienced a gradual pain scale reduction from numeric rating scale 5 to 2 over 3 hours, together with improved oxygen saturation and stable respiratory rate. The ESPB last for 48 hours and it prevented the patient from pulmonary complication or being intubated.

Conclusion:
Erector spinae plane block is effective as pain management and prevention of pulmonary complications for rib fractures patients in the ICU.

Keyword: Rib Fractures, ESPB, Pain management, Respiratory, ICU

INTRODUCTION

Erector spinae plane block is a new interfacial paraspinal plane block technique originally used for the first time by Forero at 2016 for patients with chronic thoracic neuropathic pain and patients undergoing chest wall surgery. Forero et al demonstrated ESPB with 25 mL of 0.5% ropivacaine successfully reduced severe acute post-thoracotomy pain from a pain score of 10/10 to 0/10 within 15 minutes of block completion. Currently, the prevalence of erector spinae block performed in the ICU is limited, apart from the fact that this block is relatively novel, there are intensivist who do not know the efficacy of erector spinae block for pain management in rib fractures. However the prevalence of ESPB efficacy in managing pain in the thoracic region and breast surgery is reflected in the study by Huang et al 2020, a systematic meta-analysis review of 14 randomized controlled trials (RCT). Meta-analysis revealed that ESPB significantly reduced pain, work of breathing and 24-hour opioid consumption compared with the non-block groups.[1,3]

The efficacy of ESPB in ICU also shown by Güven et al in their RCT which is applied bilaterally in adult cardiac surgeries decreased pain scores and opioid needs, at the same time reduce the length of stay of the patients in the ICU and there were no complications. Patients with rib fractures generally have severe pain that can interfere with the patient's respiratory system due to the inability to take deep breaths. Pain from this fracture limits expansion of the chest wall resulting in reduced tidal volume and inability to cough effectively, which can lead to atelectasis and sputum retention. Without adequate control of analgesia, in some cases of rib fractures, oxygenation and ventilation failure can occur so that it can end in the use of mechanical ventilation. Beh ZY's

case series also illustrated efficacy of ESPB in the ICU setting where there were 4 cases with severe pain problem and respiration morbidity which experienced drastic improvements in both pain and respiration scores after erector spinae administration and also reduced the need for opioids (morphine) and the length of stay in the ICU. Therefore, the literature mentioner earlier suggests that (ESPB) can be used in intensive care unit to be a pain control and help improve the work of the respiratory system, ventilation and better oxygenation to prevent pulmonary complication.[2,4,5]

Other benefit of this block technique is its simplicity in patient positioning, especially in the Intensive Care Unit (ICU) setting, the patient can be seated or tilted to one side, ESPB also does not interfere much with the patient's hemodynamics, and allows a reduction in the use of opioids which can cause side effects such as respiratory depression, nausea and vomiting. However complication of ESPB are pneumothorax and the side effect of Local Anesthesia Systemic Toxicity (LAST) due to using a large enough dose and volume of drug, therefore requires caution, especially recognizing anatomy, precise dose of drug and marks on ultrasound to prevent complication.[1,4,9]

This case report presented erector spinae plane block as pain management and prevent pulmonary complication for rib fractures patient in ICU.

Case Illustration

A 30-year-old man comes with complaints of pain in the right and left chest due to a high-speed motorcycle traffic accident. On arrival, the patient have shortness of breath, experienced desaturation, so he was intubated and then treated in the intensive care unit. From the history, physical examination and support the patient was diagnosed with fractures of the posterior right ribs II, III, IV, and V + fractures of the posterior left ribs III, IV. Body mass index: 22 kg/m2; X-rays showed rib fractures and contusions in both lungs. The patient was treated for 11 days in the ICU.

Day 1 to 6; the patient's condition exhibited fluctuations. After supportive therapy with intravenous analgesic sedation and mechanical ventilation, the patient experienced improvement from a clinical, hemodynamics, blood gas analysis, and evaluation of serial chest radiographs in the following days. We used fentanyl continuous on syringe pump as the analgesia and pain scale evaluated by critical care pain observation tools (CPOT) score because patient in mechanical ventilation.

Day 7; Extubation was performed. The patient then became tachypneic and desaturated within 6 hours post-extubation with variation SpO2 88-92%, presumably due to poor lung complaints due to Numeric Rating Scale (NRS) pain of 5/10 so we were considering for pain management or to reintubation. An Erector spinae plane block was performed by calculating maximum dose of bupivacaine with adrenaline is 3 mg/kg (180 mg for a body weight of 60 kg in this patient), with the tip of the needle (22-gauge x 50-mm) positioned to ensure the correct location by injecting 0.5-1 ml of saline and visualizing the spread. Block at transverse process Thoracal level 5, single injection regimen of 20 ml Bupivacaine 0.25% (2.5 mg/ml) + epinephrine 1: 200,000 (5µ/ml) on both sides was performed. Catheter could not be placed because of unavailability of catheter. Total volume of 40 ml bupivacaine 0.25% (100mg) resulted in a clinical improvement like reducing pain scale from NRS 5 to 2 gradually within 24 hours, better respiratory result, and other hemodynamic parameters as seen at (figure 3). Opioids then titrated down to 0.1 mcg/kg/hours via syringe pump right after ESPB were given.

Day 8-9; The patient was planned to undergo clipping of the ribs operation next day to correct the deformity and prevent chronic pain. Opioids replaced with paracetamol orally.

Day 10 The patient underwent clipping costae surgery. postoperative analgesia the patient was paired routinely with epidural analgesia.

Day 11 The patient was transferred to the intermediate room.

Figure 1. Local anesthetic distribution between the erector spinae muscle complex and the transverse process at thoracic level 5

Date	28/11/2022	29/11/2022	30/11/2022	1/12/2022	2/12/2022	3/12/2022	4/12/2022	5/12/2022	6/12/2022	7/12/2022	8/12/2022
Disease History	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7	Day-8	Day-9	Day-10	Day-11
Respiration	Ventilator BIPAP FiO2 60%, PEEP 7, RR 14 x/m	Ventilator BIPAP FiO2 60%, PEEP 7, RR 14 x/m	Ventilator BIPAP FiO2 50%, PEEP 7, RR 16 x/m	Ventilator BIPAP FiO2 50%, PEEP 5, RR 14 x/m	Ventilator BIPAP FiO2 40%, PEEP 5, RR 14 x/m	Ventilator CPAP FiO2 40%, PS 8; PEEP 5, RR 18 x/m	Spontaneous Breathing: NRM 12-15 LPM; RR 30 x/m	Spontaneous Breathing: NRM 10 LPM RR 20x/m	Spontaneous Breathing; FM 6-8 LPM; RR 18 x/m	Spontaneous Breathing; Spontan FM 6 LPM; 20 x/m	Spontaneous Breathing; NC 3 LPM; 16 x/m
SpO2	97	96	97	97	97	96	85	98	97	100	97
CPOT-NRS	2/8	4/8	3/8	4/8	3/8	3/8	5/10	2/10	2/10	2/10	1/10
pH	7.35	7.48	7.41	7.43	7.43	7.46	7.31	7.45	7.4	7.38	7.45
PCO2	49	38	50	47	52	44	52	44	48	51	47
PO2	90	99	97	87	162	165	82	130	135	154	140
HCO3	27.7	28.3	31.7	31.2	34.5	31.3	31.6	30.6	29.7	30.2	32.7
SO2	97	99	97	97	96	96	86	98	99	99	99
WARD	INTENSIVE CARE UNIT										move to Intermediate
ANALGESIA	Fentanyl continue 300 mcg/ 24 h				Fentanyl continue 400 mcg/24 h		ESPB ; 20 ml bupivacaine 0,25% + adrenaline 1:200.000 each side	Paracetamol 500 mg / 6h PO		Epidural Thoracal	

Figure 2. Table of Pain scale, Respiratory rate, SpO2 monitoring and Arterial Blood Gas

DISCUSSION

Pain management using regional anesthesia for the thoracic wall has increase in recent years, one of which is the Erector spinae plane block. It was first introduced by Forero for patients with chronic thoracic neuropathic pain and chest wall surgery that an ESPB with 25 mL of 0.5% ropivacaine successfully reduced severity acute post-thoracotomy pain from a pain score of 10/10 to 0/10 within 15 minutes of block completion by placing a needle and local anesthetic solution between the erector spinae muscles and the transverse process. This technique blocks the dorsal and ventral rami from the thoracic spinal nerve to the abdomen, with anterior diffusion into the paravertebral and epidural spaces, and lateral diffusion into the intercostal spaces helping to achieve extensive sensory block of the anterior, posterior, and lateral costal walls.[1,2,4]

William et al describes that ESPB has positioning and safety advantages for rib fractures compared to other regional techniques. ESPB has relatively simple and uncomplicated ultrasound markers with a position that can be performed in a tilted or sitting position, has a good safety profile where complications like pneumothorax are limited because the block is superficial. Positioned in a manner that ensures sufficient distance from the pleura and is carried out in an anatomical region devoid of notable vascular structures, our approach involves placing the patient in a comfortable supine position with a slight tilt.[2,4]

The Erector spinae plane block is expected to provide good quality analgesia because rib fractures require adequate pain management due to the severe pain especially when breathing, coughing and moving, with the end result being respiratory complications. Senapathi et al has reported serial cases of chest and abdominal surgery using this technique. They injected a single dose of bupivacaine 0,5% 20 ml without adjuvant and the level of injection according to the dermatome of the underlying disease. For the thoracic region, it was done in the 5th and 6th thoracic regions, with the results were the average pain scale of NRS 1-2, reduce the use of opioids evaluate using PCA and maintenance of hemodynamic stability. In a cohort study by Adhikary et al, specifically describe result and how to perform ESPB in the ICU with rib fractures or chest wall trauma, they use two technique which singe bolus and continuous with 20 ml ropivacaine 0.5% + 0,1 ml adrenalin (5µ/ml) was injected through a 22-gauge 80-mm needle and for continuous a 20-gauge catheter inserted through an 18-gauge 90-mm Tuohy needle. A bolus of 20 ml ropivacaine 0.5% was injected through the catheter followed by a continuous infusion of ropivacaine 0.2% at a rate of 6–10 ml/h (titrated to patient weight and clinical effect) using an ambulatory infusion pump.[5,7,8,9] Therefore, in this case, we used the same tools and single bolus techniques like Adhikary's but with slight modification on drug dose regarding the safety profile of local anesthetic. We using a single injection of 20 ml bupivacaine 0.25% on both sides (total 100 mg within maximum dose 180 mg) with adjuvant adrenaline to prolong the analgesia. Catheter could not be placed because of non-availability of catheter, of course the volume and drug dose can be larger, the risk of local anesthetic systemic toxicity can increase. So, we calculate the maximum dose of bupivacaine carefully this case where we only use more than half the concentration dose from the existing study literature.[8, 9]

Figure 3. Pain scale and respiratory close monitoring 24 hours after ESPB

After the erector spinae had given there were significant changes in the patient's pain scale (NRS) and the patient's respiratory system which monitored through respiration rate, oxygen saturation and heart rate (Figure 3). This result match or mirroring with Adhikary studies, that there was a significant increase in the mean spirometry incentive volume over 24-72 hours after erector spinae block of rib fracture patient. The maximum NRS pain score decreased significantly from baseline by 39% within 3-48 hours then degraded down. Therefore, ESPB in

this patient proved work well, as seen from the parameters by reducing the pain scale and improving the patient's respiratory system. So that pulmonary complication leads to re-intubation can be prevented.[1,3,4,5,8]

CONCLUSION

Erector spinae plane blocks are effective in producing adequate pain control and prevent pulmonary complications in rib fractures patients in the intensive care unit.

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ANESTHESIA MANAGEMENT IN LAPAROTOMY CHOLECYSTECTOMY DURING PREGNANCY

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ABSTRACT

Background: Pregnant patients impose a significant challenge in surgery and anaesthesia due to anatomical and physiological alterations. An anesthesiologist should identify the alterations and uteroplacental perfusion status, correlate them with the pharmacokinetics and pharmacodynamics of the drugs, and make adjustments as needed.
Case Illustration: We present a 23-year-old pregnant woman (G1P0A0) at 25 weeks gestational age with gestational hypertension and gestational diabetes undergoing laparotomy cholecystectomy. Regional anaesthesia was chosen, and the management could facilitate the surgical well.
Conclusion: Management of anaesthesia for laparotomy cholecystectomy in pregnant women includes optimization of preoperative status, proper choices of anaesthesia drugs, intraoperative monitoring, postoperative management, as well as considering the risk of cholecystectomy and pregnancy alterations for the patient.

Keywords: anaesthesia, pregnancy, laparotomy cholecystectomy

INTRODUCTION

Cholecystectomy or gallbladder extraction is one of the surgical procedures commonly encountered in non-obstetrical cases of pregnant women.[1,2] Pregnancy is one of the risk factors for diseases requiring cholecystectomy.[3] Cholecystectomy is indicated for gallbladder diseases, such as cholelithiasis, cholecystitis, gallbladder polyp, and porcelain gallbladder.[4] Nowadays, cholecystectomy is usually performed with laparoscopy along the technological advancement. Laparoscopic cholecystectomy is assumed to be more effective than open cholecystectomy or laparotomy.[2,5] However, certain conditions urge the conversion to laparotomy. The most common indication for conversion is significant inflammation and adhesion, causing difficulties in anatomy identification, especially in patients with a previous history of surgery.[6] Most importantly, until now, doctors have stated that delaying cholecystectomy in pregnant women poses a more significant risk than doing it immediately.

The physiological condition of a pregnant woman is different from the normal person, both physiologically and anatomically. There is a fetus inside the uterus that causes uterine enlargement resulting in changes in the structure of the organs in the mother (size and location) as well as their function. In addition, the age of pregnancy and the trimester also influence these changes. Trimester 1 is the age of pregnancy 1 – 13 weeks, trimester 2 is the pregnancy 14 – 26 weeks, and trimester 3 is 27 – 40 weeks. Factors that affect the fetus, such as the condition of the placenta, the state of the uterus, and the teratogenicity of drugs or anaesthetic agents, are the consideration of doctors in carrying out proper management. In addition, the condition of pregnant mothers and the postoperative fetus reminding the pain felt can end in premature birth.[7,8,9,10]

The report educates authors and readers about anaesthesia management in pregnant women undergoing laparotomy cholecystectomy.

CASE ILLUSTRATION

A 23-year-old pregnant woman (25 weeks of gestational age) with a history of gestational hypertension was admitted to the obstetric ward due to fever, abdominal pain, and severe nausea. The appetite gradually dropped a week ago, and the fever occurred three days before admission. Pain at swallowing, cough, and

pregnancy-related complaints (i.e. scratches and spots) were denied. The patient could still feel the movements of the fetus. The patient did not have a history of asthma or drug allergies. Routine drug consumption was nifedipine 250 mg for gestational hypertension.

The patient was overweight (52 kg and 145 cm with a body mass index of 24,7 kg/m2). The patient was vigilant, BP 130/70 mmHg, T 37^0C, HR 88 bpm, RR 20 bpm, SpO2 99% on nasal cannula three LPM. Physical examination showed abdominal distention, tenderness in all quadrants, and a regular fetal heart rate of 132 bpm. There were no airway difficulties (Table 1).

Table 1. Difficult airway assessment

No	Difficult airway	Score
1	Ventilation (ROMAN)	0
	Radiation/restriction	0
	Obstruction/Obesity	0
	Mask seal/Mallampati	0
	Age	0
	No teeth	0
2	Intubation (LEMON)	0
	Look externally	0
	Evaluate 3-3-2	0
	Mallampati	0
	Obstruction	0
	Neck mobility	0
3	Cricothyroidotomy (SHORT)	0
	Surgery/airway disruption	0
	Hematoma/mass	0
	Obstruction	0
	Restriction/deformity	0
	Tumour	0
4	LMA (RODS)	0
	Restriction on mouth opening	0
	Obstruction	0
	Disturbed airway	0
	Stiffness	0

LMA = laryngeal mask airway

Abdominal ultrasound demonstrated multiple cholelithiases, gravid uterus, and bilateral hydronephrosis (left kidney: grade 1; right kidney: grade 2) due to vesicoureteral reflux. Laboratory results showed increased blood glucose and procalcitonin levels (Table 2).

Table 2. Lab results on admission

Lab	Results	Normal range
Leukocyte	12.1	4.50-11.50
Erythrocyte	4.0	4.60-6.00
Haemoglobin	11	14.0-18.0
Hematocrit	32.7	40.0-54.0

Platelets	721	150-450
PTT	16.6	9.4-12.5
APTT	29.3	25.1-36.5
INR	1.2	0.90-1.10
BUN	14.7	5-18
Creatinine	0.65	0.67-1.17
Glucose	383	74-106
Sodium	133	136-145
Potassium	4	3.5-5.1
Chloride	104	98-107
COVID-19	(-)	(-)
HbsAg	NR	NR
Procalcitonin	1.52	< 0.5

BUN = blood urea nitrogen, Lab = laboratory, HBsAg = surface antigen of hepatitis B virus, PTT = partial thromboplastin time; APTT = activated partial thromboplastin time

The patient was assessed with the American Society of Anesthesiologists-2 (ASA-2) physical status with gravid, febrile, gestational hypertension, and iron-deficiency anaemia. Laparotomy cholecystectomy was planned.

The preoperative management included informed consent, eight-hours fasting of solid fluids and clear water, maintenance of nasal cannula three lpm, administration of intravenous line 20G with transfusion set and NaCl 0,9% 18 drops/min (macro), and providing one unit of packed red blood cell (PRC). The anaesthesia plan combined spinal and epidural regional anaesthesia using bupivacaine 0,5%.

In the surgical room, the patient was reassessed for the adequacy of fasting, fluids and additional complaints. The patient was supine, and a urine and NGT catheter was installed. Standard non-invasive monitoring devices such as sphygmomanometers, oxymeters, and ECGs are installed. Patients were given an injection of epidural sitting position anaesthesia median approach VL 3-4 LOR (+) with Tuohy needle no.18 G and a spinal sitting-position anaesthetic injections paramedian method VL 4-5 LCS (+) by Quincke needle No. 27 G used hyperbaric bupivacaine 0.5% 10 cc,

epidural agents used isobaric bupivacaine 0.5 % ten cc. The total block is generated at the T6 level based on sensory evaluation.

The operator then began the surgery. The surgery lasted 1 hour and 30 minutes. Patients entered the recovery room with a clear airway, spontaneous breathing with adequate sound, and good mental status and scored nine on the Aldrette score. Postoperative drugs were Paracetamol 1 gram / 8 hour IV and ondansetron 4 mg / 8 hour IV. After 30 minutes of observation in the recovery room, patients did not report symptoms of nausea and vomiting. The patient had good consciousness and normal vital signs (TD 120/75 mmHg, HR 88 bpm, RR 20 bpm, SpO2 99% nasal canul three lpm, and scored ten on the Aldrette score). Afterwards, the patient was transported to the ward.

DISCUSSION

Cholecystectomy or gallbladder removal is indicated for gallbladder diseases such as cholecystitis, cholelithiasis, polyps, and porcelain bile bags.[3] Patients usually came with colic pain or pain in the upper right quadrant or epigastrium that can spread to the right shoulder. Anorexia, nausea, vomiting, dyspepsia, mild fever, tachycardia, and fat-food intolerance may also be found.[10]

Cholecystectomy can be performed by laparotomy or laparoscopy. Laparoscopic cholecystectomy is the gold standard because it is associated with a lower postoperative pain rate, better postoperative wounds, and shorter hospitalization. In low-income countries, the cost-efficiency of laparoscopic cholecystectomy is also higher.[11] However, serious complications such as injury to the surrounding organs in laparoscopic cholecystectomy are more common and severe.[3,4,5]

Pregnancy is a risk factor for cholelithiasis. Increased levels of estrogen and progesterone during pregnancy induce physiological changes in the bile system triggering the formation of gallstones. Estrogen intensifies cholesterol secretion, and progesterone reduces gallic acid secretion, causing cholesterol accumulation in the bile fluid. Relatively excessive production of hydrophobic gall acid, such as chenodeoxycholic acid, inhibits the ability of the bile to dissolve cholesterol. Progesterone slows down the emptying of the gallbladder, eventually leading to stone formation. These changes can persist up to 1-2 months after birth.[1,4]

Laparotomy cholecystectomy in pregnancy can be considered if the operation cannot be delayed until baby delivery[1,2]. Laparotomy is usually done in the third trimester, as laparoscopic port placement and insufflation are challenging to perform during this period. The conversion rate for laparoscopic cholecystectomy varies greatly, about 2-15%, primarily due to bleeding and unclear anatomy. Risk factors for conversion to laparotomy include old age, male, obesity, acute cholecystitis, previous upper abdominal surgery, high levels of diabetes and glycosylated haemoglobin, and less experienced surgeons. Sometimes, immediate laparotomy is performed without waiting for conversions such as gallbladder cancer, portal hypertension and bleeding disorders, Mirizzi syndrome type II (cholecystobiliary fistula), and biliary stone ileus.[6]

Professional organizations such as SAGES, ACOG, and ASA declared that cholecystectomy is safe in any trimester. Initially, treatment of gallbladder disease during pregnancy is carried out conservatively to avoid risks to the fetus and mother. In theory, cholecystectomy of pregnant women is contraindicated in the first and third trimester. Surgery in the first trimester potentially causes abortion and fetal defects from the use of perioperative drugs. Surgical procedures can lead to premature labour and fetal distress in the third trimester. Unfortunately, non-operative treatment in pregnant women results in a high frequency of treatment and hospital recurrence rates during the antepartum or postpartum period. Delaying cholecystectomy until after delivery causes high recurrences, emergency visits, repeated hospitalization, and maternal-fetal complications.[3,4,12,13]

In our case, the patient was still in the second trimester. However, she presented with high fever, jaundice, and severe nausea. Therefore, immediate cholecystectomy laparotomy was carried out to mitigate the risk of malnutrition and clinical deterioration. Furthermore, the pregnancy age was adequate for the surgery. As a result, the procedure performed in the second semester is appropriate.

Cholecystectomy in pregnant patients should be done with good preoperative preparation. Laboratory and imaging tests should be done to diagnose and stratify the patient's risk and comorbidities. The recommended laboratory tests include:[4,12,13]

1) Complete blood tests (to identify the presence of infections, Hemolysis, Elevated Liver Enzymes, Low Platelet Count (HELLP) syndrome, and preeclampsia)
2) Liver function test (AST/ALT, bilirubin, alkaline phosphatase) (to identify HELLP syndrome and preeclampsia)
3) Amylase and serum lipase (to detect pancreatitis. Pancreatitis is a complication of gallbladder disease.
4) Urinary protein. Although urine proteins do not play an essential role in diagnosing the disease, doctors can help predict the presence of preeclampsia in patients.

   Imaging that includes:

   1) Ultrasonography of the abdomen. This tool plays a role in seeing the presence of stones or sludge on the gallbladder but is not sensitive to stones in the common biliary duct.
   2) MRCP (magnetic resonance cholangiopancreatography) MRCP is usually not used in the evaluation of biliary colic or acute cholecystitis but may be helpful in some complicated cases, such as patients with choledocolithiasis or pancreatitis not detected by ultrasound.

The presence of pathological conditions in pregnant patients can delay the cholecystectomy procedure. (Figure 2). Asymptomatic patients are not required to undergo cholecystectomy, although many doctors continue to perform surgery as a preventive measure.[4]

To ensure the safety of the mother and fetus during surgery, a profound understanding of physiological changes (Table 2) and pharmacological adaptations during pregnancy is necessary. The anesthesiologist should avoid teratogenic drugs, consider the pathophysiology of the disease, inhibit uterine contractions, and prevent premature labour (Table 3).[8]

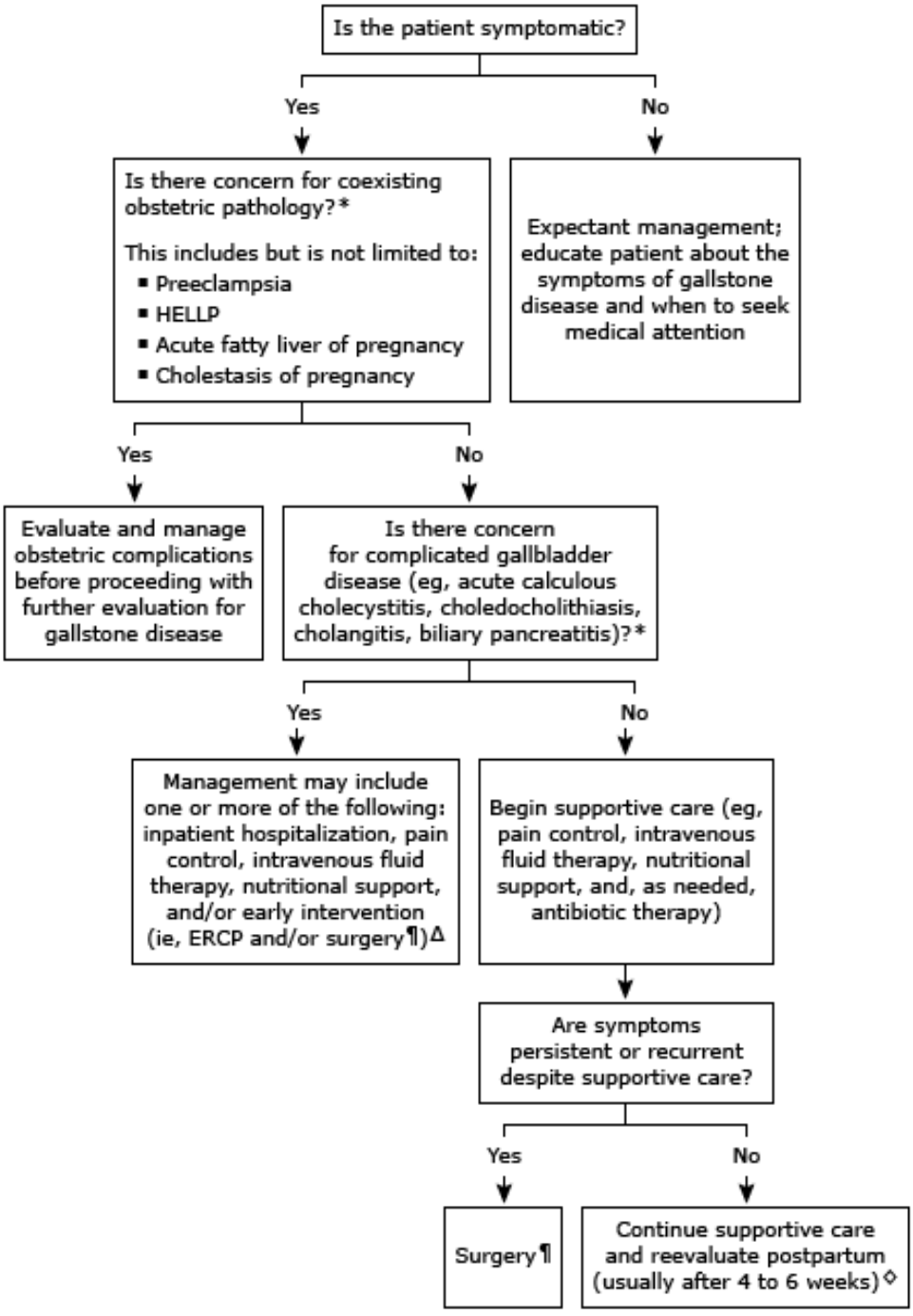

Figure 1. Algorithm for gallstone disease management in pregnancy

The minute ventilation and oxygen consumption increase, and the residual volume and functional residual capacity decrease during pregnancy. As a result, oxygen reserves decrease, and pregnant women are at risk of hypoxia and hypercapnia. Treatment with a face mask, laryngeal mask, or tracheal intubation is difficult in pregnant women due to an increased diameter of the anteroposterior chest wall, breast enlargement, laryngeal oedema, and weight gain that affects the soft tissue of the neck.[8,9,13]

Pregnant women in a supine position risk developing aortic and inferior vena cava compression by the uterus, which causes supine hypotensive syndrome characterized by pale sweating, nausea, and vomiting. The obstruction of the lower vena cava by the enlarged uterus causes the distention of the epidural vein plexus, which causes the pregnant woman to be more susceptible to local anaesthesia. In pregnant women, avoiding supine positions by shifting the uterus to the side is important.[9,13]

Table 2. Physiological changes during pregnancy[11]

Parameter	Alterations	Parameter	Alterations
Neurology		**Cardiovascular**	
Minimal alveolar concentration	- 40%	Blood volume	+ 35%
Respiration		Plasma volume	+ 55%
Oxygen consumption	+ 20-50%	Cardiac output	+ 40%
Airway resistance	- 35%	Stroke volume	+ 30%
Functional residual capacity	- 20%	Heart rate	+ 20%
Minute ventilation	+ 50%	Systolic blood pressure	- 5%
Tidal volume	+ 40%	Diastolic blood pressure	- 15%
Respiratory rate	+ 15%	Peripheral resistance	- 15%
PaO2	+ 10%	Pulmonary resistance	- 30%
PaCO2	- 15%	**Haematology**	
HCO3	- 15%	Haemoglobin	- 20%
Kidney		Platelet	- 10%
Glomerular filtration rate	+ 50%	Clotting factors	+ 30-250%

PaO2 = arterial partial pressure of oxygen; PaCo2 = arterial partial pressure of carbondioxide

Table 3. Anaesthesia consideration for surgery during pregnancy[13]

Consideration	Factors
Maternal safety	● Physiological changes during pregnancy ● Conditions requiring surgery during pregnancy
Fetal safety	● Drug transfer via placenta ● Teratogenicity: anaesthetic agents, gestational age, duration/dosage of exposure, Food Drug Administration (FDA) pregnancy category ● Maternal factors causing fetal compromise: maternal hypoxia, maternal hypo/hypercarbia
Prevention of premature labour	● Pain control ● Tocolytic agents, as indicated

Both regional and general anaesthesia are safe during any trimester, depending on each patient's needs and medical history. Regional anaesthesia is preferred in pregnant women to prevent drug distribution to the fetus. Surgery and anaesthesia can affect uterine activity, placental perfusion, fetal oxygenation, and heartrate. The fetal heart rate can be directly affected by drugs that can pass through the placenta or indirectly by their influence on the hemodynamics of the mother. Anaesthetic procedures in the mother and fetus can reduce the basal fetal heart

rate and its variability but do not cause spontaneous deceleration or uterine contractions.[2,14]

Regional anaesthesia is preferred in pregnant women over general anaesthesia because the mother can maintain her respiratory tract and minimize the drug's effect on the fetus. Regional anaesthesia was also found to provide better analgesic outcomes after surgery. However, it is necessary to consider some physiological changes in pregnant mothers regarding the clearance of neural blocks. For example, neural blockage can cause significant maternal hypotension when the patient is hypovolemic. So fluid adequacy should be achieved, and the patient's position to the left lateral tilt can be adjusted. Our patient had normal systolic blood pressure, so regional anaesthesia can be done carefully to prevent further blood pressure lowering.[14-17]

A neural block for cholecystectomy laparotomy with only epidural or spinal blockage does not provide an adequate anaesthetic effect, leading to intraoperative side effects.[14,20-22] Combined spinal and epidural anaesthesia / CSE on laparoscopy cholecystectomy or laparotomy is considered to be more likely to reduce postoperative pain, shoulder pain, and postoperative vomiting nausea, as well as the need to change the type of anaesthetics to general anaesthesia. No studies specifically compare the adverse effects of regional and general anaesthesia in pregnant mothers who undergo both laparoscopy and laparotomy.[14-17]

In our case, CSE was considered to provide adequate anaesthesia. Additional sedatives were not given because sedatives could further lower blood pressure, affecting uterine blood flow and compromising fetal well-being.

Sufficient postoperative management was required because postoperative pain has been shown to increase the risk of premature labour. Regional nerve/plexus blocking or epidural analgesia can provide excellent postoperative analgesics and reduce the risk of hypoventilation compared to intravenous opioids. Opioids can be used, as needed, to control postoperative pain. Paracetamol is an analgesic for treating mild to moderate discomfort during pregnancy. NSAIDs should be avoided, especially after 32 weeks of pregnancy, as they can cause premature closure of the fetal ductus arteriosus (if administered at more than 48 hours). NSAIDs are also associated with oligohydramnios due to decreased fetal kidney function and inhibition of uterine contractions. Our patient was given paracetamol as postoperative analgesics.[2]

Fetal heart rate monitoring should also be done before and after surgery. If the fetus is viable (pregnancy age >23-24 weeks), measure fetal heart rate and uterine contractions before and after surgery. Intraoperative monitoring can be carried out in certain situations, such as a cesarean operation or emergency delivery on fetal indication in a viable fetus.[12] In certain circumstances, intraoperative fetal monitoring may be considered for a pre-viable fetus to facilitate positional intervention or oxygenation. The fetal heart rate should be monitored in the recovery room intermittently for a pre-viable fetus and continuously for a viable foetus.[2] We conducted fetal monitoring according to the guideline. In our case, the fetal heart rate was assessed in the obstetric ward before the patient was transported to the surgical ward, in the reception room before surgery, and in the recovery room.

Uterine contractions should also be monitored as they are most likely to occur before the procedure, and the tokolytic effect of volatile anaesthesia disappears. The use of tocolytic drugs such as magnesium and indomethacin in perioperative settings has not been extensively studied but is generally used in clinical situations.[2] Our patient did not experience premature contractions; thus, tocolytics were not given.

CONCLUSION

Cholecystectomy due to cholelithiasis or acute cholecystitis should be carried out immediately in pregnancy because delayed cholecystectomy can lead to complications and diminished quality of life. However, patient condition, possible comorbidities, uteroplacental perfusion, drug teratogenicity, and risk of uterine contraction should be thoroughly examined to determine the most appropriate anaesthesia techniques and drugs.

Preoperative, intraoperative, and postoperative fetal and maternal monitoring should also be done. The most recommended anaesthetic techniques of laparotomy cholecystectomy for pregnant patients are regional anaesthesia, with the CSE technique being the primary regional technique of choice.

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MANAGEMENT OF DIABETIC KETOACIDOSIS WITH COMPLICATION OF STROKE INFARCTION AND BRAIN EDEMA IN POST PARTUM WOMEN IN THE INTENSIVE CARE: A CASE REPORT

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ABSTRACT

Background: Diabetic ketoacidosis (DKA) is a unique condition in which there is a decompensation of metabolic derangements characterized by the triad of hyperglycemia, acidosis, and ketosis. Diabetic ketoacidosis has been reported as a risk factor for stroke in children and adolescents. Cerebral hypoperfusion in untreated diabetic ketoacidosis can lead to cerebral injury, arterial ischemic stroke, cerebral venous thrombosis, and hemorrhagic stroke.

Case Illustration: A 31-year-old woman with a diagnosis of P1A0 post-SC emergency ai fetal compromised, PEB, pregestational DM, IUGR fetus, decreased consciousness due to a large stroke and brain edema, severe metabolic acidosis with DKA, pulmonary edema, TB pleuritis discontinued OAT. Referral patient from Jogja City Hospital with the planned termination of pregnancy. At the time of admission, it was reported that the complaints of active fetal movement, nausea, and vomiting. Patients received methyldopa 500 mg/8 hours, calcium carbonate 500 mg/8 hours, sparfloxacin 200 mg/12 hours, aspilet 1 x 80 mg, and insulin 12-12-12 IU SC. The family said the patient's blood sugar was out of control.

Conclusion: This case emphasizes the importance of close monitoring and proper management of patients with type 2 diabetes mellitus to prevent serious complications such as DKA and cerebral edema. This has not been done optimally. Patients with a history of diabetes mellitus must be educated about the importance of proper monitoring and treatment to prevent serious complications and improve quality of life.

Keywords: diabetic ketoacidosis, stroke infarction, intensive care

INTRODUCTION

The incidence of DKA is around 4-8 cases in every 1000 patients with diabetes mellitus and is a case that is difficult to treat in health centers that are not fully facilitated. Mortality from KAD is around 0.5 percent to 0.7 percent depending on the health center that handles the KAD case.[2]

Diabetic ketoacidosis (DKA) is a unique condition in which there is a decompensation of metabolic derangements characterized by the triad of hyperglycemia, acidosis, and ketosis. This is usually caused by an absolute or relative deficiency of insulin and an increase in counter-regulatory hormones which cause excessive lipolysis to form ketone bodies. DKA and hypoglycemia are serious acute complications of Diabetes Mellitus (DM) and require prompt treatment, so they are emergency cases. In DKA, severe dehydration can occur up to shock due to osmotic diuresis.[1]

Diabetic ketoacidosis (DKA) can significantly affect the function of the blood vessels of the brain. Damage to the blood-brain barrier can cause serious complications of DKA, namely brain edema.

The etiology of brain edema in DKA is still uncertain. It is thought that a rapid osmotic shift due to the rapid correction of hypovolemia and a reduction in plasma glucose may cause a shift of water into cells. The

osmotic effect of glucose can cause inflammation. The body is in a pro-inflammatory state during DKA which involves the production of interleukin-1. Interleukin-1 is said to be involved in the pathogenesis of brain edema and stroke infarction.

Case Illustration

A 31-year-old female patient with a diagnosis of P1A0 post-SC emergency ai fetal compromised, PEB, pregestational DM, IUGR fetus, decreased consciousness due to a large stroke infarction, and brain edema, severe metabolic acidosis with DKA, pulmonary edema, TB pleuritis discontinued OAT. Referral patient from Jogja City Hospital with the planned termination of pregnancy. At the time of admission, it was reported that the complaints were loud (-), active fetal movements (+), amniotic fluid leaking (-), bloody mucus discharge (-), blurred vision (-), dizziness (-), heartburn (-), nausea (+), vomiting (+). CHAPTER and BAK no interference. Patients received methyldopa 500 mg/8 hours, calcium carbonate 500 mg/8 hours, sparfloxacin 200 mg/12 hours, aspilet 1 x 80 mg, and insulin 12-12-12 IU SC. The family said the patient's blood sugar was out of control.

Three to four weeks before admission to the hospital, patients already experience symptoms such as polyuria, polydipsia, and polyphagia which are characteristic of uncontrolled diabetes. The patient also complained of nausea, vomiting, and abdominal pain. In addition, patients complain of weight loss occurring three to six months prior to admission.

The patient was admitted to Dr. Sardjito with blood pressure 139/88 mmHg, pulse 100 x/minute, breathing 20 x/minute, 99% saturation with room water. Patient consciousness is fully awake with GCS E4M6V5. There were no anemic conjunctiva or icteric sclera, isochoric pupils with a diameter of 3/3 cm, and +/+ light reflex. The patient's JVP is not increased, the I-II heart sound is regular, and the sound is added (-). Lung sounds were vesicular in both lung fields, no crackles or wheezing was found. CRT < 2 seconds, warm acral, no leg edema, and no lateralization. The HbA1C examination, which was carried out on August 22, 2022, obtained a result of 8.3%.

Table 1. Laboratory Examination (3/10/2022)

AL/AT	11.500/240.000
HB/HT	9,5/27,7
PPT	8,8/11
INR	0,8
APTT	29,8/31.2
BUN/Cr	38/2,56
SGOT/SGPT	80/24
ALB	2,88
GDS/4 hr	430/412/323/258/198
Na/K/Cl	136/4,3/104

The patient underwent cardiotocography in the IMP room and the results obtained were category I impressions and it was decided for emergency SC by TS Obsgyn. The patient underwent emergency SC for indications of fetal compromise with ASA 3E physical status with PEB, gravida, anemia (Hb 9.5), AKI, type 2 DM, and TB pleurisy. Anesthesia was performed with an RA epidural and after surgery, the patient returned to IMP.

Three days after surgery, at 17.00 TS Obsgyn called EWS because the patient reported decreased consciousness and respiratory distress with desaturation. Obtained on physical examination with blood pressure 98/75 mmHg, pulse 125 x/minute, respiration 35 x/minute, 98% saturation with NRM 15 lpm. The patient's consciousness was obtained GCS E2M2V4. Obtained anemic conjunctiva, no icteric sclera, pupil isochor with a diameter of 3/3 cm, and light reflex +/+. The patient's JVP is not increased, the I-II heart sound is regular, and the

sound is added (-). Lung sounds were crackles in both lung fields, and no wheezing was found. CRT < 2 seconds, warm acral, leg edema found, and no lateralization.

Table 2. Laboratory Examination (7/10/2022)

AL/AT	22.800/496.000
HB/HT	7,8/24,0
BUN/Cr	54/3,66
SGOT/SGPT	67/22
ALB	1,94
GDS	483
Na/K/Cl	131/5,1/103

While in the intensive care unit, the patient was intubated with an ETT number 7.0 cuff, an arterial line was placed on the right radial artery, and a CVC was placed on the right jugular vein. After intubation, one hour later the patient was taken for blood tests and cultures of blood, urine, and sputum.

After not being sedated, the patient was evaluated for consciousness, and the neurological status was E1VtM1, pupil anisochore 3 mm/5 mm, light reflex -/-, cranial nerves: brainstem not intact, movement and strength: not lateralized, sensory could not be assessed, vegetative status: BAK on DC. Then, a CT scan of the head was performed, and the results obtained were extensive acute infarction of the dextra frontotemporoparietal lobe, dextra insular, dextra basal ganglia, dextra thalamus according to the dextra MCA and ACA territories, with perifocal edema causing subfalcine herniation as far as 0.5 cm to the left and diffuse cerebral edema accompanied by the tonsillar herniation.

In addition, because the X-ray picture contained pulmonary edema, the patient was consulted by TS Cardiology for peripartum cardiomyopathy (PPCM) tracking. TS Cardiology performed hemodynamic echocardiography with LVIDd 52, estimated EF 38-45%, global hypokinetic. Patients assessed with CHF et causa DA: LV dilated, global hypokinetic, DE: myopathy dd PPCM.

Treatment given while in the intensive care unit, namely continuous insulin 6 cc/hour, injection of meropenem 1 gram/8 hours, loading infusion of NaCl 0.9% 1 L, injection of lansoprazole 30 mg/24 hours, nebulization with ventolin: pulmicort= 1:1/8 hours, and sedated using fentanyl and midazolam continuously for 1x24 hours.

Management of DKA in this patient, namely rehydration and insulin therapy. Rehydration in this patient was carried out by infusion of 3.5 L of 0.9% NaCl while in the IMP room and followed by 1 L of 0.9% NaCl in the intensive care unit. To control blood sugar, the patient is given continuous insulin at 6 cc/hour. In this case, sodium bicarbonate is not given.

The treatment of stroke infarction and cerebral edema in this patient, namely with supportive care, such as the use of mechanical ventilators and administration of vasopressors has been carried out. For emergency treatment of acute strokes, such as thrombolysis, mechanical recanalization of arterial occlusion, and heparinization are not performed. Aspilet and mannitol were also not given to this patient.

After 6 days of treatment in the intensive care unit, the patient's metabolic acidosis was resolved, and blood sugar was controlled. It was assessed that the patient was in a deep coma, with complete loss of brainstem, and apnea.

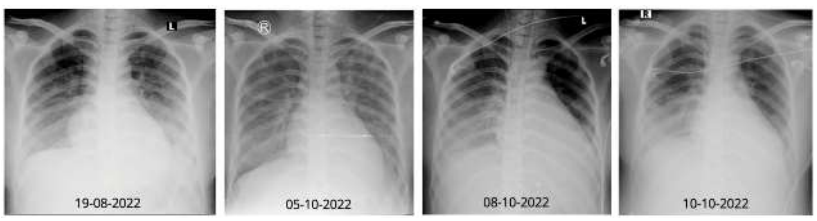

Figure 1. Rontgen Thorax Evaluation

DISCUSSION

Diabetic ketoacidosis is a condition in which metabolic decompensation occurs characterized by the presence of the triad of hyperglycemia, acidosis, and ketosis.[1] This patient appears hyperglycemia with a blood sugar of 483, acidosis with a pH of 7.130, and ketonuria +1 on urinalysis.

In patients with DKA who are known to have diabetes mellitus previously, about 80 percent of the trigger factors can be identified, while the other 20 percent have unknown precipitating factors.[1,6] Infection is the most common precipitating factor and is estimated to trigger more than 50% of cases of DKA. [1,6] In infection, there will be an increase in cortisol and glucagon secretion, resulting in a significant increase in sugar levels. Common infections are urinary tract infections and pneumonia. Pneumonia or other lung diseases can affect oxygenation and precipitate respiratory failure, so it must always be considered a serious condition and will reduce respiratory compensation from metabolic acidosis.[1,6]

Features of polyuria, polydipsia, polyphagia, weight loss, nausea and vomiting, abdominal pain, dehydration, and coma are classic clinical signs of diabetic ketoacidosis.

The first step taken in patients with DKA is a quick history and physical examination to ensure airway patency, respiratory rate, cardiovascular, conscious status, kidney function, and hydration status of the patient.

Physical examination is often found, namely decreased skin turgor, Kussmaul breathing patterns, tachycardia, hypotension, decreased consciousness, and shock.[5] Laboratory tests that can be done are to check blood glucose levels and urinalysis to see the amount of glucose, ketones, nitrates, and leukocyte esterase in the urine.[11]

The main treatment for diabetic ketoacidosis is fluid therapy. Rehydration improves the body's response to insulin therapy. Patients can be given normal saline at a rate of 20 cc/kg/hour in the first hour. After the initial bolus, rehydration is continued with normal saline fluids at a rate of 250-500 cc/hour in hyponatremia patients or given 0.45/% normal saline at a rate of 250-500 cc/hour in eunatremic and hypernatremic patients.[12] In geriatric patients with comorbidities heart and kidney disease, excess fluid can lead to acute respiratory distress syndrome and complications of cerebral edema.

Fluids can reduce glucose levels and reduce peripheral insulin resistance. Insulin therapy can promote the movement of water into the intracellular space and exacerbate hypovolemia and hypernatremia because the true sodium value in hyperglycemic conditions is higher than measured sodium. This rapid rise in sodium can trigger both pontine and extrapontine myelinolysis. Therefore, it is very important to start fluid therapy as early as possible.

Serum sodium > 140 and total serum osmolality > 330 mOsm/kg, indicating a severe fluid deficit.[8] Apart from these assessments, there are several clinical symptoms that can be used as a determinant of the degree of dehydration, including:

- 5%: decreased skin turgor, dry mucous membranes, tachycardia.
- 10%: capillary refill time ≥ 3 seconds, sunken eyelids.
- > 10%: weak peripheral arterial pulse, hypotension, shock, oliguria

Insulin therapy should be started as soon as the diagnosis of diabetic ketoacidosis is established. The use of insulin will reduce levels of the hormone glucagon, thus suppressing the production of ketone bodies in the liver, the release of free fatty acids and fatty tissue, the release of amino acids from muscle tissue, and increase the utility of glucose in the periphery.

In diabetic ketoacidosis, regular insulin by continuous intravenous infusion is the treatment of choice. In adult patients, an intravenous bolus of regular insulin of 0.15 units/kg followed by a continuous infusion of regular insulin of 0.1 units/kg/hour (5-7 units/hour in adults) should be given.

If the potassium level is <3.3 mEq/l, it must be corrected first to prevent the worsening of hypokalemia which can lead to cardiac arrhythmias.[17]

If the hydration status is adequate, the insulin infusion can be increased 2 times every hour until a constant decrease in blood sugar is achieved between 50 – 75 mg/dl/hour. When the blood glucose level reaches 250 mg/dl, decrease the insulin infusion to 0.05–0.1 u/kg/hour (3–6 u/hour), and add 5%–10% Dextrose infusion. (6,11) After

that the speed of insulin administration or the concentration of Dextrose must be adjusted to maintain glucose values until the acidosis improves.[17]

During insulin therapy, blood samples should be taken every 2-4 hours to measure electrolytes, glucose, BUN, creatinine, osmolality, and venous pH. In general, arterial blood gas analysis is not necessary; venous pH (which is usually 0.03 units lower than arterial pH) and anion gap can be followed to measure improvement in acidosis.[17]

Patients with diabetic ketoacidosis have low serum sodium levels because of high blood sugar levels. For each increase in blood sugar of 100 mg/dl above 100 mg/dl, the sodium level is assumed to be 1.6 mEq/l higher than the measured level.

If hypokalemia is found at the start of the measurement, this indicates a deficit in total body potassium, and potassium replacement is essential during the first 24-36 hours.[12] Correction of potassium values in acidotic conditions can predict changes in serum potassium. For every 0.1 decrease in pH, the potassium concentration will increase by 0.5 meq/l (0.5 mmol/l), and the same principle applies to an increase in pH. This calculation can be used when correcting potassium levels in the body while waiting for the pH value to improve).

At the time of treatment of diabetic ketoacidosis, the value of serum potassium levels can decrease rapidly due to the therapy we provide, especially when administering insulin which triggers reentry of potassium into the intracellular, dilution due to increased extracellular fluid, correction of acidosis, and increased excretion in the kidneys in these conditions. If these changes occur rapidly, hypokalemia can trigger lethal arrhythmias, respiratory paralysis, paralytic ileus, and rhabdomyolysis.

Other things that must be considered in patients with diabetic ketoacidosis are continuous ECG monitoring because of the risk of hypokalemia, hyperkalemia which causes arrhythmias. Nasogastric tubes are administered to patients who are unconscious because of the risk of gastroparesis and aspiration. A urinary catheter is placed if there is impaired consciousness or if the patient does not pass urine after 4 hours of starting therapy, especially to assess fluid balance, urine output, and assess fluid status.

Antibiotic therapy is given when there is evidence of infection, but the leukocyte count often rises sharply in diabetic ketoacidosis and does not confirm infection. History, physical examination, fever, and increased CRP are more reliable biomarkers.

In this case, report complications of diabetic ketoacidosis occur in the form of cerebral edema and large stroke infarction. This complication is because patients with diabetic ketoacidosis are prone to thrombosis, which is due to dehydration and vascular volume contraction, low cardiac output, increased blood viscosity, and often due to atherosclerosis. This complication is more common when the osmolality is very high. Low-dose heparin may be considered for prophylaxis in patients at high risk of thrombosis, although there are no data supporting its safety and effectiveness.

The management of this patient related to the diagnosis of stroke, acute infarction, and extensive cerebral edema was not optimal. What has been done in this patient is the provision of airway support and oxygen supplementation in patients with decreased consciousness by maintaining saturation> 94%.

CONCLUSION

The case of diabetic ketoacidosis and cerebral edema emphasizes the importance of close monitoring and proper management of patients with type 2 diabetes mellitus to prevent serious complications such as DKA and cerebral edema. This has not been done optimally. Patients with a history of diabetes mellitus must be educated about the importance of proper monitoring and treatment to prevent serious complications and improve quality of life.

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EPIDURAL ANESTHESIA FOR SECTIO CAESAREA WITH HYPERTHYROID AND MAJOR INCOMPATIBILITY: A CASE REPORT

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ABSTRACT

Introduction: Epidural anesthesia is the administration of local anesthetic drugs into potential cavities outside the dura mater with one of the indications being sectio caesarea. Hyperthyroidism is an abnormal increase in the serum concentration of free thyroid hormone. Hyperthyroid patients have a special risk when undergoing surgery, namely thyroid storm. Blood transfusion is an important component of emergency obstetric care and appropriate blood transfusion significantly reduces maternal mortality. A history of major incompatibility is a special condition for carrying out a bleeding strategy during obstetric procedures.

Case Illustration: Reported a 24-year-old woman G4P21002 UK 36+4 weeks with history of antepartum hemorrhage with total placenta previa and moderate-risk MAP with hyperthyroidism and a history of major incompatibility. The patient was classified as ASA II. The patient was planned to undergo epidural anesthesia with 0.4% levobupivacaine.

Conclusion: The effects of thyroid dysfunction and history of major incompatibility significantly complicate surgical procedures and postoperative recovery, so it is very important to detect dangerous conditions. Epidural anesthesia will be important consideration in operative and postoperative management to avoid thyroid storm incidence especially in pain management, postoperative recovery and stabilize hemodynamic of the patient.

Keywords: epidural anesthesia, hyperthyroidism, major incompatibility, sectio caesarea

INTRODUCTION

Epidural anesthesia is the administration of local anesthetic drugs into potential cavities outside the duramater.[1] This space extends from the craniocervical junction at C'1 to the sacrococcygeal membrane to administer epidural anesthesia in each of these areas.[2] Epidural anesthesia is performed near the nerve roots that innervate the surgical site, for example a lumbar epidural for operations on the pelvis and lower extremities and a thoracic epidural for operations on the upper abdomen.[1,2]

Placenta accreta, when the placenta is failed to separate from the uterine wall after delivery.[3] Placenta accreta occurs when the chorionic villi abnormally invade the myometrium. Placenta accreta, increta, or percreta are associated with major pregnancies, including life-threatening maternal bleeding, large volume blood transfusions, and peripartum hysterectomy.[4]

Sectio ceasarea is an artificial birth, in which the fetus is born through an incision in the abdominal wall and uterine wall.[5] Complications include bleeding, heavy bleeding can occur during surgery if the branches of the uterine artery are also opened, or due to uterine atony.[6]

Hyperthyroidism is an abnormal increase in the serum concentration of free thyroid hormone.[7] Thyroid disorders are the second most common endocrine abnormality in pregnancy and it is well known that thyroid dysfunction can have adverse effects on both the mother and the fetus.[8] Hyperthyroid can caused thyroid storm a special risk when undergoing surgery which can be exacerbated by several conditions including anesthesia, surgery, bleeding, pregnancy and child birth (vaginal birth or by cesarean section).[7] Patients who are known to have hyperthyroidism have several considerations and actions that must be taken, both in the preoperative, intraoperative and postoperative phases.[9]

Blood transfusion is an important component of emergency obstetric care and significantly reduces maternal mortality.[10] Obstetric bleeding is one of the main causes of massive bleeding and maternal death.[11]

Correct assessment are difficult in pregnancy because of physiological changes and comorbid conditions.[12] A history of major incompatibility is a special condition for carrying out a bleeding strategy during obstetric procedures. ABO-incompatible blood transfusions often result in acute hemolytic reactions followed by disseminated intravascular coagulation (DIC) and acute kidney injury (AKI).[13] Transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO) are major causes of transfusion-related morbidity and mortality.[14]

This case reports one case of a 24-year-old woman G4P21002 UK 36+4 weeks with history of antepartum hemorrhage with total placenta previa and moderate-risk MAP with hyperthyroidism and a history of major incompatibility, a re-section cesarean section was performed under epidural anesthesia.

CASE ILLUSTRATION

A 24 year old woman G4P21002 UK 36+4 weeks felt bleeding from the birth canal for 6 days, 5 pads/day, now stopped, patient feels 36 weeks pregnant, active fetal movement, patient does not feel pain of contractions coming out, no there is fluid coming out of the vagina. The patient has no complaints of fever, cough, runny nose, shortness of breath. The patient has a habit of sleeping with two pillows, does not complain of waking up at night due to tightness and chest pain. The patient had a history of cesarean section 4 years ago with antepartum hemorrhage with total placenta previa and moderate-risk MAP. The patient has a history of being diagnosed with hyperthyroidism since 8 years ago and took routine drugs thyrozol 1x20mg and propranolol 1x10mg. The patient has a history of major incompatibility.

Based on the history of past medical history, the patient had no history of hypertension, diabetes mellitus, atopy or chronic disease. There was no family history of similar complaints, drug allergies, food allergies, atopy or asthma.

Physical examination of the patient appeared mildly ill with vital signs within normal limits. Electrocardiographic supporting examinations and chest x-rays with results within normal limits. Complete blood count examination showed Hb 12.3 g/dl; WBC 10300/ul; PLT 221,000/ul; HCT 36 %; platelets : 321; erythrocytes : 4.69; PT : 12.5, APTT: 30.5, INR: 0.900. The chemical examination of the caraway showed the following results: Blood type O; Current blood sugar 101 mg/dl; Electrolytes Sodium: 141, Potassium: 3.3, Chloride: 114. Thyroid serum examination showed TSH 0.05 (0.40-4.20); FT3 2.69* (3.00-8.00); FT4 13.78 (10.30-34.70).
Wayne's scoring index and Burch Wartofsky's scoring of the patient includes on table 1 and table 2 :

Table 1. Wayne's scoring index

Parameter	Value	Score
Shortness of breath	No	0
Palpitation	No	0
Tired easily	No	0
Can't stand the heat	Yes	+5
Can't stand the cold	No	0
Excessive sweating	No	0
Nervous	No	0
Appetite increased	No	0
Appetite decreased	No	0
Weight increased	No	0
Weight decreased	No	0
Thyroid enlargement	Yes	+3
Bruit on thyroid	No	0
Exophthalmos	Yes	+2
Palpebral retraction	No	0
Extended lids	No	0
Hyperkinesis	No	0
Palms moist	Yes	+1

Pulse < 80	No	0
Pulse > 90	Yes	+3
Atrial fibrillation	No	0
Value		**+14 (*normal*)**

Table 2. Burch Wartofsky's scoring

Parameter	Value	Score
Temperature (36.6^{o}C)	No	0
CNS manifestations	No	0
Gastrointestinal dysfunction	No	0
Cardiovascular: Tachycardia	Yes	+5
Precipitation factor	**+5**	**Unlikely thyroid storm**

Consultation with a specialist in internal medicine, the patient was given treatment for hyperthyroidism, namely PTU 3x200 mg, Lugol 1 day before SC 4 drops / 8 hours to 2 days after surgery, Methylprednisolone injection 62.5 mg / 24 hours. Transfusion is not recommended for patients because finding an incompatible is at risk of TRALI or TACO. To minimize massive bleeding and the risk of transfusion, the surgery was undergone with cardiothoracic and vascular surgeon by vascularization ballooning first before perform the cesarean section.

Based on the anamnesis, physical and supporting examinations, patients are classified as ASA II, with mild to moderate systemic disorders as a result of surgical abnormalities or pathophysiological processes without limitation of functional activity. The mortality rate is 16%. The patient was planned to undergo epidural anesthesia with 0.4% levobupivacaine.

DISCUSSION

Reported a 24-year-old woman G4P21002 UK 36+4 weeks with history of antepartum hemorrhage with total placenta previa and moderate-risk MAP with hyperthyroidism and a history of major incompatibility, a resection cesarean was performed under epidural anesthesia with 0.4% levobupivacaine.

Sectio caesarea is an artificial birth which the fetus is born through an incision in the abdominal wall and uterine wall provided that the uterus is intact and the fetus weighs above 500 grams.[5] Delivery using the cesarean section method has been proven that the risk of maternal death is 4-6 times greater than vaginal birth.[4] The complications that can arise include puerperal infection.[15] Postoperative infection occurs in intrapartum infection.[16] Another complication is bleeding, heavy bleeding can occur during surgery if the branches of the uterine arteries are also open, or due to uterine atony.[15,16]

Epidural anesthesia is a neuraxial block technique, where its use wider than spinal anesthesia.[1] Epidural blocks can be performed via a lumbar, thoracic, cervical or sacral approach (which is commonly called a caudal block).[2] Epidural technique is widely used in operative anesthesia, analgesia for obstetric cases, postoperative analgesia and for chronic pain management.[2] The epidural space is outside the duramater and the nerve roots pass within this epidural space after exiting the lateral portion of the spinal cord, and then head outward.[2] The onset of epidural anesthesia (10-20 minutes) is slower than that of spinal anesthesia.[17]

In this case, induction of anesthesia using levobupivacaine 0.4%. Levobupivacaine is a long-acting amide local anesthetic used in analgesia and anaesthesia.[18] Levobupivacaine are local anesthetics effects on motor and sensory nerves by inhibiting the opening of voltage-gated sodium channels.[19] Due to the long duration of action, it is possible to use this local anesthetic drug with a one-time injection technique.[20] The way it works is to block the conduction process of the peripheral nerves in the body's tissues, which is reversible.[18]

Premedication is the use of drugs before induction of anesthesia.[21] The purpose of premedication is to create a feeling of comfort, awareness from anesthesia, reduce the incidence of hypersalivation, bradycardia, nausea and vomiting after anesthesia, reduce the amount of anesthetic drugs and reduce physiological stress.[22] The patient

underwent premedication in the form of ondansetron 4 mg intravenously and paracetamol 1g intravenously. Ondansetron is a carbazalone derivative that is structurally related to serotonin and is a subtype-specific 5-HT3 receptor antagonist that is located on the CTZ as well as on vagal afferents of the gastrointestinal tract, without affecting dopamine, histamine, adrenergic or cholinergic receptors.[23] The dose of ondansetron 4-8 mg intravenously is effective in reducing the incidence of Post Operative Nause And Vomiting (PONV).[22,23] Premedication with oral paracetamol can reduce pain.[21] Paracetamol works by inhibiting cyclooxygenase (COX)-mediated production of prostaglandins and reducing tissue inflammation.[21]

Thyroid disorders remain the second most common endocrine abnormality during pregnancy and it is well known that thyroid dysfunction can have adverse effects on both the mother and the fetus.[7] Normal human pregnancy is euthyroid with normal serum concentrations of free T4 and T3.[24] The main cause of hyperthyroidism in pregnancy is Graves' disease, with a prevalence of 0.2%.[24] Thyroid storm is a life-threatening exacerbation or decompensation of a pre-existing hyperthyroid condition.[8] Thyroid storm is a clinical diagnosis based on the following symptoms and signs: (1) fever, (2) mental and emotional disturbances, (3) tachycardia, (4) tachypnea, (5) diaphoresis, (6) diarrhea.[5,8] Thyroid storm can progress to coma, multiorgan system failure, and death.[7] Early detection and aggressive management are very important in limiting morbidity and mortality.[7] Several events can precipitate a thyroid storm: surgery, child birth, trauma, iodinized contrast agents, therapy with iodides, emotional stress, pulmonary embolism, stroke, infection, diabetic ketoacidosis, hypoglycemia, congestive heart failure, and intestinal infarction.[8,24,25] The patient has several risk factors that can trigger this thyroid storm. However, at the time of surgery, the patient was in a euthyroid condition, because the patient had been regularly taking antithyroid drugs 1x20 mg thyrozole and 1x10 mg propranolol for the last eight years.

For the preoperative preparation, the patient is advised by internist to stop consuming thyrozol 1x20 mg and propranolol 1x10 mg, and start taking PTU 3x200 mg. The patient then followed the thyroid crisis management protocol as recommended one day before surgery was given Lugol 4 drops / 8 hours until 2 days postoperatively. Methylprednisolone are given 62.5 mg every 24 hours intravenously.

The risk of developing a thyroid storm in the perioperative period can be minimized by appropriate preparation in patients with hyperthyroidism.[25] The goals of preoperative therapy are inhibition of thyroid hormone synthesis and secretion in patients with a history of hyperthyroidism and to reduce the vascularity of the thyroid gland.[24] The main therapy for preoperative are antithyroid (especially PTU), beta-adrenergic receptor antagonists, glucocorticoids, and iodine.[7] No prospective randomized studies have compared the efficacy of various methods for preoperative preparation of hyperthyroid patients.[7] Surgery should be postponed until the patient is euthyroid.[7] Patients should have normal T3 and T4 concentrations and not have resting tachycardia or resting tachycardia.[26] If emergency surgery must be performed despite clinical hyperthyroidism, the hyperdynamic circulation can be controlled by titration of esmolol infusion.[25,26] Anesthesiologists should be prepared to manage thyroid storm perioperatively.[24,26]

There are no prospective randomized studies on anesthetic techniques evaluated the effectiveness or safety of various anesthetic techniques in patients with hyperthyroidism.[27] Both general and neuraxial anesthesia can be used safely and the decision is made based on the individual patient condition, the presence and degree of airway abnormalities, cardiac involvement and electrolyte disturbances.[26,27] In the intraoperative setting, cardiovascular function and body temperature should be closely monitored in patients with a history of hyperthyroidism.[27] Hyperthyroid who are not treated properly can experience chronic hypovolemia and are prone to exaggerated hypotensive responses during induction of anesthesia.[7,27]

Preparation for complications of operative action is blood transfusion.[8] Blood transfusion is an important component of emergency obstetric care and significantly reduces maternal mortality.[11] Obstetric bleeding is still one of the main causes of massive bleeding and maternal death.[9] Blood loss and correct assessment are difficult in pregnancy because of physiological changes and comorbid conditions.[10,11] ABO incompatibility has three features: major incompatibility, which occurs when a recipient with blood type O receives a graft from an A/B/AB donor, and minor incompatibility, which occurs when a donor with anti-A/B antibodies donates stem cells to a patient with A/B blood type or AB and bidirectional incompatibility is determined when the donor and recipient have anti-

ABO antibodies.[13] ABO-incompatible blood transfusions often cause an acute hemolytic reaction followed by disseminated intravascular coagulation (DIC) and acute kidney injury (AKI).[12] Transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO) are major causes of transfusion-related morbidity and mortality.[14,28] This adverse event is characterized by acute pulmonary edema within 6 hours after blood transfusion and has historically been difficult to study because of unknown and nonspecific diagnostic criteria.[29] Mitigation strategies include exclusion of women from plasma donation or exclusion of women with a history of pregnancy or known anti-leukocyte antibodies from receiving or donating blood.[10,30]

Current treatment consists of immediately stopping the blood transfusion along with anti-DIC treatment, in the case of DIC.[10] However, there have been some reports of plasma exchange therapy for blood transfusions being ABO incompatible.[13] Plasma exchange therapy involves replacing the plasma in the blood with 5% FFP or albumin to remove toxic substances in the plasma and replenish insufficient substances.[30] For inappropriate blood transfusions, plasma exchange therapy results in removal of anti-A or anti-B antibodies and loss of free hemoglobin.[31] The management of ABO incompatibility is the administration of drugs that relieve allergic reactions, such as antihistamines; drugs that reduce the inflammatory reaction such as steroids; intravenous administration of physiological fluids; as well as administering drugs that increase blood pressure such as epinephrine if the blood pressure drop occurs drastically.[12] General management of ABO incompatibility in transfusion is stopping the transfusion as soon as possible and giving normal saline fluids and the second management.[11] In this case, the patient was not recommended for transfusion because there was a history of major incompatibility at risk of TRALI or TACO. The patient was also given prophylactic treatment with methylprednisolone 62.5 mg every 24 hours to prevent inflammatory reactions.

After the operation was completed, the patient was transferred to recovery room and received enteral PTU and Lugol drugs again. In this patient, monitoring in the recovery room for an hour showed a stable hemodynamic status and cardiac condition that was able to compensate for surgery, and the patient was admitted High Care Unit. The postoperative analgetic for the patient was epidural analgesia with levobupivacaine 0.25%.

CONCLUSION

A 24-year-old woman G4P21002 UK 36+4 weeks with history of antepartum hemorrhage with total placenta previa and moderate-risk MAP with hyperthyroidism and a history of major incompatibility. The patient was classified as ASA II. The patient was planned to undergo epidural anesthesia with 0.4% levobupivacaine. The effects of thyroid dysfunction and a history of major incompatibilities significantly complicate the surgical procedure and postoperative recovery, making it extremely important to detect the presence of a compromising condition. Epidural anesthesia will be important consideration in operative and postoperative management to avoid thyroid storm incidence especially in pain management, postoperative recovery and stabilize hemodynamic of the patient.

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PERIOPERATIVE PATIENTS TOTAL ATRIOVENTRICULAR BLOCK (TAVB) WITH PERMANENT PACEMAKER (PPM) : A CASE REPORT

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ABSTRACT

Background : Patients with cardiac disease are frequently encountered in anesthetic practice and represent a significant challenge because they have a high risk of perioperative death and morbidity. Cardiac degeneration of the conduction system and changes in the conduction of the interstitial spaces between cells can be a manifestation of cardiac pathology or non-cardiac disease and are most frequently seen in older patients. Sinus node dysfunction and high-grade atrioventricular block (AVB) are the most common indications for permanent pacemaker therapy. As the number of patients with pacemakers increases, the likelihood that anesthesiologists will encounter these patients also increases. Therefore, as anesthesiologists, we need to prepare and know what to pay attention to in patients with pacemakers who are going to undergo surgery, especially non-cardiac surgery.

Case Illustration : Reported a male, 90 years old was diagnosed of left strangulated scrotal hernia, who underwent hernioraphy surgery. The patient has major comorbid disorders of third degree heart block is using of a permanent pace maker. Pre-operative assessment concluded the physical status of ASA III E. Patient was planned to receive general anesthesia. Invasive hemodynamic monitoring was performed by placing an arterial line. The patient was induced with sevoflurane and preemptive analgesic fentanyl 150 mcg, rocuronium 30 mg and followed by endotracheal tube sized 7.5 insertion. Anesthesia was maintained by mechanical ventilation with oxygen : air (50:50) and sevoflurane. Intraoperative analgesia use fentanyl continues titrated dose. Furthermore, the herniorrhaphy procedure is carried out for approximately 3 hours. Postoperatively the patient underwent treatment in the ICU.

Conclusion : Heart block is a disorder of the cardiac conduction system characterized by the presence of disharmony between atrial and ventricular rhythms. Good knowledge of pathophysiology, evaluation during the perioperative period, good cooperation between specialist doctors related to patient management are the keys to successful surgical management.

Keywords : Hernia, permanent pacemaker, total AV block, perioperative

INTRODUCTION

Total atrioventricular block (TAVB) or third degree AV block is complete dissociation between the atria and ventricles, which is characterized by complete dissociation between the P wave and the QRS complex on electrocardiography (ECG). Total AV block is an emergency associated with a heart attack if left untreated. Total AV block can occur due to several clinical abnormalities, both structural and functional. Pacemakers are an important part of electrophysiology and cardiology in general. There is a constant increase in the use of pacemakers due to increasing life expectancy and an aging population. More than 3 million patients in the United States have pacemakers and these numbers are increasing worldwide. In Indonesia, the prevalence of bradyarrhythmias with PPM implantation is still unknown but it is undeniable that it is increasing every year. Several perioperative guidelines have been developed to manage patients using PPM. The American Society of Anesthesiology (ASA) standards were chosen as the framework for the clinical approach to perioperative management of patients with PPM. In terms of anesthesia, the induction technique and anesthetic treatment depend on the clinical condition of the patient. Generally, anesthetic agents do not affect PPM function, but will affect the patient's physiological condition. Therefore, the anesthetic technique needs to be adapted to the patient's clinical condition. Neuraxial anesthesia is the first choice for patients with PPM, especially those with co-morbid cardiovascular disease, because it has less effect on their physiology and allows for rapid recovery. However, it is

important to pay attention to the patient's clinical condition, the expected duration of surgery, and the comfort of the surgeon.[1,2]

CASE ILUSTRATION :

A 90-year-old man complained of abdominal discomfort for 4 hours before going to the hospital. Was consulted to the anesthesia department for hernioraphy surgery. A lump has appeared in the left scrotum since 4 months. Initially the lump appeared in the left groin intermittently and was not painful. Since 4 months this lump has descended into the scrotum area and is difficult to return. The pain in the lump initially felt intermittent, but since 4 hours before entering the hospital the lump felt increasingly painful. Denied nausea and vomiting. last defecation 1 day ago.

Preoperative assessment showed that the patient had no chest pain, shortness of breath, fever, or cold cough. The patient has a history of heart rhythm abnormalities (3rd degree heart block) and has received a permanent pace maker in January 2023 (post successful PPM VVIR for indications of symptomatic bradycardia / TAVB with ventricular escape rhythm et degenerative causes). History of hypertension for 5 years. History of previous heart attack was denied. Currently, there are denial of complaints of chest pain, a feeling of being squeezed in the chest, and a feeling of palpitations in the chest. The patient usually sleeps with 1 pillow. Currently the patient is receiving therapy with nifedipine 1x 10 mg, bisoprolol 1x 2.5 mg, nitrocaf 1x1 tab, HCT 1x 25 mg and clopidogrel 1x 75 mg. There was no history of comorbid diabetes mellitus, bronchial asthma, allergies, congenital heart disease. History of previous anesthesia was denied. The setting of PPM in this patient is: Mode : VVIR, Rate: 70-130, Outputs 2.5/0.4, Sense : 6, Impendance : 440, Batt 9.7 Yr, R Wave 12, VP 67 %, VS 33 %, Setting LRP 80.

Preoperative vital signs examination showed the patient was fully conscious with GCS E4V5M6, blood pressure 160/112 mmHg, pulse rate 45 times/minute irregular, respiratory rate 22 times/minute, temperature 36.7oC, oxygen saturation (SpO2) 96-98 no NRM 10 lpm air and supine position, weight 60 kg, and height 165 cm. Physical examination showed the patient's airway was clear able to open his mouth with 3 fingers, mallampati score II, free neck movement, and the presence of permanent dentures on the upper incisors and a lump in the scrotum with a supple and tender feeling. Other physical examinations were within normal limits. Preoperative laboratory examination showed hemoglobin 8.3 g/dl, platelet count 466 x 103/µl, PT 14.4 seconds, APTT 32 seconds, INR 1.32, albumin 3.46 mg/dL, SGOT 32 u/L, SGPT 23 u/L, urea 11.8 mg /dl, and creatinine 3.55 mg/dL, Na/K/Cl 135/5.7/106 9mmol/L). Screening antigen for COVID-19 infection gave negative result of SARS CoV-2. Blood gas analysis obtained FiO2 : 0.8, PH 7.205, pCo2 40.7, pO2 162.9, SO2 99.7 % HCO3- : 15.7 AaDO2 : 142, PAO2 : 304.9 BEecf: 12.22, BE -11.42, Lactat : 1.3. Chest X-ray examination showed normal lung and cardiac image. The ECG showed A sense V paced intermittent pacing 60 times/minute, VPC frequent (R on T couplet). The Echocardiography showed concentric LVH, global systolic function and good LV kinetics with an EF of 57%. Normal RV systolic function, mild AR, mild TR and Low probability of PH. This case has been consulted to the cardiology and internal medicine department and, From the cardiology department there is no additional therapy for hypertension and cardiac problems, and no contraindications for surgery and does not need assistance during surgery. From the internal medicine department, transfuse PRC with a target HB above 10g/dl, correct hyperkalemia with 2 flacon D40% and 10 units of regular insulin accompanied by 1 ampoule of Ca gluconate. Evaluation of electrolytes 4 hours post correction. Treat underlying disease and evaluate Blood gas analysis

The preoperative screening examinations concluded that the patient had an ASA (American Society of Anesthesiologists) III physical status by considering the patient's elderly age, total Atriventricular Block (TAVB) on PPM, CHF CF 2, Acute Kidney Injury, Anemia, Uncompensated Metabolic acidosis and Hypoalbuminemia . The patient was planned to receive general anesthesia.

Obtaining approval for surgery was carried out with an explanation that the operation was carried out with a high risk. Furthermore, it was also explained that anesthesia would be carried out using general anesthesia techniques and an arterial line would be placed on the right radial artery. After the operation, the patient will be treated in the intensive care unit first. While in the operating room, a monitoring tool was installed in the form of

an ECG, arterial line and SpO2. Installation of intra venous line and urinary catheter has been done before. The infusion is installed smoothly. Before induction of anesthesia, blood pressure was monitored at 160/73 mmHg, heart rate 90-110x/minute, respiratory rate 24x/minute, and SpO2 98% NRM 10 lpm.

Induction of anesthesia was done by injecting Fentanyl 150 mcg IV, Rocuronium 30 mg IV, and inhalation of Sevoflurane 1-1.5 vol%. Premedication with 10 mg of metoclopramide IV and ranitidine 150 mg i.v. were given to accelerate gastric emptying and prevent aspiration of gastric contents. Intubation was performed using an endotracheal tube measuring 7.5, with a depth of 20 cm. The patient was positioned supine during intubation and the duration of the operation. Through out the operation, controlled ventilation was done with SIMV (Synchronized Intermittent Mandatory Ventilation) mode, Pressure support of 8 mmHg, PEEP 5 mmHg, and oxygen and air (50% : 50 %). Intraoperative analgesia use fentanyl continuously titrated dose.

Hemodynamics of the patient during surgery which lasted for 3 hours had been maintained in a stable state. Throughout the surgery, continuous monitoring of blood pressure, heart rate, ECG, , ETCO2 (End-Tidal Carbon Dioxide), was done.

Total amount of fluid given was 750 ml, including 500 ml of crystalloid fluid (Ringer lactate), 250 ml of PRC transfusion. Fluid output through urine was 100 ml for 3 hours (>0.56 ml/kgBW/hour), total bleeding was 75 ml. Other administered medications were paracetamol 1 gram IV.

Postoperatively monitored in the ICU. The patient was transported to the ICU in a tube-in state, sedated with midazolam and fentanil titrated dose as analgesia postoperative, and controlled breathing. There had not been a re-check of postoperative PPM function when the patient was transported to the ICU. It was planned to re-check the PPM function when the patient had been treated in the ICU.

DISCUSSION

Total atrioventricular (AV) block or third degree AV block is a complete dissociation between the atria and ventricles, which is characterized by complete dissociation between the P wave and the QRS complex on electrocardiography (ECG). Total AV block can occur due to several clinical abnormalities, both structural and functional. Structural changes due to coronary artery disease, infection, congenital heart disease, inflammatory disease, and neoplasms commonly result in permanent AV block. On the other hand, the functional disturbances of autonomic, metabolic, and drug origin, which are associated with AV block, may be reversible. The American College of Cardiology/American Heart Association (AHA) guidelines continue to recommend implantation of a permanent pacemaker for the treatment of total AV block and advanced second-degree AV block at any anatomic level, when associated with symptomatic bradycardia (including heart failure) and suspected ventricular arrhythmias. caused by AV block.[2,3,4]

Several perioperative guidelines have been developed to manage patients using PPM. The American Society of Anesthesiology (ASA) standards were chosen as the framework for the clinical approach to perioperative management of patients with PPM. The perioperative approach in these patients includes indications for PPM insertion, setting the PPM function before and after anesthesia, monitoring device function during anesthesia, use of electrocautery and defibrillation during anesthesia.[5,6]

Evaluation and optimization of comorbidities before surgery is necessary. One of the most common comorbidities in patients with electrophysiological disorders is heart failure, which is associated with SA and/or AV node dysfunction that triggers systolic contractions of the right ventricle and left atrium. Preanesthetic assessment of current PPM type and function is required. This can be done by tracing the patient's medical history, medical records, PPM information cards, and contact numbers for cardiologists and PPM manufacturers. It is also recommended that PPM function has been checked at least once in the last twelve months prior to surgery.[5,6,7]

Referring to the standards of the American Society of Anesthesiology (ASA), preoperatively in this patient include: Indications for the use of PPM in this patient Symptomatic bradycardia / TAVB with ventricular escape rhythm and degenerative causes. Types and Products: products used with the Biotronic brand with the current VVIR function mode setting. The tool functions properly and no reprogramming is needed before surgery based on the results of the consultation from the cardiology department.

Neuraxial anesthesia is the first choice for patients with PPM, especially those with co-morbid cardiovascular disease, because it has less effect on their physiology and allows for rapid recovery. However, it is important to pay attention to the clinical condition of the patient, the estimated duration of surgery, and the comfort of the surgeon. Spinal anesthesia can be used by giving low-dose hyperbaric local anesthetics so that side effects of hypotension can be reduced. Low doses of intrathecal opioids as adjuvants should also be considered to increase the effectiveness of intraoperative and postoperative analgesia.[5]

In terms of anesthesia, the induction technique and anesthetic treatment depend on the clinical condition of the patient. Generally, anesthetic agents do not affect PPM function, but will affect the patient's physiological condition. Therefore, the anesthetic technique needs to be adapted to the patient's clinical condition. Under general anesthesia, opioids and inhalational agents can be used safely for patients with PPM. However, for patients with bradycardia, high doses of fentanyl and dexmedetomidine should be avoided, as they increase cardiac dependence on PPM by altering PPM trigger and electrical stimulation thresholds. Intraoperative use of N2O can also cause PPM malfunction due to its infiltration into the space that may exist around PPM implantation in the chest area. This infiltration will lead to accidental removal of the anode leads from the pacing generator.[5,6]

In this patient, general anesthesia was chosen as the anesthetic technique performed, this was because the patient was still taking CPG, the duration of the operation and the patient's comfort. Induction using 150 mcg fentanyl, titrated dose of sevoflurane and 30 mg of rocuronium. The use of propofol agents is avoided in these patients to prevent hypotension which will affect the patient's hemodynamics and further aggravate the work of the heart.

Maintenance of general anesthesia is carried out with O2 gas: air (50%:50%) and the volatile anesthetic agent sevoflurane with dial titration of 1% – 1.5%. Analgesic during surgery using continuous fentanyl 500 mcg in Nacl 0.9 % titrated dose. Monitoring during anesthesia using oximetry, ECG monitoring, invasive blood pressure, and capnography. The choice of fentanyl analgesic during surgery compared to the use of N2O because the use of N2O intraoperatively can interfere with PPM function.

Particular attention was paid to the use of cautery during surgery, whereby only bipolar cautery was permitted in surgery on patients using PPM, with the cautery pads placed away from the pacemaker, at least 15 cm. This return electrode should be placed close to the lesion and away from the cardiac device to ensure that the path followed is short and directed away from the heart and the implanted device. In this patient the cautery used was a bipolar type with electrodes attached to the right leg. Use of electrocautery in the inguinal area (below the umbilicus) with a distance of more than 15 cm from the PPM position. So that this condition is expected to have a minimal effect on PPM work.[5,6]

During surgery hemodinac relatively stable. There were no periods of hypotension and tachycardia. Systolic blood pressure is in the range of 105-160 mmhg, diastolic 50-100 mmhg. The heart rate is relatively stable at a speed of 80 beats/minute. This follows the settings of the PPM. For respiratory rates in the range of 14-18 times per minute. Peripheral oxygen saturation is maintained in the range of 99-100% with an oxygen fraction of 50%. From the hemodynamic stability and ECG picture, it can be concluded that there is no cautery effect on PPM, fluid requirements during surgery are fulfilled and pain control in patients can be maintained properly. During surgery a defibrillator is prepared in the operating room.

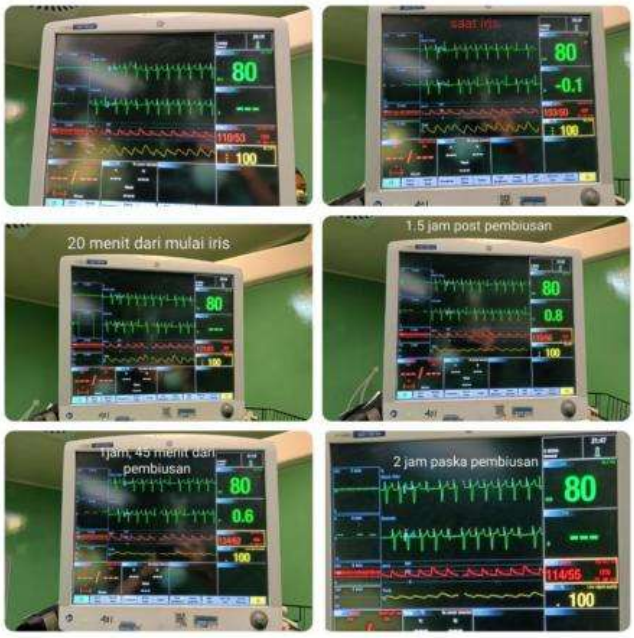

Figure 1. ECG pattern and hemodynamic during surgery

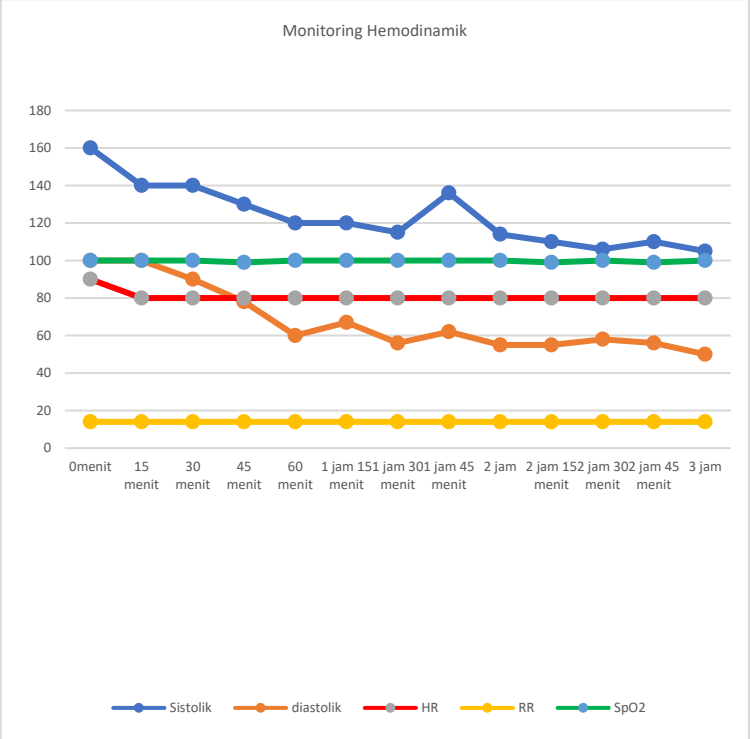

Figure 2. Graph of hemodynamic monitoring during surgery

Perioperative PPM failure can be affected by three factors: (1) failure of the pacing generator (rare), (2) failure of leads (this is also rare. If it occurs, it is due to dislocation while positioning the patient), and (3) failure to receive the pacemaker cardiac arrest or increased pacemaker threshold (this is more commonly due to myocardial ischemia or infarction, acid-base and electrolyte imbalance, or high circulating concentrations of antiarrhythmic drugs).[5,8,9]

It is important to note that tachycardia will not be discovered intraoperatively during hemodynamic monitoring of patients with PPM especially those who are highly dependent on their pacemaker (fixed-rate programmed), even in hypovolemic conditions. Therefore, close monitoring of intraoperative bleeding and fluid replacement is essential.[10]

The patient should be closely monitored during the postoperative period and a pacemaker with external defibrillator function should be available until it is confirmed that the PPM is functioning normally. Ideally, the patient's PPM should be re-examined during this period to check whether the function or mode of operation is good before sending the patient back to the ward. This is especially important if problems are encountered during the intraoperative period.[5,11]

CONCLUSION

A good perioperative assessment is needed, especially in terms of clinical conditions, the underlying causes of cardiac conduction disorders, co-morbidities and changes in the patient's physiology associated with the underlying disease. Thorough preparation for possible complications, such as hemodynamic disturbances to cardiac arrest, must be mastered by an anesthesiologist in patients with impaired cardiac conduction. Close monitoring during surgery using anesthetic regimens and mechanical ventilation is urgently needed given the significant changes in respiratory physiology and hemodynamics in patients with impaired cardiac conduction with PPM.

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CASE REPORT

ANESTHESTIC MANAGEMENT OF AN INFANT WITH CONGENITAL LARYNGOMALACIA FOR INGUINAL HERNIA REPAIR

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ABSTRACT

Background: Congenital Laryngomalacia is a congenital condition characterized by the abnormal flaccidity of the supraglottic structures of the larynx. This floppiness can cause the laryngeal airway to collapse during inspiration, often resulting in a distinctive high-pitched stridor. Employing the classic Laryngeal Mask Airway (cLMA) could be less than ideal for managing obstructions that reside distal to its termination, given its predominant anchoring within the supraglottic airway. However, when compared to the potential complications of more invasive airway interventions and their associated edema, the cLMA proves to be a valuable anesthetic option.

Case Illustration: A four-month-old infant diagnosed with congenital laryngomalacia, small atrial septal defect, pneumonia with resolution, and malnutrition was scheduled for a left inguinal hernia repair and a phimosis circumcision. Anesthetic management consisted of the utilization of the cLMA for general anesthesia, complemented by caudal regional analgesia. After the surgical intervention, the infant was admitted to the Pediatric Intensive Care Unit (PICU) for overnight observation and was later transferred to the general pediatric ward for further management.

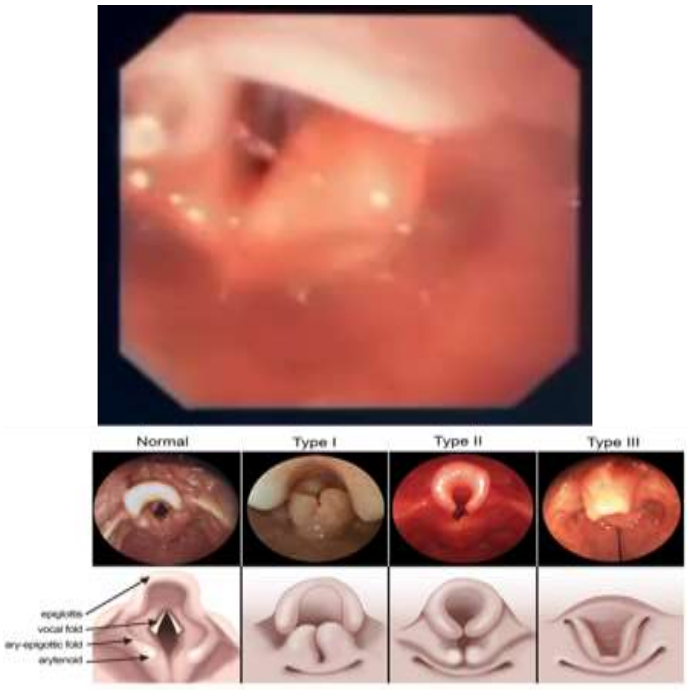
Conclusion: The use of a cLMA may be an option for the Proseal LMA (PLMA) which is proposed as an option to endotracheal intubation to avoid perioperative complications related to airway instrumentation and edema.

Keywords: ***Laryngomalacia; general anesthesia; classic laryngeal mask airway; inguinal hernia repair; caudal analges***

INTRODUCTION

Laryngomalacia is a congenital immaturity of the supraglottic cartilage that produces a high-pitched inspiratory stridor that is worsened by crying, feeding, or supine position. This condition is the most common cause of neonatal stridor and usually appears around 2 weeks of age. However, this condition can also appear around the age of 2-4 months early in life.[1]

Anesthesia can be a challenge in patients with laryngomalacia because the airway may be more difficult to manage due to its risk of collapse and causing obstruction.[1,2] Furthermore, the choice of intraoperative airway management in patients with laryngomalacia is a complex and challenging decision. This is particularly pronounced in pediatric cases due to their narrower airway dimensions, placing them at elevated risk for post operative stridor and glottic edema.[3]



Picture 1. Nasopharyngoscopy results showing type 1 laryngomalacia based on Olney's classification.

It is important to note that the utility of the LMA is constrained when addressing airway obstructions occurring beyond the placement of the LMA.[4] On one hand, the utilization of the LMA offers advantages in avoiding airway instrumentation and edema.[5] Furthermore, the LMA has been noted to exhibit a lower incidence of insertion failure in pediatric patients compared to adults.[6] Moreover, a prior case report has documented the application of the Proseal LMA (PLMA) as a method of airway management in a patient presenting with laryngomalacia.[5]

CASE ILLUSTRATION

Patient with 4 months of age and 3.8 kg of body weight was consulted for left inguinal hernia repair surgery and circumcision for phimosis. The patient exhibited stridor, with a respiratory rate ranging from 70 to 80 breaths per minute and oxygen saturation levels of 95 - 99% with nasal cannula 1 liter per minute.

Picture 2. (a) The patient received caudal analgesia. (b) Monitor of the patient prior to the removal of the cLMA. (c and d) The patient was observed in the operating room. (e) The patient prior to be transported to the Pediatric Intensive Care Unit (PICU). (f) Monitor of the patient upon arrival in the PICU. (g) The patient's condition after being in the pediatric ward.

The patient was born at term at 40 weeks of gestation spontaneously, did not cry immediately, received initial neonatal resuscitation steps and birth weight 2.3 kg The patient showed signs of respiratory distress one day later and was hospitalized in the NICU for 40 days. Nasolaryngoscopy evaluation and echocardiography revealed type 1 laryngomalacia and an ASD 3 mm in diameter. The patient also had pneumonia at the age of 2.5 months. No history of desaturation or cyanosis while the patient was sleeping. The patient's preoperative evaluation was assessed as ASA physical status 3 with severe malnutrition, type 1 laryngomalacia, small atrial septal defect (ASD) and a resolved episode of pneumonia. The patient was planned to undergo anesthesia with classic LMA and caudal analgesia intraoperatively. Anesthesia plans, anesthesia-related risks, and postoperative plans for PICU admission were also communicated during the preoperative visit.

On the day of the surgery, the patient was re-evaluated in the preoperative holding area, and overall, the patient's condition remained like the preoperative visit, with an oxygen saturation of 99% on a 1-liter-per-minute nasal cannula and a heart rate of approximately 150 beats per minute. The patient was then taken to the operating room.

Anesthesia was induced using Sevoflurane gas and 10 mcg of fentanyl for analgesia. The patient's airway was secured using a size 1.5 classic LMA. Spontaneous breathing was maintained, and the patient was positioned in the left lateral decubitus position. Caudal analgesia was administered using 2 cc of 0.25% isobaric bupivacaine for intraoperative and postoperative pain management. Anesthesia maintenance was provided with a mixture of oxygen and air (50:50) along with sevoflurane at a range of 2 - 2.5%. The patient was then repositioned to the supine position to undergo left inguinal hernia repair surgery, followed by circumcision for phimosis. The surgery lasted approximately 1.5 hours.

Upon completion of the procedure, the cLMA was removed. Postoperatively, the patient's general condition remained relatively calm, indicating that the caudal analgesia was still effective, with a respiratory rate of around 70 - 90 breaths per minute and an oxygen saturation of 99% on a 1-liter-per-minute nasal cannula. The patient was then observed for 30 minutes in the operating room then transported to the Pediatric Intensive Care Unit (PICU) and monitored for overnight observation before being transferred to the pediatric ward for further care.

DISCUSSION

Laryngomalacia is marked by the occurrence of supraglottic structural collapse concomitant with the act of inhalation. It stands as the most prevalent laryngeal disorder during infancy. Laryngomalacia manifests as stridor, a high-pitched, musical, vibrating, multi-phasic inspiratory sound that emerges within the initial 10 days of life.[7] However, this condition can also emerge around the age of 2 to 4 months in early life. Symptoms of laryngomalacia typically peak around 6 to 8 months of age and diminish between 12 to 24 months.[1]

There are numerous classifications utilized in laryngomalacia. One of those employed due to its practicality and relevance to surgical intervention is the Olney's classification, which is based on the morphological types of laryngomalacia, dividing it into:[8]

Type 1. Prolapsing supra-arytenoid floppy tissue.

Type 2. Shortened aryepiglottic folds associated with a long, omega-shaped epiglottis that curls upon itself.

Type 3. Overhanging retroflexed epiglottis collapsing posteriorly during inspiration.

Laryngomalacia can be categorized based on clinical symptoms into mild, moderate, and severe forms. In mild cases, individuals exhibit inspiratory stridor and sporadic occurrences of feeding-related symptoms such as coughing, choking, and regurgitation. Infants with mild laryngomalacia maintain a coordinated suck, swallow, and breathing mechanism, typically presenting with an average oxygen saturation level of 98–100%.[1]

Moderate laryngomalacia cases involve frequent episodes of feeding-associated coughing, choking, or regurgitation, prompting caregivers to report feeding challenges. These patients demonstrate a lower baseline oxygen saturation, often around 96%.[1]

Severe laryngomalacia is marked by inspiratory stridor, recurrent apneas, cyanosis, aspiration resulting in recurrent respiratory infections, feeding intolerance, or failure to thrive. Infants with severe laryngomalacia demonstrate a notably lower resting SpO2 of 86%.[1]

In the presented patient, type 1 laryngomalacia was identified with a spectrum of moderate to severe clinical symptoms, characterized by desaturation that had previously reached 80% in room air, improving to 99% saturation with the administration of a 1-liter-per-minute nasal cannula. The patient also experienced malnutrition and recurrent respiratory infection symptoms. No desaturation was observed while the patient was asleep, allowing for the assumption that state-dependent laryngomalacia was absent.[1,7]

The patient was prepared for surgery according to the standard pediatric fasting guidelines. The patient was also not allowed to receive sedative premedication, which could potentially worsen the airway obstruction. [2,5]

The most important thing was to maintain the patient's spontaneous breathing until the airway was secure with the use of an endotracheal tube or LMA.[2,5] Effective airway management strategies encompass techniques such as the chin lift, jaw thrust, and the application of continuous positive airway pressure (CPAP).[9] It's observed that the duration of induction might be extended when utilizing inhalation agents, notably sevoflurane. Continuous positive airway pressure plays a crucial role in averting stridor.[10] For optimal efficacy, CPAP should be applied with a well-sealed mask, ensuring partial closure of the adjustable pressure-limiting (APL) valve and keeping the associated bag inflated during the exhalation phase, while providing support during inhalation.[11] The function of CPAP can be likened to an 'airway stent', designed to mitigate the risk of supraglottic collapse and enhance the functional residual capacity (FRC).[3] When employing manual ventilation techniques using a face mask, it is imperative to proceed with caution, minimizing the risk of excessive inspiratory pressure. Excessive force during manual face mask ventilation may inadvertently exacerbate obstruction, primarily due to an increase in pharyngeal pressure. It's noteworthy to mention that the utilization of an oropharyngeal airway (OPA) is not advised, given the potential risk of exerting pressure on a prolapsed epiglottis.[9] The use of neuromuscular relaxant agents should be avoided before the patient is intubated or has a LMA inserted, given the neuromuscular implications associated with laryngomalacia.[2,5]

Airway management options encompass both intubation and the use of the Laryngeal Mask Airway (LMA). However, these choices can pose dilemmas. Intubation, while effective, carries inherent risks of stridor and glottic edema due to the reduced diameter of the pediatric airway. Post-extubation stridor incidence varies, with ranges observed from as low as 2% in patients undergoing elective surgery to as high as 40% in pediatric patients with

trauma and burns. Infants present additional challenges, given their narrowed oropharyngeal space and tracheal tube lumen, which complicate the use of Supraglottic Airway (SGA) or airway exchange catheters. Intubation might be complex in cases where the epiglottis obscures the glottis, impeded by the laryngoscope's tip, warranting consideration for a rigid bronchoscope. However, intubation offers a more definitive airway, mitigating the risk of aspiration and enabling the adoption of different surgical positions beyond the supine position. In one case report, a patient with laryngomalacia undergoing labioplasty was managed with endotracheal intubation, followed by conscious extubation postoperatively, which encountered post-extubation desaturation; this was managed with adrenaline nebulization, lateral positioning, and oxygenation. Another report highlighted the use of uncuffed endotracheal tube (ETT) intubation for general anesthesia in a 17-month-old patient undergoing pyeloplasty, which did not exacerbate stridor, respiratory distress, or cause desaturation. ETT utilization is, in fact, a frequently employed technique for laryngomalacia, particularly during supraglottoplasty procedures aimed at its correction.

In this case, an LMA was selected with considerations aimed at avoiding airway instrumentation, preventing edema, and taking into account previous case reports indicating the safe use of PLMA in cases of laryngomalacia.[5] A cLMA size 1.5 was chosen for insertion in the patient. It has been observed that the ease of insertion, the number of insertion attempts, device positional stability, airway trauma, and hemodynamic alterations exhibit comparability between PLMA and cLMA in pediatric patients. However, PLMA is reported to offer distinct advantages over the cLMA, including the facilitation of gastric tube placement, effective ventilation, and oxygenation without inducing gastric distention.[12]

Airway patency was also maintained as the patient was positioned in the left lateral decubitus posture to facilitate the administration of caudal analgesia for both intraoperative and postoperative pain relief. The choice of caudal analgesia was aimed at avoiding the use of opioid analgesics and mitigating the crying response that could exacerbate laryngomalacia-related stridor.[1]

Addressing inguinal hernias promptly in neonates and infants is imperative to preclude complications such as bowel incarceration, infarction, and gonadal atrophy.[13] In healthy pediatric patients diagnosed with inguinal hernias, the recommended repair surgery is typically performed before the age of two. Special consideration is required for patients with a postconceptual age (PCA) of less than 60 weeks, particularly for premature infants, patients with neurological deficits, those with anemia, or those who required intensive care during the neonatal period.[14] These risks must be weighed carefully when determining the optimal timing for surgery, given the urgency of hernia repair in pediatric patients. Premature patients with a PCA of less than 46 weeks necessitate a minimum of 12 hours of post-operative observation, and those with a PCA between 46 and 60 weeks require observation adjusted for their comorbidities.[13] Infants with a PCA of less than 60 weeks are recommended to undergo overnight monitoring, considering the potential risk of post-operative apnea and decreased heart rate.[14]

CONCLUSION

Laryngomalacia stands as the predominant etiological factor for stridor observed in the neonatal and infancy periods, necessitating meticulous attention. It is advocated that inhalational induction, while maintaining spontaneous ventilation, be employed until the airway is definitively secured. In the context of managing the airway, the classic Laryngeal Mask Airway (cLMA) may present a viable alternative to the Proseal Laryngeal Mask Airway (PLMA) with the intent of mitigating potential postoperative complications. Vigilant monitoring remains crucial to achieve optimal outcomes.

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GANET AWAKE FOI WITH LIDOCAINE NEBULIZATION FOR PATIENT POST MAXILLOMADIBULAR FIXATION : A CASE REPORT

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ABSTRACT

Background : Because of the potential involvement of the airway, anesthesiologists are concerned about maxillofacial damage. In contrast, awake fiber optic bronchoscope guided intubation is a standard operation in the difficult airway protocol. Lidocaine can be added to a nebulizer and administered with oxygen for 30 minutes using a non-rebreather mask with the bag removed as an effective and noninvasive approach for airway topicalization down to the trachea.

Case Illustration : A 21-year-old man complained of pain in both arms 2 days after having a traffic accident. The patient underwent blood laboratory tests, antebrachial and manual X-rays, and head MSCT without contrast. The patient was diagnosed with Closed Galeazzi Fracture (D), Oblique Type; Closed Galeazzi Fracture (S), Oblique Type with Fracture Maxilla bilateral and Fracture Symphisis Mandibular after Maxillomadibular Fixation a day ago. The airway of the patient not clear because can not open the mouth due to attached Maxillomadibular fixation and decreased nasal patency. The patient was scheduled for Bilateral Radius ORIF with Small DCP by Orthopedic Department. From the anesthesia department, the patient is assessed by ASA III. The patient is planning to undergo surgery with GANET awake FOI with Blunting Nebulized Lidocaine 2%.

Conclusion : GANET awake FOI is a well-established and adaptable method for airway control in patients with known or suspected difficult airways, such as maxillofacial fractures, and it is an important patient safety problem.

Keywords: fiber optic intubation, general anesthesia, lidocaine nebulization, maxillofacial fracture

INTRODUCTION

An anesthesiologist faces a significant problem when dealing with difficult airway control. Anesthesiologists are concerned about maxillofacial injuries because of the potential involvement of the airway. Most individuals who appear with multiple trauma may necessitate coordination across several specialists. According to advanced trauma life support, the initial goal in managing a trauma patient is airway maintenance and cervical spine stability. Airway management issues can cause serious morbidity and death in maxillofacial trauma patients during both primary and elective surgical management. Failure to establish an airway or intubate was discovered to be the most common cause of patient fatality in patients with facial trauma.[1]

In the case of a problematic airway, awake intubation in a spontaneously breathing patient is the safest technique to secure the airway. Any technique (direct laryngoscopy, video laryngoscopy, blind intubation) can be used to do awake endotracheal intubation. Awake fiber optic bronchoscope (FOB) guided intubation, on the other hand, is a standard procedure in the difficult airway algorithm. However, if the airway is difficult to intubate, a tiny guidewire must be passed through the working channel of the FOB to advance through the narrow section, and then guide the passage of the endotracheal tube into the trachea. Because it was thin, smooth, semi-rigid, blunt ended, available, sterile, and affordable, a nasogastric tube (NGT) guidewire was chosen to be the guidewire in emergency situations when other tools were not available.[2,3]

This study aims to present cases of Bilateral Closed Galeazzi Fracture post-Maxillomadibular Fixation ec Fracture Maxilla bilateral and Fracture Symphisis Mandibular pro ORIF Radius Bilateral with ASA III physical status managed by GANET Awake FOI with 2% Lidocaine Nebulization Blunting.

CASE ILLUSTRATION

A 21-year-old man came to Moewardi Hospital after 2 days having a traffic accident. While riding a motorcycle, the patient hit another motorcycle and fell into an unknown position. After the incident, he complained of pain in both right arms which got worse when moved. History of fainting for 5 minutes, no history of seizures, nausea, and vomiting. The patient also complained of pain in the head, face, and right hand. The patient denied a history of trauma, chemotherapy, and radiotherapy. The patient had a history of hypertension and had undergone ORIF insertion and open reduction surgery 6 months ago

On physical examination, the patient is composmentis. The patient's vital signs, blood pressure of 177/93 mmHg, heart rate of 111 bpm, respiratory rate of 18 bpm, body weight of 60 kg, height 150 cm, BMI 26.7 kg/m2 (overweight), temperature 36.6°C, and 98% oxygen saturation at room temperature. In preoperative airway assessment, the patient was installed maxillomadibular fixation a day ago so he can not open him mouth so the Mallampati can not be evaluated. The nasal patency was decrease because of he has maxilla fracture. General physical examination showed anemic conjunctiva and others within normal limits.

Examination of the local status of the antebrachii dextra region found a slab attached, tenderness in the distal 1/3, no Neurovascular Disturbance was found, and limited ROM elbow due to pain. The left antebrachial region was found to be attached to a slab, with tenderness in the distal 1/3, no Neurovascular Disturbance was found, and limited ROM elbow due to pain.

The results of the patient's laboratory examination showed a leukocytosis of 15,600 and low erythrocytes of 4,25. The patient underwent head MSCT examination without contrast, with no visible bleeding in the brain parenchyma; bilateral pneumoorbita; bilateral pterygoid plate fractures, bilateral inferior orbital rims, nasal septum, nasal bones, anterior, posterior, medial, lateral walls, bilateral superior and inferior maxillary sinuses, anterior walls of bilateral ethmoidal sinuses (Le Fort fracture type II); complete fracture of the right mandibular condyle and symphysis to the right parasymphysis of the mandible to the dentoalveolar as high as levels 4.1, 4.2, 4.3; complete fracture of the dentoalveolar process of the maxilla with dislocation of dentin 2.1 and 2.2 (Ellis fracture class VII); missing teeth in dentin 2.3; soft tissue swelling accompanied by subcutis emphysema in the maxillary and mandibular region bilaterally; bilateral ethmoidal hematosine, bilateral maxillary, and nasal septal hematoma. The patient also did an X-ray of the manus with the results of a complete fracture of the distal 1/3 of the radial os bilaterally, displaced fracture fragments (+), and fracture of the styloid process of the ulna bilaterally with dislocation of the radioulnar joint bilaterally, accompanied by soft tissue swelling around it.

The patient was diagnosed with Closed Galeazzi Fracture (D), Oblique Type; Closed Galeazzi Fracture (S), Oblique Type. The patient was scheduled for Bilateral Radius ORIF with Small DCP by Orthopedic Department.

From the anesthesia department, the patient is assessed by ASA III. The patient is planning to undergo surgery with GANET awake FOI with Blunting Nebulized Lidocaine 2%. The analgesics given were paracetamol and fentanyl, and 2 PCR bags were prepared. Postoperatively the patient is planned to be hospitalized in the HCU.

Figure 1. Clinical appearance

Figure 2. Lidocaine nebulization

Figure 3. Nasotracheal intubation

DISCUSSION

In this case, the patient was diagnosed with bilateral Maxilla Fracture and Mandibular Symphysis Fracture which caused problems for the airway and needed to be managed. The MSCT of the patient's head also showed a Le Fort II Fracture and a Grade IV Ellis Fracture. It was concluded that the patient had a maxillofacial fracture. Maxillofacial trauma is a big concern for an anesthesiologist due to the expected involvement of the airway.

Due to disordered anatomy, soft tissue edema, hemorrhage, and a probable full stomach situation, maxillofacial damage makes airway management problematic. During airway management, an anesthesiologist must keep the following things in mind: type of injury and likely airway involvement, complicated bag and mask ventilation and endotracheal intubation, cervical spine involvement, risk of aspiration of gastric contents, and bleeding that may obstruct view of oral cavity.[1,4]

Orotracheal intubation, nasotracheal intubation, and surgical intervention (cricothyroidotomy or tracheostomy) are among the alternatives for securing an airway. Direct laryngoscopy and orotracheal intubation employing rapid sequence intubation with manual inline stabilization are the most preferred and fastest procedures if the mouth opening is acceptable. Blind or fiberoptic bronchoscope-guided nasotracheal intubation should be conducted in a patient with limited mouth opening. A skull base fracture must be ruled out before attempting nasotracheal intubation. The McCoy laryngoscope should be utilized in patients with appropriate mouth openings because it may improve the visibility of the laryngeal view with little cervical spine movement.[1,5]

The ASA difficult airway algorithm prioritizes awake endotracheal intubation based on a patient's history of difficult endotracheal intubation and/or mask ventilation, or in patients whose physical traits imply such difficulties. Although FOB is routinely utilized, other instruments that are available may be required to facilitate awake endotracheal intubation. In this research, the fiberoptic bronchoscope is 5.2 mm in diameter and too thick to pass through the tiny airway, hence a thin guidewire is used to enter the trachea.[3,6]

FOI continues to be the accepted standard in the elective airway care of the awake spontaneously breathing patient with a potentially challenging airway. In such cases, FOI is excellent since intubation can

be conducted prior to the administration of general anesthesia, avoiding the risks of inadequate ventilation and oxygenation, loss of upper airway patency, and failure intubation.[11]

A history of difficult intubation and several anatomic characteristics that may predict difficult laryngoscopy may indicate the necessity for FOI. Limitations in mouth opening, thyromental distance, neck mobility, inability to prognath, oropharyngeal categorization, and obesity are examples. FOI may also be recommended in the presence of known or suspected cervical spine instability, anatomic anomalies of the mandible or larynx, congenital head and neck deformities, and a history of head, neck, and spine trauma. If a difficult airway is suspected, the patient's ability to mask ventilate as well as the requirement for tracheal intubation should be evaluated. Awake intubation is advised for patients who are at high risk of problematic mask ventilation, especially those who are at high risk of aspiration during the airway management process.[6,11]

A lack of preparatory time, competence, support, or equipment, as well as significant airway injuries, are all absolute contraindications to awake FOB intubation. The approach requires the patient's cooperation and is impossible to perform on an uncooperative patient. Blood or heavy secretions in the upper airway that can obstruct vision, a very narrow entrance gap, and the presence of a pharyngeal abscess are all relative contraindications. FOB is connected with the danger of vocal cord injury and the "corking out" of some perilaryngeal masses. Prior to intubation, the latter should be discussed with the ENT surgeon.[1,3,7]

To reduce the danger of epistaxis during nasotracheal FOB intubation, vasoconstrictors must be given to the nasal mucosa. Vasoconstrictors that are commonly utilized include phenylephrine 0.25-0.5% spray and oxymetazoline 0.005% spray. Cocaine 4% (maximum dose 1.5 mg/kg) can be utilized to provide vasoconstriction as well as local anesthetic. For simultaneous vasoconstriction and local anesthesia, a mixture of local anesthetic (4% lidocaine) and vasoconstrictor (epinephrine/phenylephrine) can be employed. Local anesthetics and vasoconstrictors can be applied to the nasal mucosa using moistened Q-tip swabs or pledgets, a spray, or a gel coating narrow nasal airways.[1,3]

The delivery technology used, including but not limited to mucosal atomization, the spray-as-you-go (SAYGO) approach, transtracheal injection, and nebulization, can cause varying local anesthetic (LA) absorption. In patients with limited mouth opening, 4% lidocaine can be added to a nebulizer and administered with oxygen for 30 minutes using a non-rebreather mask with the bag removed as an effective and noninvasive approach for airway topicalization down to the trachea.[8,9]

Muller et al. conducted a study in which they compared nebulized lidocaine to topical lidocaine administered by syringe in patients requiring diagnostic bronchoscopy. When compared to lidocaine instilled via syringe, administration via nebulizer was associated with lower lidocaine dose, improved oxygenation during the procedure, superior cough suppression, and a better safety profile, though there was no difference in the amount of drug required for sedation for both techniques. The downsides of nebulization are the longer delivery duration, the inaccuracy of the total dose of LA administration due to egress around the mask, and the risk for toxicity.[8,10]

The patient with difficult ventilation, such as can not open the mouth and the decrease of nasal patency can be use awake intubate. This method is commonly used when ventilation is difficult to reduce risks during anesthesia. Because of the patient was installed maxillomadibular fixation and can not open him mouth, to maintain the patient's airway and breathing during the operation, a nasoedotracheal tube is installed using FOI. To reduce the risk of installing a nasoendotracheal tube and to make the patient comfortable when this procedure is carried out, blunting can be chosen using a local anesthetic agent. One way is to use 2% lidocaine nebulization before intubation.

When trouble with airway control is predicted, FOI has a distinctive role in numerous therapeutic circumstances. These include conscious intubation in the case of predicted airway trouble, intubation when neck motion is to be avoided, and airway examination (e.g., trauma, inhalational injury). The value of FOI in challenging airway management is widely proven, with a high success rate. A study of 54 patients comparing the ILMA with FOI (orotracheal) in awake patients with topical anesthetic found that the ILMA

had 84 and 96% overall success rates, respectively; intubation times were shorter in the ILMA group, and cardiovascular responses were comparable. A more recent study comparing FOI to the McGRATH video laryngoscope in awake patients intubated under topical anesthetic and sedation found no differences in time to intubation, first-time intubation success, or patient-reported comfort with the operation.[11]

CONCLUSION

Airway care is a critical patient safety problem, and FOI is a well-established and adaptable tool for airway control in patients with known or suspected difficult airways, such as maxillofacial fractures. A range of clinical treatments are feasible, including awake nasal and oral procedures, generally with regional and/or topical local anesthetic techniques and with or without sedation.

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CASE REPORT

ANESTHESIA MANAGEMENT FOR REMOVAL A 17KG OF GIANT UTERINE TUMOR: A CASE REPORT

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ABSTRACT

Anesthesia management for giant intraabdominal tumors should be carefully managed to prevent the patient from getting perioperative complications. We report anesthesia management a rare uterine tumor with a giant size from a 55-year-old woman using general anesthesia. The first clinical laboratory showed Hemoglobin (Hb) was 7 g/dl and after being transfused with 6 units of Packed Red cell (PRC) for 3 days, the Hb value reached 10,4 g/dl (on the same day with the surgery performed). Ca 125 tumor markers were 17,75 U/mL and abdominal computed tomography revealed a giant myoma uterine which has feeding from the uterine artery bilateral and minimal ascites. Evidence of malignant tumor, atelectasis, and pleural effusion was not observed. After being pre-oxygenated with 100 percent oxygen, the patient was induced with 1 mg of midazolam, 50 mg of ketamine, and 25 mg of atracurium intravenously, and after that, the patient was intubated. Tidal Volume (TV) was set at 7mL/KgBB and PEEP was kept at 5cmH20 to prevent pulmonary edema and barotrauma. During the operation, the position of the patient was reverse Trendelenburg position with a tilt to the left side. After the surgery, we used multimodal analgesia to manage the pain with Tramadol IV 8 hourly and fentanyl 50mcg hourly. We successfully removed 17 kg of the giant tumor with general anesthesia and kept the stability of hemodynamics during the operation and post-operation without any problems such as pulmonary edema, hypotensive syndrome, and any other major problems.

Keywords: Giant uterine tumor; Pain management; perioperative management; General anesthesia

INTRODUCTION

Leiomyomas or fibroids are the most common benign pelvic tumors in females that grow monoclonally from the smooth muscle cells of the uterus. Such tumors occur in nearly half of women over the age of 35 years, with increased prevalence during the reproductive phase due to hormone-stimulated growth. Although uterine leiomyomas are frequent in women, fibroids > 50 cm in size with a weight of 11.6 kg (25 lb) and more being defined as giant, are exceedingly rare.[1] In cases of giant uterine leiomyoma, evidence-based guidelines for management are limited to conservative management. The increase in leiomyoma size often complicates surgery, which often leads to total or subtotal hysterectomy.[2] Surgery and anesthesia management on a giant abdominal mass is challenging because the enlargement mass affects the normal anatomical position of the internal genital organs and may cause intraoperative hemodynamic instability. Therefore, this condition needs a different treatment approach than other cases. Proper surgical management and careful perioperative care are essential to ensure a good outcome after excision.[3] General anesthesia is still the most widely used technique for abdominal hysterectomy. [4] We present a case of a giant uterine leiomyoma that we diagnosed and surgically managed in Prof. Dr. Soekandar Hospital in Mojokerto, East Java. We aim to increase awareness among general physicians and anesthesiologists about the several risks, challenges, and factors that need to be watched out for in the anesthesia

management of giant myoma uterine removal. In this case, we expelled the tumor and managed the hemodynamics using general anesthesia successfully.

CASE ILLUSTRATION

A 51-year-old woman presented with an expanding mass in her abdomen seven years ago, but she did not see a doctor. She had moderate dyspnea due to the mass in her abdomen, nausea, generalized weakness, and diminished appetite. Any micturition and defecation disorders were denied. The patient was married for 25 years and had no previous surgical history. Based on previous medical history, the patient had never experienced anything similar. Similar complaints from the patient's family members were also denied.

The initial vital signs showed the following: Blood Pressure (BP): 140/90 mmHg, heart rate (HR): 86 beats/min, respiratory rate: 26 times/min, and body temperature: 36.3°C. The physical examination shows a pallor conjunctiva and during the abdominal exam, an immovable mass was felt in the midline of the abdominal area, extending from the lower abdomen to the epigastric area.

The first clinical laboratory showed Hemoglobin (Hb) was 7 g/dl and after being transfused with 6 units of Packed Red cell (PRC) for 3 days, the Hb value reached 10,4 g/dl (on the same day with the surgery performed). Ca 125 tumor markers were 17,75 U/mL which means still in the normal range (less than 35 U/mL). Chest X-ray revealed no major problem, and abdominal computed tomography revealed a giant myoma uterine which has feeding from the uterine artery bilateral and minimal ascites. Evidence of malignant tumor, atelectasis, and pleural effusion was not observed. Three days before the day of surgery, the patient was given breathing exercises with deep breathing and coughing exercises in the sitting position.

Fig 1. Pre-operative view of the patient's abdomen

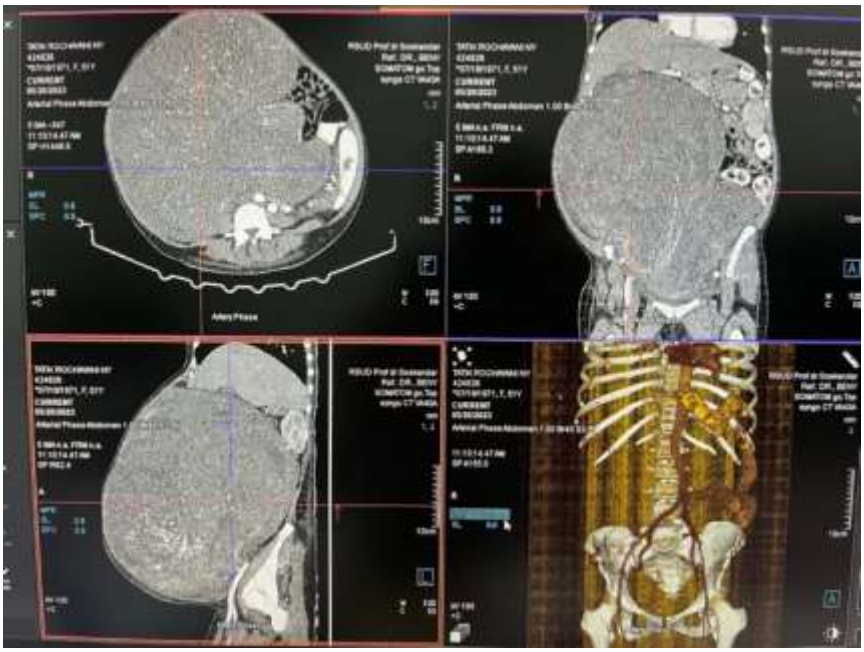

Fig 2. Abdominal Computed Tomography Scan with contrast revealed a giant myoma uterine which has feeding from the uterine artery bilateral and minimal ascites.

Standard monitors that showed non-invasive blood pressure (NIBP), pulse oximeter, ECG monitor, and also capnography waveform were applied to the patient in the operating room to facilitate precise hemodynamic control. After being preoxygenated with 100 percent oxygen, the patient was induced with 1 mg midazolam, ketamine 50 mg, and atracurium 25mg intravenously, and after that the trachea was intubated and the tube was placed in the lateral cavum oris. Anesthesia was maintained with 1.5% sevoflurane, ketamine 0.5 mcg/hour, and fentanyl 50 mcg every hour.

After inducing anesthesia, the tidal volume (TV) was kept at a minimum level of 7 mL/kg predicted body weight with an initial respiratory frequency of 12 breaths/min and positive end-expiratory pressure (PEEP) of 5 cmH_2O. The respiratory rate was adjusted to maintain an end-tidal carbon dioxide ($P_{ET}CO_2$) of 35 to 45 mm Hg. The inspiratory/expiratory ratio was 1:2, and the patient's airway pressure was 17 cmH_2O. During the operation, the position of the patient was reverse Trendelenburg position with a tilt to the left side.

Fig 3. The surgical assistant was holding the giant uterine tumor during the procedure

A total of 17 kg of mass was gradually obtained from the uterus. And the total hysterectomy and bilateral salpingo-oophorectomy were performed after that. Total surgery time was 100 minutes and blood loss was 1000cc with 200cc clear yellow urine output, therefore, the patient was given a total 500cc Nacl 0,9 %, 200 cc HES, and 2 bags packed red cell (700cc). After the procedure, the surgical wound was further infiltrated and multimodal analgesia with Tramadol IV 8 hourly and fentanyl 50mcg hourly was injected. After that, the patient was extubated and transferred to the ICU for further monitoring. The respiratory and circulatory dynamics were stable thereafter. The final pathology diagnosis of the extracted tumor was benign myoma uterine.

DISCUSSION

Giant intra-abdominal tumors are associated with several risks and challenges. Anesthesia management is of vital importance in perioperative management. The problems involving the circulatory system during the resection of giant tumors can be divided into the following aspects: before the tumor is removed, the supine hypotensive syndrome can be induced by compression of the tumor; a rapid decrease in thoracic pressure and abdominal pressure after the removal of giant tumors can cause hemodynamic collapse; intraoperative bleeding can occur; and changes in intrathoracic pressure due to postural and intraoperative positive pressure ventilation can also affect hemodynamic factors.[3] Postoperative pulmonary complications, such as atelectasis or pneumonia, are common and high after abdominal and thoracic surgery. It may cause unnecessary discomfort, prolonged hospital stay, and increased healthcare costs. Moreover is the leading cause of morbidity and mortality, specifically within the first postoperative week.[5] Perioperative breathing exercises may shorten postoperative length of stay, improve patient satisfaction, slightly reduce hospital charges, and not cause significant side effects.[6] In this case, the patient was given breathing exercises with deep breathing and coughing exercises in the sitting position three days before the day of surgery to improve lung function. Study Dhiaa *et al* also revealed that there was an

improvement of all parameters of lung functions in the group exposed to the breathing exercise program and pursed-lip method than the control group ($p < .05$) in the two periods of measurement post-operatively. [7] Before the tumor is removed, placing the patient in the reverse Trendelenburg position with a tilt to the left side and continuous monitoring of blood gases may avert the supine hypotensive syndrome and prevent further respiratory difficulties.[8] In our case patient was also positioned reverse Trendelenburg position to prevent supine hypotensive syndrome.

We selected general anesthesia during the giant tumor removal procedure. Because of the large tumor size, there was a high risk of hemodynamic collapse and re-expansion of pulmonary edema even after removal and these complications would have made emergency airway maintenance difficult. Epidural anesthesia is avoided in this case for the following reasons: 1) high risk of epidural hematoma formation because of dilatation of the epidural venous plexus; 2) potential technical difficulties due to increased internal epidural pressure; and 3) potential hemodynamic instability associated with administration of local anesthetics into the epidural space.[9] Using regional anesthesia also may increase the risk of bleeding associated with the loss of clotting factors and rapidly deteriorating hemodynamics in a short time; additionally, hemodynamics can be worsened by a sympathetic blockage. Furthermore, bleeding and increased surgical manipulation prolong the operating time, causing discomfort in the awake patient.[10] In our case, general anesthesia was maintained with 1.5% sevoflurane, ketamine 0.5 mcg/hour, and fentanyl 50 mcg every hour.

A study by Mortazavi *et al,* otherwise showed that in terms of hemodynamic status, it was found that the spinal anesthesia group was more stable than the general anesthesia group in patients with selective abdominal hysterectomy, but this difference was not significant ($P > 0.05$).[11] Corte *et al* in their study also revealed that in terms of laparoscopic hysterectomy, current evidence suggests no significant advantages to using SA over GA for laparoscopic treatment of gynecological diseases.[12]

Another possible mechanism for postoperative pulmonary compromise is the sudden expansion of chronically collapsed lungs after the removal of the large abdominal mass, causing re-expansion pulmonary edema (RPE).[8] There is no standard method to prevent it but re-expanding the lung very slowly using low-tidal volume with PEEP practice may be helpful to prevent pulmonary edema. [8,13] Liu H's study about intraoperative management in patients with abdominal compartment syndrome induced by giant liposarcomas showed that keeping inspiratory pressure under 20 cmH20 even if muscle relaxants were used able to manage the patients during the operation and postoperatively without respiratory complications. [13] In our case we used control volume mode with 7 mL/kg predicted body weight tidal volume with an initial respiratory frequency of 12 breaths/min and positive end-expiratory pressure (PEEP) of 5 cmH_2O to prevent barotrauma and there was no respiratory complications during giant tumor removal.

Growing tumors are usually hypervascular, which poses great risks of severe bleeding. Furthermore, the circulation and blood pressure plummeted rapidly when the tumor was removed due to a sharp decrease in the compression of the abdominal aorta and inferior vena cava. The supplying vessels of the tumor can be distinguished with selective angiography preoperatively and ligating them could greatly reduce blood loss during operation. The abdominal circumferences of both patients increased progressively during their hospitalization due to the growing tumors.[13] Unfortunately, we did not undergo preoperative ligation due to technical difficulties and facility limitations. In our case, the patient was closely monitored at this time, and over time, fluids were replenished, fortunately, the was no severe hemodynamic instability during operation.

Severe postoperative pain can be detrimental to postoperative recovery. Therefore, postoperative analgesia was considered important. [3] We decided to use multimodal analgesia after surgery: which was an intravenous pump of fentanyl 100 mcg/hour combined with intravenous tramadol 100 mg/8 hour for 3 days during postoperative pain management. In our case, we can see the advantages of multimodal analgesia. The gradual removal of the giant tumor, and monitoring provided stable hemodynamic management during surgery.

Due to a precise diagnosis of the type of tumor, a thorough history and pre-operative evaluation, investigations, and anticipation of various potential challenges associated with anesthetic management we could manage this case uneventfully.

CONCLUSION

Comprehensive perioperative management is the key factor in the successful anesthesia management of giant uterine tumor removal.

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Supraclavicular Block for Arteriovenous Shunt Surgery In Patient with Low Ejection Fraction : A Case Series

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ABSTRACT

Background : Patients with chronic renal failure with any etiology require replacement therapy that is able to replace the excretory and endocrine functions of the kidneys. Arteriovenous Shunt (AV Shunt) is the gold standard for access to hemodialysis. All heart disease patients with low LVEF (Left Ventricular Ejection Fraction) is high risk for perioperative complication.

Case Illustration : We performed anesthesia in two chronic kidney disease (CKD) patients with low LVEF heart failure in two patients undergoing AV shunt surgery in regio cubitii. Both patients were administered supraclavicular ultrasound guided. We give to both patients with Bupivacaine 0.5%, but with different volumes 20 cc and 16 cc. Rerspectives there was no significant derangement in vital signs during incision and intraoperative time. The first patient with 0.5% bupivacaine anesthesia with a volume of 20 ml began to feel pain after 15 hours after administration of local anesthesia, while the second patient with a volume of 16 ml began to feel pain after 12 hours after administration of local anesthesia. In addition, we also give oral paracetamol 500 mg every 8 hours as an analgesic and anti-inflammatory. Postoperative monitoring in both patients showed stable hemodynamics and no complications.

Conclusion : Supraclavicular block give sufficient to facilitate AV shunt surgery in regio cubitii. This technique give good profil hemodynamic in patient with low LVEF and also have the advantage of being able to provide good postoperative pain.

Keywords : CKD, Low LVEF, AV shunt, Supraclavicular block

INTRODUCTION

Based on data obtained from the Indonesian Renal Registry on In 2017, the number of kidney failure patients was 30,831 people from the entire population in Indonesia. Prevalence CKD in Indonesia based on the results of Riset Kesehatan Dasar (Riskesdas) in 2013 of 2% and on in 2018 increased to 3.8%.[1]

Patients with chronic renal failure with any etiology require replacement therapy that is able to replace the excretory and endocrine functions of the kidneys. One such replacement therapy is hemodialysis. This process requires vascular access to the patient. Arteriovenous Shunt (AV Shunt) is the gold standard for access to hemodialysis. Making access is done through surgery to connect (anastomosis) arteries and veins in the arm or other body parts so that it can be used as access for hemodialysis.[2]

All patients with heart disease undergoing non-cardiac surgery, the risk of postoperative outcome is higher in patients with low LVEF (Left Ventricular Ejection Fraction). According to the Veterans database study in which the 90-day postoperative mortality rate among patients with HF (Heart Failure) was lowest among patients with HF with preserved ejection fraction (HFpEF) (4.88 percent), similar in patients with HF with midrange ejection fraction (HFmrEF) (5.11 percent), higher in patients with LVEF 30 to 39 percent (6.58 percent), and highest in patients with LVEF <30 percent (8.34 percent).[3]

Based on the high risk mentioned above, in patients with comorbid heart disease, especially patients with low EF, it is necessary to perform anesthesia with minimal risk. Regional anesthetic techniques, such as supraclavicular block, are among the anesthetic techniques that have potential perioperative benefits including stress response attenuation, cardiac sympathectomy, earlier extubation, shorter hospital stay, and intense postoperative analgesia.

The supraclavicular approach to the brachial plexus blockade results in anesthesia of the upper limb below the shoulder because all trunks and divisions can be anesthetized. The goal is to place the needle in the brachial plexus sheath in the vicinity of the subclavian artery and inject local anesthetic until the spread within the brachial plexus is documented by observing the centrifugal displacement of the trunks and divisions on the ultrasound.[4]

CASE ILLUSTRATION

We performed anesthesia in two chronic kidney disease (CKD) patients with low EF heart failure. The first patient, a 56 year old male with a diagnosis of CKD stage V, Low EF 25%. Right cubital AV shunt surgery will be performed. This patient has a 5-year history of hemodialysis with AV shunt access in the left arm but suffered damage. The patient experiences shortness of breath with mild activity and METS = 4. The vital signs were: blood pressure (BP), 120/85mmHg; pulse rate (PR), 90 beats/min; respiratory rate (RR), 20 breath/min, and oxygen saturation (SPO2), 98% room air. Lung examination revealed minimal rales in both lung bases, and cardiac examination revealed systolic murmurs in the mitral valve area, pitting edema in both lower extremities. Summary of Preoperative Laboratory findings; Complete Blood Count: hemoglobin, 7,80 g/dl; hematocrit, 26.90 %; White Blood Cell, 6.70 ×103 cells/L, platelet count, 267×103 cells/L, Renal function BUN 110 mg/dL, creatinine 8.82 mg/dL, electrolyte Natrium 136 mmol/L, Kalium 4,3 mmol/L, Clorida 101mmol/L and The coagulation factor and liver function tests were within the normal range. Electrocardiography (ECG) was sinus rhythm 75 beat per minute, normoaxis, VES infrequent, and OMI anterior. Postero-anterior Chest X-ray: There early edema pulmonum with cardiomegaly. Echocardiografi trans thoracal : RA dilation, LV global and segmental systolic function decreased by 25%, Segmental kinetic disturbance, Grade II LV diastolic dysfunction, Normal RV systolic function, MR Mild, PR mild, AR mild, TR moderate and high probability of PH.

The second patient, a 49 year old woman with a diagnosis of CKD stage V, Low EF 30%. A left cubital AV shunt operation will be performed. This patient has a history of hemodialysis for 1 year with HD cath access in the right subclavia. The patient has shortness of breath on light activity with METS = 4. The vital signs were: blood pressure (BP), 150/82 mmHg; pulse rate (PR), 93 beats/min; respiratory rate (RR), 20 breath/min, and oxygen saturation (SPO2), 98% room air. On examination of the lungs the results were normal, and on examination of the heart a systolic murmur was found in the area of the mitral valve, pitting edema was found on both lower extremities. Summary of Preoperative Laboratory findings; Complete Blood Count: hemoglobin, 6,60

g/dl; hematocrit, 21.20 %; White Blood Cell, 7.10 $\times 10^3$ cells/L, platelet count, 234×10^3 cells/L, Renal function BUN 69 mg/dL, creatinine 10.80 mg/dL, electrolyte Natrium 141 mmol/L, Kalium 5,2 mmol/L, Clorida 109 mmol/L and The coagulation factor and liver function tests were within the normal range. Electrocardiography (ECG) was sinus rhythm 101 beat per minute, normal axis. Postero-anterior Chest X-ray: There normal pulmo with cardiomegaly. Echocardiografi trans thoracal : LA dilation, LVH eksentric, LV global and segmental systolic function decreased by 30%, Global hipokinetic disturbance, Grade I LV diastolic dysfunction, Normal RV systolic function, MR Mild, PR mild, AR mild, TR mild, mild pericard effusion and intermediate probability of PH.

Both of our patients performed the same anesthetic technique with supraclavicular block with ultrasound guidance. We gave local anesthetic to both patients the same drug with Bupivacaine 0.5%, but with different volumes. In the first patient the volume given was 20 cc, while in the second patient we gave a volume of 16 cc. Preoperatively, we informed the all patient about the risks and benefits of the block procedure to be performed. We also communicate with surgeons about this procedure. In the end, all patient and surgeon agreed and it was decided to perform supraclavicular block anesthesia Then, written informed consent was obtained for both surgery and anesthesia as per the hospital protocol.

Before the block procedure begins, we have prepared a complete preparation including peripheral block equipment and drugs, ultrasound, anesthesia machine, general anesthetic equipment and drugs, as well as emergency medications including lipid emulsion. The patient was positioned supine and semi sitting then a standard monitor (NIBP, pulse oximetry, ECG) was installed. The patient's head turned away from the side to be blocked, we make head up position of the head of the bed, and also asking the patient to reach for the ipsilateral knee to depress the clavicle slightly and allow better access to the structures of the anterolateral neck.

The skin is disinfected and the ultrasound guidance on a sterile protective coated probe. Then the transducer is positioned in the transverse plane immediately superior to the clavicle at approximately its midpoint. The transducer is tilted caudally to obtain a cross-sectional view of the subclavian artery. We looking for view of brachial plexus as hypoechoic oval structures lateral and superficial to the artery. Then we injecting 2 ml lidocaine 2 % into the skin 1 cm lateral to the tranducer to minimize pain during needle insertion. With guiding USG, we inserted the block needle in plane toward the brachial plexus in lateral to medial direction. We also use nerve stimulator to confirm proper needle placement. We look a motor response of the arm, forearm, or hand. After the needle good visible on monitor and reach the target on brachial plexus, we aspirate to make sure clear or no blood and then flow test with NaCl 0.9% are performed. Finally we inject bupivacain 0,5 % in two separate injection on upper and lower of around plexus brachialis. In the first patient the volume given was 20 cc, while in the second patient we gave a volume of 16 cc.

Figure 1. This figure in first patient. Red arrow showing freely dispersion of local anesthetic in cranial of brachial plexus after injection through needle

Figure 2. This figure in second patient. Red arrow showing freely dispersion of local anesthetic in caudal of brachial plexus after injection through needle

Fifteen minutes after the block procedure, the extent of the sensory loss was assessed by pinprick testing, and it was successful. Then the patient was given sedation with a midazolam 0,05 mg per kgbw. The operating procedure begins. Oxygen, 3 L/min was delivered via nasal prong throughout the procedure. There was no significant derangement in vital signs during incision and intraoperative time.

Figure 3. Showing two patients after about fifteen minutes onset of block is achieved and pinprick test was successful. The AV shunt procedure then begin. Patiens in sedation midazolam 0,05 mg/Kgwb and supplementary oxygen 3 liters per minutes.

After the AV shunt procedure was finished, the patient was observed in the recovery room, the hemodynamically stable patient was then fully conscious with an Aldert score of 10. NRS score 0. The patient was then admitted to the ward, where we were observed for 24 hours. Monitoring results obtained with NRS 0 with the arm still feeling numb, hemodynamically stable and no side effects were found.

We evaluated the pain scale until the patient was in the ward, both patients did not feel pain with their arms still feeling numb and unable to move. The first patient with 0.5% bupivacaine anesthesia with a volume of 20 ml began to feel pain after 15 hours after administration of local anesthesia, while the second patient with a volume of 16 ml began to feel pain after 12 hours after administration of local anesthesia. In addition, we also give oral

paracetamol 500 mg every 8 hours as an analgesic and anti-inflammatory. Postoperative monitoring in both patients showed stable hemodynamics and no complications.

DISCUSSION

Both of our patients are at high risk for general anesthesia and surgery. Both patients had heart failure (HF) with a low ejection fraction of 25% and 30%. Patients with high-risk HF need to be properly considered in choosing an anesthetic technique that has the least possible effect on cardiorespiratory function. In addition, it is also necessary to closely monitor hemodynamics during the perioperative period.

Patients HF who undergo surgery are at high risk of complications such as acute decompensated HF, hypertension, hypotension, arrythmia, and death. Causes of worsening hemodynamics include stress response due to surgery, decreased intravascular volume (bleeding, fluid shifts), and effect of anesthetic drugs.[5]

Several studies have shown that PNB has many advantages compared with general anaesthesia, such as superior postoperative analgesia, improved postoperative mortality, intraoperative haemodynamic stability, and a reduced incidence of pulmonary complication. Additionally, PNB has several benefits compared with neuraxial anaesthesia. A previous study of patients who underwent diabetic foot surgery showed that the incidence of significant hypotension was higher in the spinal anaesthesia group than in the popliteal block group. Therefore, anaesthesia using PNB may be a suitable choice to maintain haemodynamic stability and the analgesic effect.[6]

Brachial plexus block is one of the peripheral nerve block anesthesia technique which achieved by injection of local anesthetic solutions into tissues surrounding individual peripheral nerves or nerve plexuses. Local anesthetics bind to specific sites in voltage-gated Na+ channels. The onset of action depending on pKa. Lidocaine (pKa 7,9) have onset approximately 3 minutes, whereas of bupivacaine (pKa 8,1) have onset about 15 minutes after injection. Bupivacaine used for peripheral nerve block has a long duration of action ranging from 4 to 16 hours without epinephrine adjuvants.[7]

Patients with HF with reduced ejection fraction (HFrEF) have poor outcomes and high mortality owing to a reduced cardiorespiratory reserve. Several studies have shown that PNB has many advantages compared with general anaesthesia, such as superior postoperative analgesia, improved postoperative mortality, intraoperative haemodynamic stability, and a reduced incidence of pulmonary complications.[6]

The regional anesthetic technique has advantages over AV Fistula surgery which is known to affect AVF maturation and outcome compared to local anesthesia. This is because sympathetic blockade results in vasodilation, improves tissue oxygenation and increases blood flow through the new fistula, therefore reducing early thrombosis. Several studies have demonstrated superior short-term patency rates of AVF created under brachial plexus block (BPB) compared with LA. In the only randomised controlled trial (RCT) to date with prolonged follow-up, RA improved both early and 1-year functional AVF patency compared with LA. A concomitant health economic analysis using HRQoL data extrapolated from the literature established net cost savings at 1 year and an incremental cost-effectiveness ratio (ICER) of approximately £12 900 per quality-adjusted life year (QALY) gained over a 5-year time horizon with RA.[8]

CONCLUSION

We successfully performed supraclavicular block (PNB) anesthesia in two patients with CKD and low EF heart failure to facilitate AV shunt surgery in the cubital region. Ultrasound-guided supraclavicular block and nerve stimulator provided satisfactory results in both cases. Intraoperative hemodynamics in both patients were stable. With the actions taken, the block can prevent patients with comorbid HF and CKD from possible complications to the cardiorespiratory system if general anesthesia is performed.

In addition, PNB provides the advantage of being able to provide good postoperative pain relief in both patients. The first patient with a 20 cc LA volume was able to provide adequate analgesia for up to 15 hours and the second patient with a 16 cc LA volume for up to 12 hours post LA injection. PNB is also known to provide the other benefits of having sympathetic blockade which causes vasodilation, increases tissue oxygenation and

increases blood flow through new fistulas, thereby reducing early thrombosis. RA also increased early and 1 year functional AVF patency compared to LA.

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OPIOID FREE ANESTHESIA FOR MINIMAL INVASIVE SPINE SURGERY

INTRODUCTION

Opioids are routinely used in the perioperative period to facilitate surgery and also postsurgical pain management. It provides adequate analgesia in response to unpleasant stimuli, modulate impulse in both peripheral and central nervous systems, binds to such receptors and acts in ion channels gates to reduce neuronal excitability. However, the opioids use was associated with many risks and also adverse events like nausea-vomiting, pruritus, constipation, urinary retention, oversedation, in rare cases life threatening respiratory depression, that contributes to prolong length of stay patients in hospital.[1,2] Recently, there were a new concept that has been proposed to avoid the unwanted impacts of opioid use by employing Opioid Free Anesthesia (OFA) technique for such cases that feasible. The OFA itself is focuses on find alternatives to achieve balanced anesthesia during surgery with multimodal analgesia, relying on nonopioid agents and regional anesthesia. Furthermore, the OFA concept is also compatible with the Enhanced Recovery After Surgery (ERAS) protocols, which allows early mobilizations after surgery without compromising patient's comfort.[3] This case is discussed about the advantages use of OFA concept in Anterior Cervical Discectomy and Fusion (ACDF) surgery, we also address the rational method to employ the OFA concept based on literatures to this study and report the results.

CASE ILLUSTRATION

We describe the successful Opioid Free Anesthesia (OFA) concept in three patients who were diagnosed Myeloradiculopathy at level cervical vertebrae underwent Anterior Cervical Discectomy and Fusion (ACDF) procedures at Hasan Sadikin General Hospital Bandung. The OFA was performed by using pre-emptive analgesia before the surgery, dexmedetomidine as opioid-sparing and sedative agent combined with atracurium to facilitate tracheal intubation. The superficial cervical plexus block then was done to provide analgesia in incision area, each patient was given unilaterally with anatomical landmark using 15ml of Bupivacaine 0.25%. Hemodynamic was monitored carefully and periodically intraoperative.

Table 1. Characteristic of the patients

	Patient 1	Patient 2	Patient 3
Gender	Female	Male	Male
Age (year)	54	60	62
Bodyweight (Kg)	60	70	60
Comorbid			
Hypertension	✓	✓	-
Diabetes	✓	-	-
Others			
ASA physical status	III	II	II

The first patient was a 54 years old female with uncontrolled diabetes and hypertension. She complained paresthesia that is spreading from neck to fingers and toes. After worked up on diagnosis, she had planned to have ACDF surgery. She was prescribed Gabapentin 2x100mg to relieve the symptoms. One day before the surgery, as for preemptive analgesia, the patient is given Ibuprofen 800mg and Paracetamol 1000mg per oral. Dexmedetomidine was given continuously 1mcg/kg as loading dose for 10 minutes, followed by maintenance dose 0.2-0.7mcg/kg/hour, and atracurium 0.5mcg/kg for induction. After induction, the superficial cervical plexus block was performed before the incision. Intraoperatively, patient's hemodynamic was stable with blood pressure range from 90-138/64-88 mmHg, heart rate 52-75 bpm, and SpO2 99%. Later, the patient was extubated in the Operating Room and transferred to High Care Unit post operative.

The second patient was a 60 years old male with well controlled hypertension. He was complaining about severe pain that radiating from neck to both hands. He often took Natrium Diclofenac 2x50mg, yet the pain was still worsened in the last two years. Then he was planned to have ACDF surgery. We gave him Ibuprofen 800mg and Paracetamol 1000mg pre operative, and Dexmedetomidine combined with Atracurium for induction. Superficial cervical plexus block was given with bupivacaine 0,25% before surgery. Intraoperative, there was a period that systolic blood pressure is high, we gave additional analgetic using Ketorolac 30mg iv, then blood pressure was stable during the procedure. He was extubated in the Operating Room and discharged in two days with minimal complications and pain score.

As for the third patient, was a 62 years old male with no comorbidities. Patient was having tetraparesis with severe pain since last year. Form Magnetic Resonance Imaging, there were bulging disc at Vertebrae level C2-C6, and was planned to have Anterior Cervical Corpectomy and Fusion (ACCF) surgery. For this patient, we gave paracetamol 1000mg, combined with ibuprofen 800mg and Amitriptyline 25mg for the preemptive analgesia. Induction using dexmedetomidine and atracurium based on body weight. Intraoperative monitoring showed satisfying hemodynamic, the patient also extubated in the Operating Room and transferred to high care unit post operative.

The superficial cervical plexus block was done to each patient after intubation. We gave each patient 15ml of Bupivacaine 0.25% using 21G needle ipsilateral to the incision site. Anatomical landmark was identified by imaginary line from the mastoid process to C6. The needle was inserted at the midpoint of this line. This is where the branches of the superficial cervical plexus emerge from behind the posterior border of the sternocleidomastoid muscle. After cleansing the skin with antiseptic, "fan" technique was used to injected the local anesthetic alongside the posterior border of the sternocleidomastoid muscle as we aimed to block all four major branches of the superficial cervical plexus nerve.

Figure 1. anatomical landmark of superficial cervical plexus block

Hemodynamic was observed carefully for its side effect of dexmedetomidine. There was no significant adverse effect found intraoperatively for all patients. We assess the pain score right after the surgery, all patients were given ibuprofen 800mg iv every 12 hours and paracetamol 1000mg po every 6 hours on the first day after

surgery. All the patients showed satisfying result and discharged to surgical ward in the next two days with minimal side effect and only mild pain.

DISCUSSION

Anesthesiologist are using opioids to reduced the need hypnotics drugs and to ensure the effective analagesia during surgery, but recently, opioids use was contributing to many problems such as nausea and vomiting, misused, and delay post operative rehabilitation. Opioid Free Anesthesia (OFA) is a multimodal anesthesia combining different drugs and techniques to reduce and minimizing opioids uses in anesthesia practice. When regional anesthesia is not applicable, alternative drugs that work to inhibit sympathetic system and reduce the consumption of opioids are used to provide adequate anesthesia during surgery. Mostly, patient who received OFA are those who are prone to deleterious side effects of opioids.[4]

Pain is complex interaction of biological, chemical, and environment factors that resulting in noxious stimuli that are reduced under deep general anesthesia.[2] The opioid base anesthesia provide potent analgetic effect and also promotes hemodynamic stability by suppressing the sympathetic system. Recently, the interest of perioperative use of adjuvants such as ketamine, lidocaine, magnesium sulphate, dexamethasone has been increased with beneficial effects reported and the new method of Opioid Free Anesthesia (OFA) has been introduced.[2]

Even in the short period, the opioids used are correlating with adverse event likem nausea and vomiting, pruritus, constipation, sedation, and life-threatening respiratory depression, also can provoke post operative delirium. Opioid sparing strategies such as OFA is now emerging and provide better recovery in some cases, reduces the unwanted effects of opioids, without compromising patients comfort such as pain post operative. Opioids also can induce post operative acute tolerance called opioid induced hyperalgesia. This leads to worsen pain and increasing postoperative opioid needs. As chronic post operative pain is currently considered as major concern, OFA has some preventive role to it. [1,3]

The OFA technique requires further study to objectively compare the current standard opioid based anesthesia. This case report was aimed to showed that OFA is feasible to be done. Using alternatives opioids sparing and regional anesthesia, we can provide balanced anesthesia for this kind of surgery. Dexmedetomidine is a potent, highly selective α-2 adrenoceptor agonist, with sedative, analgesic, anxiolytic, sympatholytic, and opioid-sparing properties. The analgetic effect of dexmedetomidine is not strong, so we added The Superficialc Cervical Plexus Block to provide a better analgetic intraoperative.[5]

Compared with open procedure, ACDF has complications such neck hematoma and airway compromise, but this was rarely reported. Our experience in this kind of surgery in ASA Class I and II were showed no significant complications and recover in short periods of time. Even in some studies stated that ACDF surgery can be done in outpatient setting.[6] As for ERAS protocols, we combined the OFA method and Superficial Cervical Plexus Block in this case report.

Superficial cervical plexus block can be performed to provide anesthesia and post operative analgesia in head and neck surgery. The cervical plexus is formed by the anterior division of the four upper cervical nerves. The plexus is located on the anterior surface of the four upper cervical vertebrae, and covered by sternocleidomastoid muscle. The cutaneous innervation of both the deep and superficial cervical plexus blocks the skin of the anterolateral aspect of the neck.[7]

Figure 2. Superficial Cervical Plexus Block Techniques based on anatomical landmark[7]

Increases in heart rate and blood pressure are two physiological symptoms of the stress reaction to anesthesia and surgery. While the surgery stimulates autonomic response, the OFA method using dexmedetomidine and superficial cervical plexus blocks facilitate sedative and analgetic effect to achieve balanced anesthesia without compromising hemodynamic changes during surgery and discompfort after surgery. Stable intraoperative hemodynamics and a reduced or even no need for intraoperative opioids used are all physiological manifestations of the blunted stress response. The observations were made in our study showed by stable intraoperative hemodynamic and satisfying result in all patients.

CONCLUSION

Opioid-free anesthesia (OFA) is a combination of several strategies that aim to avoid perioperative use of opioids in order to minimize its side effect without compromising patient's comfort. Several studies showed that OFA has more benefits than Opioid Based Anesthesia, hence many research and applications of this new method are still needed in the future.

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CASE REPORT

CANCER PAIN MANAGEMENT IN PATIENTS WITH CHRONIC MYELOID LEUKEMIA: CASE REPORT

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ABSTRACT

Background : Pain associated with a cancer diagnosis is a serious problem and one of the most common symptoms reported by cancer patients. Experiencing pain and not getting enough help can have a devastating and negative impact on the patient's performance status and emotional well-being, leading to increased anxiety, anger, feelings of depression, and even cognitive dysfunction, thereby reducing the patient's quality of life [1]. Cancer pain that is not relieved by standard oral or parenteral analgesics is a dire fact in 10-15% of patients.
The goal of cancer pain management is to relieve pain to a level that allows an acceptable quality of life. In 1986, the World Health Organization (WHO) introduced the analgesic ladder as a framework that physicians can use when developing a cancer pain treatment plan[2]. Steps for managing cancer pain range from NSAIDs, opioids, adjuvants to pain interventions.
Case Illustration : A 64 year old woman with a diagnosis of CML complained of intermittent abdominal pain. The stomach pain that is felt becomes increasingly severe and unbearable. The patient cannot rest, even though he has been given strong opioids from the doctor in charge. We changed the opioid regimen and increased the dose but the pain still did not improve. We carry out pain intervention according to the WHO step ladder by administering continuous epidurals and neurolysis. The results obtained were quite good, the NRS value was lower and the patient's clinical condition was better.
Conclusion : Cancer pain can be a frightening problem for anesthesiologists as pain consultants. The characteristics of pain that are very diverse and with high intensity make it a challenge in itself. The combination of drugs and pain interventions can provide good results for patients.

Keywords: cancer pain, WHO, Chronic Myeloid Leukemia

INTRODUCTION

Pain is defined by the International Association for the Study of Pain (IASP) as an unpleasant sensory and emotional experience associated with, or resembling an experience associated with, actual or potential tissue damage. The IASP defines cancer-related chronic pain as chronic pain caused by the primary cancer itself, or metastases (chronic cancer pain) or its treatment (chronic post-cancer treatment pain)[1]. Cancer pain, which is severe and excruciating, consists not only of physical components but also psychological, social, emotional and spiritual components as aptly described by Dame Cicely Saunders[2].

We managed a 64 year old woman with a diagnosis of Chronic Myeloid Leukemia, who complained of pain in the right side of her stomach that had been coming and going for the past 7 months. The patient was only diagnosed with CML 2 months later. The patient's urology colleagues have been given analgesic drugs and continuous intravenous opioids, but the pain they feel has not improved. Based on the WHO 4-step pain management ladder, patients are already at level 3, namely the use of strong opioids. We carried out pain intervention for this patient, starting with installing an epidural and administering continuous epidural medication, to

performing nerve ablation and neurolysis. After the intervention we provided, we observed improvements in the quality of pain both from the patient's NRS and clinical scores.

CASE ILLUSTRATION

We report a 64-year-old female patient who was consulted by the Urology division for the management of abdominal pain that did not improve. Complaints of abdominal pain have been felt intermittently since 7 months ago. The patient has carried out various examinations and treatments, both painkillers and procedures, but the abdominal pain reappeared. It was only discovered that the patient was suffering from Chronic Myeloid Leukemia 2 months later. On physical examination, we found the patient looked weak, appeared to be in pain in the right suprapubic and lumbar region of the abdomen. Stomach feels supple, no lump found. The liver is within normal limits, while the spleen feels slightly enlarged. Pressing pain in the middle right abdomen down to the lower abdomen. On other physical examinations we found no abnormalities. From the patient's history, stomach pain was first felt 2 months ago, and it was later discovered that the patient had kidney stones on the right side. The patient underwent surgery to remove kidney stones and then the pain disappeared. 2 weeks later the patient felt pain again in the same place as before, then another examination was carried out and a hematoma was obtained in the operation area and conservative and anti- pain management was carried out. The patient said that he experienced significant weight loss in the last 2 months, accompanied by a decreased appetite. There was also a history of a significant decrease in Hb in the patient. The diagnosis of Chronic Myeloid Leukemia was concluded by a fellow Internal Medicine consultant Hematooncologist based clinically on the presence of spleen enlargement which was confirmed from the MSCT Abdomen results, repeated significant Hb decreases, and MDT results, even though the BCR-ABL 1 result was negative.

When we examined him, the patient was already on continuous opioid therapy with titrated fentanyl. The patient stated that he felt severe pain, felt like he was being stabbed (NRS 8-9), which did not improve with the opioids that had been given at this time. The pain has become more severe recently so that the patient cannot rest because the pain is continuous.

We performed an epidural and provided continuous epidural as a pain management option for this patient. We use the agent ropivacaine 0.125% + fentanyl 12.5 mcg with an initial speed of 5 cc/hour. We maintain intravenous fentanyl and we evaluate it. During 3 days of observation and evaluation, the patient's complaints of pain were still persistent, and additional doses for "breakthrough pain" were given several times with the agent fentanyl 50 mcg bolus and epidural bupivacaine 0.25% 8 cc bolus, so we replaced the epidural agent with ropivacaine 0.125% and morphine 1.25 mg and an intravenous agent with continuous morphine titration. Evaluation the next day the patient still often felt breakthrough pain so we decided to intervene on the pain with radiofrequency ablation and neurolysis. After the pain intervention was carried out, the pain began to be felt by the patient with NRS reaching 3-4. We tapered off the continuous epidural and intravenous morphine gradually and slowly.

DISCUSSION

The most widely accepted algorithm for the treatment of cancer pain was developed by WHO[3]. It suggests that patients with pain start taking acetaminophen or nonsteroidal anti- inflammatory drugs (NSAIDs). In our patient, we found that the patient was treated with continuous opioids in combination with intermittent intravenous

paracetamol. The patient is intolerant to ketorolac because she has a history of gastritis that is easily triggered by NSAIDs. For the management of cancer- related pain in adults, an algorithm created by the National Comprehensive Cancer Network (NCCN) distinguishes 3 levels of pain intensity based on a numerical value from 0 to 10 obtained using a numerical or pictorial rating scale (0 means no pain to 10 being the most severe pain). [4]. The 3 levels of pain intensity referred to in the algorithm are mild pain (1–3); moderate pain (4–7); and severe pain (8-10). In addition, this algorithm differentiates the approach to pain management in patients who are not chronically using opioids (opioid naive) from those who have previously used or are chronically using opioids for

cancer pain (opioid tolerant). From the history of patients who have used continuous intravenous opioids for 2 days at a dose of 50mcg/hour, this patient is included in the opioid tolerant category. From the NCCN guidelines it is said that patients can be given intravenous boluses or patient- controlled analgesia (PCA) with a total dose equivalent to 10-20% of the total opioid administered in the last 24 hours [1]. Reassess after 15 minutes, if the pain scale still does not change or increases, increase the dose by 50-100% of the last dose, can be repeated up to 2-3 times. We carry out evaluations continuously at short intervals because the patient's pain continues to come and go. In accordance with the NCCN guidelines, where the patient's desired goals are not achieved with the treatment that has been given, an intervention strategy can be considered. Initially we chose to give a continuous epidural because it is relatively easy. Agency for Health Care Policy and research (AHCPR) and NCCN guidelines recommend considering epidural or intrathecal infusions in cases refractory to medical management[5]. It is estimated that 5% or more of cancer patients experience pain that is refractory to medical management. The American Society of Anesthesiologists cancer pain practice guidelines recommend optimizing opioids and adjuvants, with consideration for administering neuraxial drugs to patients with refractory side effects over more conservative treatment. The WHO "ladder" for cancer-related pain is a well- validated and generally effective approach to pain management, which recommends nonopioid therapy for mild pain and opioid therapy for moderate or severe pain. However, 12 to 14% of patients experience uncontrolled pain despite adhering to WHO guidelines[6]. For patients with cancer-related pain refractory to opioids, treatment options include opioid rotation, optimization of nonopioid analgesics, and interventional therapy. Our patients have tried various types of opioids available in our hospital, but nothing has been able to improve the pain that patients feel. For cancer-related pain unresponsive to systemic analgesics, step four on the WHO ladder – interventional therapy – has been proposed. Data indicate that interventions such as neurolytic blocks and neuraxial drug administration can result in better pain control with fewer side effects, compared to systemic opioid therapy. On this basis we conducted a trial of continuous intrathecal drug administration. After continuous epidural administration with ropivacaine 0.125% and 12.5 mcg fentanyl, we still maintain continuous intravenous fentanyl, the patient's complaints of pain decreased at the beginning after installation, the patient can rest. However, on the day after the intervention, the pain returned and came and went with the same intensity as before. We did the titration and evaluation for 3 days, and we decided to replace the intravenous and epidural agents with morphine, but until the next day's evaluation the patient still needed resque for breakthrough pain which often appeared.

Based on the evaluation above, we decided to perform pain interventions that include nerve ablation and neurolysis. We also found that the area of the stomach that felt pain expanded to almost the entire area of the stomach. Interventional therapy has a special role in the management of cancer pain and consists of a number of techniques including minimally invasive neuroablative and neuromodulation interventions. This drug is indicated when pain is resistant or when intolerable side effects preclude the use of trad pharmacotherapy.

CONSLUSION

Manifestations of cancer pain can appear in various levels, and have different characteristics for each individual and cannot be explained, and tend to have an increasingly severe intensity. Cancer pain that is intractable and resistant to the WHO analgesic ladder is a therapeutic nightmare for oncologists and pain physicians that has a significant impact on patients' quality of life. Management of cancer pain starts from NSAIDs to opioids with administration of adjuvants to pain interventions.

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COMBINED FEMORAL AND SCIATICA NERVE BLOCK IN PATIENT WITH CAD1VD POST-PCI UNDERGO DEBRIDEMENT OF RIGHT FOOT DUE TO DIABETIC ULCER

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ABSTRACT

Background: The mortality and morbidity of patients with coronary artery disease with low ejection fraction undergoing general anesthesia is enormous. Peripheral nerve block has long been an option because it can provide the advantage of hemodynamic stability. However, a peripheral nerve block is often perceived to be time-consuming and undependable as the sole anesthetic procedure

Case Illustration: A 62-year-old woman diagnosed with a diabetic ulcer with congestive heart failure caused by ischemic heart disease with low ejection fraction post percutaneous coronary intervention six months ago will undergo debridement and biopsy of her right foot. The patient is anesthetized with a combined femoral and sciatica nerve block with ultrasound and nerve stimulator guiding. 20 minutes after anesthesia the patient feels no pain and debridement can be performed successfully, without significant hemodynamic changes and admission to the intensive care unit. Patients do not feel pain up to 6 hours postoperatively.

Conclusion: This case is further evidence that patients with myocardial infarction with low ejection fraction might not experience post-anesthesia complications that caused by general anesthesia and do not require admission to the intensive care unit with proper peripheral nerve block.

Keywords: femoral nerve block, sciatica nerve block, ultrasonography-guided, heart failure, low ejection fraction

INTRODUCTION

Prevalence of coronary artery disease is associated with an increased risk for intraoperative myocardial ischemia(1). Several studies showed that in patients undergoing noncardiac surgical procedures, intraoperative myocardial ischemia correlated with postoperative cardiac morbidity and mortality. The overall incidence in this high-risk population is reported to be 5.6%(2).

Regional anesthesia offers advantages and is preferable, especially for a patient who does not tolerate it well under general anesthesia.

CASE ILLUSTRATION

A 64-year-old woman diagnosed with a Wagner IV pedis dextra ulcer with comorbid congestive heart failure NYHA 3 with an ejection fraction of 28% due to ischemic heart disease will undergo debridement, degloving, and culture sampling.

6 months ago the patient experienced chest pain and shortness of breath and then underwent PCI 1VD with DES on the indication of NSTEMI KILLIP 3. The patient suffered from a DM ulcer on the right leg and has been hospitalized for 14 days. History of medication in these patients includes: clopidogrel 75mg once a day, miniaspilet 80mg once a day, vbloc 3,125mg three times a day, valsartan 40mg twice a day, and novorapid therapy 8 units three times a day.

Laboratory tests showed an increase in leukocyte numbers of $13.3.10^3$ / L, hemoglobin 9.9 mg/dl with kidney function, transaminase enzymes, and electrolytes within normal limits. On thoracic X-ray examination, the initial impression of pulmonary and cardiomegaly edema was obtained with a CTR of 0.75. On

echocardiography examination, it was found that global systolic function decreased with EF 28% with segmental kinetic disorders and severe hypokinetic inferoseptal, and anteroseptal with other hypokinetic segments.

In the anesthetic induction room, an 20G intravenous cannula was inserted in her left forearm, followed by the placement of an electrocardiogram, pulse oximeter, and blood pressure cuff.

50 µg of fentanyl and 1 mg of midazolam were given intravenously for analgesia, after that the sciatic nerve block was performed under aseptic conditions using Labat's posterior approach. Confirmation of needle placement was easily achieved by eliciting plantar flexion with stimulation as low as 0,4 mA. The Femoral nerve block was performed under ultrasonography guidance. Twelve mg of bupivacaine 0,5% was injected into the femoral nerve block and 22 mg of bupivacaine 0,5% was injected in the sciatica nerve block.

Twenty minutes later, debridement was carried out with minimal patient discomfort, hemodynamic parameter remained relatively unchanged. The blood pressure ranges 128-135 mmHg (systolic) and 67-80 mmHg (diastolic) heart rate 65-84./min and oxygen saturation was 97-98%.

After surgery, the patient is observed in a recovery room for 30 minutes and transported back to the ward with ketorolac 30mg every 8 hours intravenously as the analgetic agent.

Figure 1. Diabetic ulcer of the patient that will undergo debridement

Figure 2. During the procedure, the patient is awake, comfort, and the hemodynamic was stable.

DISCUSSION

When dealing with patients with severely impaired cardiovascular function, anesthesiologists need to select appropriate anesthesia techniques and carefully monitor vital signs to maintain hemodynamic stability during the perioperative period. PNB has several advantages compared to general anesthesia as well as neuraxial anesthesia.

In a study conducted by Yaziqi et al a combination of sciatica and femoral block can reduce the complications of myocardial intraoperative infarction when compared to general anesthesia(3). Naja et al similarly showed that combined sciatic-paravertebral nerve block for surgical hip fracture repair in elderly patients led to a lower incidence of intra-operative hypotension and need for post-operative admission to the ICU/ HCU, when compared to patients receiving general anesthesia(4).

A previous study of patients undergoing diabetic foot surgery showed that the incidence of significant hypotension was higher in the spinal anesthesia group than in the popliteal block group(5).

In this case, with a combination of sciatica and femoral blocks, the patient can be debridement and biopsy properly, hemodynamically stable, does not require monitoring using an arterial line, and postoperatively can return to the ward without the need to go to the intensive care unit. Peripheral nerve block may avoid hypertension, tachycardia, and increased myocardial oxygen demand related to light general anesthesia. It also may avoid hypotension, bradycardia, and decreased myocardial blood supply related to deep general anesthesia or the sympathetic blockade caused by spinal and epidural anesthesia(3)

The sciatic block offers anesthesia and analgesia of the lower extremity below the knee, except along the medial aspect, which is innervated by the theenous nerve. There have been four major approaches described. These include the classic posterior approach of Labat, the anterior, lateral, and supine lithotomy position(6). In this patient, block sciatica is performed in the Labat position.

Femoral nerve block has been used to achieve anesthesia and analgesia of the anterior thigh and knee with very few complications. Intravascular injections and direct neural injury appear to be infrequent given the lack of case reports in the literature. Hematomas are frequently formed by arterial puncture (particularly intraarterial catheters placed for cardiac catheterization); however, neurological complications appear to be fairly low given the little evidence of problems in the literature(6).

CONCLUSION

Therefore, peripheral nerve block can be a suitable choice to maintain hemodynamic stability and adequate analgesic effect. patients with myocardial infarction with low ejection fraction might not experience post-anesthesia complications caused by general anesthesia and do not require admission to the intensive care unit with proper peripheral nerve block.

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CASE REPORT

CONTINUOUS SUPRACLAVICULAR BLOCK IN UPPER EXTREMITY SURGERY

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ABSTRACT

Background : General anesthesia (GA) and regional anesthesia (RA) have been successfully used for upper limb orthopedic surgical procedures. Nerve block anesthesia which is cheaper than GA has many advantages such as targeted anesthesi at the surgical site, excellent postoperative pain relief, decreased opioid use, and shorter recovery time.

Case illustration : We present a case of a 25-year-old woman with a fracture of the right humerus, was planned for ORIF Supraclavicular block was performed under ultrasound guidance in supine position, the needle inserted about 2-3 cm away from the probe with subcutaneous tunneling was performed. We use A 15 ml of 0.5% ropivacaine and 10 ml lidocaine 2% as local anesthesia agent, in addition dexmedetomidine as sedative agent intraoperatively. Postoperatively, there patient was hemodynamically stable without any complication occurred. Postoperative pain was controlled during the hospital care with NRS values of 2-3.

Conclusion : The supraclavicular brachial plexus block using catheter shows wide potential use in upper limb surgery. Although there are several complication and disadvantages of this block. The used of supraclavicular brachial plexus block in upper limb surgery had some advantages such as reduction in use of opioid, patient satisfaction, reduce PONV, no significant airway complication, and hospital treatment cost efficiency.

Keywords ***: anesthetic procedure, Supraclavicular block, Upper limb surgery***

INTRODUCTION

The dramatic increase in orthopedic surgical procedures over the past few decades the expectation of continued growth, and information about changes in anesthetic techniques in cases of orthopaedic surgery on the upper extremities. Where changes affecting health care, especially the anesthesia technique provided, is the change in procedures from inpatient to outpatient care.[3]

General anesthesia (GA) and regional anesthesia (RA) have been successfully used for upper limb orthopedic procedures. Nerve block anesthesia which is less expensive than GA has many advantages such as targeted anesthesia at the surgical site, excellent postoperative pain relief, decreased opioid use, and shorter recovery time. Upper limb blocks can be performed as a single anesthetic or as adjunct analgesia to GA. In this article, we will discuss the use of continuous supraclavicular block in patients undergoing upper limb surgery.[4]

One of the negative aspects that hampers the single-shot technique is the limited duration of action of the local anesthetic. Consequently, patients who have been discharged after undergoing a single-shot supraclavicular block during the procedure may experience postoperative pain soon after arriving home from the hospital, or even in transit.[5, 10]

CASE ILLUSTRATION

A 25-year-old female with a diagnosis of right humeral fracture was planned for ORIF. Preoperative evaluation of the patient, we found the patient was classified as ASA 1. With the consent of the procedure ultrasound-guided continuous supraclavicular block was performed. At the start of the procedure, 1 mg of midazolam and 25 mcg of fentanyl were administered for sedation. Supraclavicular block (SCB) was performed under ultrasound guidance using a sterile linear transducer (7-13 MHz) with a size 18 epidural needle using the in-plane technique with the patient lying in the supine position, the needle was inserted approximately 2-3 cm away from the probe. 15 ml ropivacaine 0.5% and 10 ml lidocaine 2% were deposited in the target area.

Figure 1. Ultrasound view of supraclavicular block

Sensory block was assessed before surgery started, during surgery patients were anaesthetized using dexmedetomidine. Patients were monitored using NIBP, ECG, RR, and SpO2 throughout the procedure. The procedure lasted 180 minutes in the supine position with good patient comfort and the supraclavicular block was re-administered with 10 ml of ropivacaine 0.5% over 2 hours of surgery. No clinical signs of respiratory distress were encountered. The patient first experienced pain at 7 hours post-operatively which was managed with 10 ml of a mixture of ropivacaine 0.125% + fentanyl 12.5 mcg every 8 hours via catheter. (figure 2).

Figure 2. Catheter fixation in supraclavicular block

DISCUSSION

Upper extremity surgeries are generally performed under general anesthesia due to the inability to access the airway intraoperatively, positioning during surgery, and regional technique complications of blind techniques. Interscalene and supraclavicular brachial plexus blocks are the most common options for upper extremity surgery that can accommodate shoulder, elbow, forearm, wrist, and hand procedures in a fast-paced outpatient setting. The supraclavicular, subclavian, long thoracic, and suprascapular nerves, alone or together, are responsible for pain transmission after clavicle fracture and post-clavicle surgery. To obtain an effective blockade, we must consider the variability of their nerve innervation. The main nerve supply for the distal clavicle comes from the superficial cervical plexus (SCP) and the C5 nerve root, via the suprascapular nerve and its branches. The SCP arises from the anterior rami of C1-C4 and gives off four terminal branches of the greater auricular, minor occipital, transverse cervical, and suprascapular nerves that provide sensory innervation. Despite the advantages of this block, there are several complications such as systemic local anesthetic drug poisoning, pneumothorax, hematoma, complex regional pain syndrome, plexus neuropathy, Horner's syndrome, respiratory depression, arterial puncture, etc.[1, 3, 5]

We, therefore, used ultrasound (ultrasonography) guidance, in this case, to minimize the complication rate during the procedure, which made it easier for us to localize the needle tip precisely and real-time observation of the spread of the injection. We were able to reduce the local anesthetic dose and perform a more successful block perioperatively. As the dose of local anesthetic was reduced with the use of ultrasound and a lower dose was administered, combined or multiple blocks became possible. [4, 7]

Vorobeichik L, et al in their meta-analysis of continuous injection peripheral nerve block technique compared to single injection in upper extremity surgery showed that continuous technique has more advantages such as: reduced cumulative analgesia 24 hours postoperatively, improved dynamic pain, patient satisfaction, reduced length of stay (LOS), reduced postoperative nausea and vomiting (PONV), no significant airway complications. Based on our study, we found decreased opioid use, patient satisfaction, decreased PONV, and no significant airway complications in patients with pulmonary contusion (Table 1). [2,8,9]

Table 1. Assesment post operatif

	Day 1	Day 2
Opioid use	No	patient discharged
Complications	No	
PONV	No	
Complacency	Yes	
Malposition of the catheter	No	
NRS	2	

The use of catheters in the supraclavicular brachial plexus block technique has the potential for catheter malposition and dislodgement, where several catheter fixation techniques that can be used to prevent it are suturing, tunneling, taping, and anchoring. We used the tunneling technique combined with the addition of a puncture site distance of ± 2-3 cm from the end of the ultrasound can help the fixation to be more stable, whereas some articles say that the use of catheters in supraclavicular brachial plexus blocks has a high incidence of malposition and dislodgment. (Figure 2). Complications associated with the use of supraclavicular perineural catheters are rare. There is one report in the literature of plexus irritation caused by the catheter. This study showed that supraclavicular catheter placement and prolonged administration of ropivacaine 0.125% did not increase the complication rate. Based on cost-effectiveness studies in developed countries, it was found that there was an average cost saving of $2,000 per case or about 3 million rupiahs for each case that was performed under regional anesthesia techniques compared to general anesthesia techniques. This can be used as an important consideration in the current era of cost minimization. [2, 4]

CONCLUSION

The continuous supraclavicular block technique for upper limb surgery is one of the emerging techniques of peripheral nerve block anesthesia, especially in cases of upper limb surgery. This case report discusses humeral bone surgery with supraclavicular nerve blockade anesthesia technique using ultrasound guidance to minimize the complication rate during the procedure, which facilitates precise needle tip placement and real-time observation of injection spread.

The surgery lasted for 2 hours with no complications during the duration of the surgery. During 2 days of postoperative care, there were no complications. Based on several studies that have been conducted, we found concordance regarding decreased opioid use, patient satisfaction, decreased PONV, and no complications in this case report.

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SCALP DEGLOVING INJURY PATIENT WITH LEFT SUPERFICIAL TEMPORAL ARTERY RUPTURE IN RSUD GRATI: A CASE REPORT

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ABSTRACT

Background: Scalp degloving injury might be life-threatening if it doesn't get immediate medical care. The head region has a special condition that must be a concern because of the complicated anatomical structure, especially the wound involving terminal arterial rupture that caused massive bleeding and shock hemorrhage.

Case Illustration: We report A 22-year-old Malayan-Mongoloid man that came to a rural hospital with a shock hemorrhage in 3rd grade caused by vulnus degloving frontotemporal sinistra and left superficial temporal artery rupture due to "Celurit", a traditional sickle weapon in the Madura tribe. The diagnosis and treatment are done simultaneously in a quick time by teamwork. On clinical examination, the airway and breathing patient were patent. Blood pressure was 90/50 mmHg with radial pulse 120 times per minute, capillary refill time delayed, cold extremities, conjunctiva pallor was found, and blood loss estimated at more than 1.5-liter. Laboratory tests revealed that hemoglobin level of 7,7 g/dL, hematocrit 22,6%, white blood cell (WBC) count of 16,980/mm3, and Thrombosit 188.000/mm3. Early resuscitation with crystalloid, 3 packed red cell product, and bleeding control by artery ligation results in good outcomes for the patient. Ceftriaxone is given to minimize infection, morphine is chosen as analgetic, and tranexamic acid as an anti-fibrinolytic agent. After stabilizing the patient's condition, he was referred for surgical resuscitation.

Conclusion: Scalp degloving injury with left superficial temporal artery rupture is a special condition that must be diagnosed and treated quickly by teamwork to be life-saving. The things that can lead to life-threatening must be dismissed as soon as possible.

Keywords: Scalp Degloving Injury, Shock Hemorrhage, Superficial Temporal Artery Rupture, Fluid Resuscitation, Permissive Hypotension.

INTRODUCTION

Traumatic head injury may lead to death if left untreated.[6] The head region has a special condition that must be a concern because of the complicated anatomical structure.[5] Low-income and middle-income countries contribute to higher morbidity and mortality rates in this case.[8]

Scalp degloving injury might be life-threatening if it doesn't get Immediate medical care, especially the wound involving terminal arterial rupture. In the present case. We report a case of a patient with scalp degloving injury due to "Celurit", a traditional sickle weapon in the Madura tribe.

CASE ILLUSTRATION

A 22-year-old Malayan-Mongoloid man came to the Emergency Room (ER) in Grati General Hospital with a scalp degloving injury at the left temporal due to Celurit, 30 minutes after doing "Carok", a death match in the Madura tribe to resolve a dispute problem. No history of loss of consciousness was mentioned

On clinical examination, He spoke fluently and explained while retaining the pain. He looked slightly takipnea and the face pain rating scale was 9. This condition concludes the airway patient was still patent. There was a large degloving injury on the left frontotemporal head, vulnus laceration of maxillary sinistra without any skin necrosis, and rupture of the left superficial temporal artery (STA) with massive ongoing bleeding (Fig. 1).

Figure. 1 Vulnus Degloving Left Frontotemporal with superficial temporal artery (STA) rupture.

Shock hemorrhage still occurred. Blood pressure decreased until 90/50 mmHg with radial pulse 120 times per minute, capillary refill time delayed, cold extremities, conjunctiva pallor was found, and blood loss estimated at more than 1.5-liter. Laboratory tests revealed that hemoglobin level of 7,7 g/dL, hematocrit 22,6%, white blood cell (WBC) count of 16,980/mm3, and Thrombosit 188.000/mm3. From the head CT Scan, there is no involvement of brain trauma, but the 3D reconstruction of the skull bone showed a left zygomatic process fracture (Fig. 2). The patient was diagnosed with Shock Hemorrhage in 3rd grade due to Vulnus Degloving Frontotemporal Sinistra and STA Rupture.

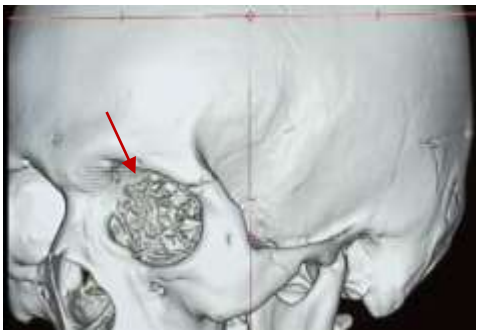

Figure. 2 CT Scan : 3D Reconstruction of Skull Bone.

DISCUSSION

The diagnosis was made quickly and the patient was treated in the red triage. Teamwork is the keystone to achieving a good outcome for the patient.[2] Severe blood loss is the leading cause of preventable trauma deaths.[1] Therefore, bleeding control by giving pressure to the wound location[11] and insertion of a double IV line by 18G catheter was done simultaneously. Because there was no availability of blood products in our hospital, resuscitation with crystalloid fluids was the first choice.[1] Fluid resuscitation with 1.5 L crystalloid and 500 ml gelatine was administered to manage the hypovolemic shock while blood products arrived. Rupture of the left STA could be life-threatening because 15-20% of cardiac output is received by the head and brain,[12] it is estimated 400-500ml/min blood flow to the common carotid artery.[3] Ligation of the left STA was performed and succeeded in stopping massive bleeding. Ligating the artery in traumatic injury is still controversial because it can decrease organ perfusion, but it can be considered in emergency conditions.[11] Injection of tranexamic acid is also given to shorten the bleeding time. It works as an anti-fibrinolytic agent by inhibiting the tissue plasminogen activator.[7]

10 mg of morphine was administered for pain relief. Compared with other analgesia, opioid is more potent in reducing moderate to severe pain. Besides their benefits, Opioids should be monitored for the side effects of cardiovascular complications including hypotension & bradycardia,[9] which happened in this patient, therefor 0,05 mcg/kg/min infusion drip of norepinephrine was given to maintain permissive hypotension in this patient. These treatments were chosen because resuscitation with restricted volume and permissive hypotension had improved survival rates.[4] There is no plate install procedure for left zygomatic process fracture because of the minimal lesion.

1gr Ceftriaxone is given to minimize infectious complications in open trauma.[10] After 3 hours of treatment, the patient received three packed red blood cell (PRBC) transfusions to replace massive blood loss because early activation of it improves outcomes for the patient.[1] After stabilizing the patient's condition, he was referred to RSUD Soetomo Surabaya for surgical resuscitation (Fig. 3).

Figure. 3 Scalp Degloving Injury after surgery

CONCLUSION

At the core of the issue is that managing trauma patients is an art in medicine. The diagnosis and treatment should done simultaneously in a quick time by teamwork. The things that can lead to life-threatening must be dismissed as soon as possible. In head injury patients with massive blood loss caused by artery rupture without any problem in the airway and breathing, resuscitation with blood product or crystalloid should done first to stabilize the condition. Finally, the patient could be referred to an advanced health facility for surgical resuscitation.

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TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK WITH LEVOBUPIVACAINE AND MAGNESIUM SULFATE IN ENHANCED RECOVERY AFTER CESAREAN DELIVERY (ERACS) PATIENT: A CASE STUDY

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ABSTRACT

Enhanced recovery after cesarean delivery (ERACS) programs aim to optimize perioperative care and improve postoperative outcomes in cesarean section patients. Regional anesthesia techniques, such as transversus abdominis plane (TAP) block, have gained popularity for providing effective postoperative analgesia with reduced opioid consumption. We present a case of a 30-year-old female patient who underwent elective cesarean delivery and received a TAP block with a combination of levobupivacaine and magnesium sulfate. The case demonstrates the potential benefits of this approach in managing postoperative pain in ERACS patients, leading to enhanced recovery, and improved maternal satisfaction.

Keywords : cesarean delivery, ERACS, TAP block, levobupivacaine, magnesium sulfate

INTRODUCTION

The caesarean delivery is an artificial delivery method that has become more common worldwide over the past few decades, although the rate of increase differs enormously from one country to another and even within the same environment, from one medical institution to another.[1] According to data from the Indonesian Demographic and Health Survey Data (IDHS), the cesarean delivery rate in Indonesia increased dramatically from 4.0% in 1998 to 18.5% in 2017.[2] However, cesarean delivery is associated with moderate to severe postoperative pain that prolongs functional recovery, delays discharge, and has a negative impact on rehabilitation. High pain scores also have the potential to prevent early mobilization and the mother's ability to be independent and to care for her newborn baby.[3,4]

Enhanced recovery after cesarean section (ERACS) programs is an effective way to increase the clinical benefit of cesarean delivery. It can effectively reduce surgical stress, accelerate postoperative recovery, and decrease morbidity as well as medical cost. Anesthesiologists play a key role in implementing ERACS, especially in regulating surgical stress and postoperative pain. Multimodal analgesia is a key component in the management of postoperative pain as part of an ERACS protocol, which results in fewer side-effects and faster postoperative recovery.[4,5]

Postcesarean delivery analgesia may be improved by a number of intraoperative interventions. Long-acting intrathecal opioids provide analgesia for several hours after cesarean delivery but come with the drawback of causing several side effects, such as nausea, vomiting, and pruritus.[4] Regional anesthesia techniques, such as transversus abdominis plane (TAP) block, have shown promising results in providing effective postoperative pain relief and reducing the need for systemic opioids. The primary downside of single-shot regional blocks is their limited duration of action when administered with local anesthetic only. Several adjuvants, including opioids, alpha 2 agonists, N-methyl-D-aspartate (NMDA) receptor antagonists, and other drugs, have been utilized to extend the duration of blocks.[6]

The addition of magnesium sulfate as NMDA receptor antagonist to the local anesthetic solution in regional blocks has been suggested to enhance analgesic efficacy and prolong the duration of pain relief.[7] Despite the benefits of MgSO4 being supplementary to local anesthetic solution in regional blocks are well established, the exploration of adding MgSO4 to levobupivacaine for enhancing postoperative analgesia in TAP blocks remains

limited. This case study will hence, explore the use of TAP block with levobupivacaine and magnesium sulfate in an ERACS patient.

CASE PRESENTATION

A 30-year-old female, Gravida 2 Para 1, Abortus 0, at 38 +1 weeks of gestational age, presented for an elective cesarean delivery. The patient had a medical history of cesarean delivery due to premature rupture of membrane. In the preoperative period, the patient was adequately counseled about the ERACS program, and informed consent was obtained for the TAP block. Patient was ASA II physical status and had already scheduled for elective SC procedure with spinal anesthesia. Medication history included prenatal vitamins.

Anesthesia was induced through a spinal neuraxial block. Sterilization was achieved using a solution containing 7.5% povidone-iodine. Following draping and preparation of the patient, Patient was arranged with spinal anesthesia in a sitting position, performed puncture on the intervertebral space L3-L4 using Sprotte needle measuring 27 G and 100-mm in length. Anesthetic regimen administered were hyperbaric bupivacaine 6.5 mg plus fentanyl 25 mcg and morphine 100 mcg, with a total volume of 1.9 cc diluted with cerebrospinal fluid (CSF) up to a total volume of 2.1 cc. The anesthesia regimen was injected at a speed of 0.4cc/second. The sensory level for the patient after the spinal neuraxial block was determined to be at the T6 level. The procedure proceeded to the performance of a caesarean section by the obstetrician and a healthy female neonate was delivered without any complication. APGAR scores of 9/9 were recorded at 0 and 5 minutes, respectively.

Subsequent to a successful delivery, TAP blocks were inserted under ultrasound guidance, using a 38-mm linear high resolution ultrasound probe and a 100-mm 25G needle. Chlorhexidine was used for sterile preparation and the patient was placed in the supine position. The ultrasound probe was placed between the costal margin and the iliac crest. All 3 layers of the abdominal wall were visualized. The needle was inserted in plane with the ultrasound probe and directed towards the fascia between the internal oblique and transversus abdominis muscles. The transversus abdominis plane was identified, and a total of 30 ml of a mixture containing 0.25% levobupivacaine and 500 mg of 10% magnesium sulfate was injected bilaterally between the internal oblique and transversus abdominis muscles as a single shot technique.

In the postoperative period, the patient was closely monitored for pain and received additional analgesia only if necessary. Postoperative hemodynamic data (HR, MAP), numerical rating scale (NRS) pain score, and PONV were recorded at 0, 1, 2, 6, 12, and 24 h after surgery (Table 1). The patient was encouraged to ambulate early as part of the ERACS protocol. The patient reported minimal pain in the immediate postoperative period, with NRS scores ranging from 0 to 3 out of 10. She required no supplemental opioids and experienced no adverse effects related to the TAP block or the anesthesia. Early ambulation was achieved, and the patient was able to care for her newborn comfortably.

Initial vital signs on arrival were blood pressure of 110/72, heart rate of 82, temperature of 36,7, and respiratory rate of 18 with 100% saturation. After a time period of 1 hour in the PACU, the patient was reassessed and noted to be stable. Vital signs were BP of 125/80, HR of 88, temperature of 36.7, and RR of 18 with 100% saturation. The patient had adequate analgesia and was able to move her distal extremities. Using the Modified Aldrete Criteria, the patient was discharged from the PACU with a score of 9.

Table 1. Patient's Monitoring Data

Time	NRS	Vital Signs				
		Heart Rate (bpm)	RR	Temperature	Blood Pressure (mmHg)	PONV
Post TAP Block	0	82	18	36.8	110/72	-
1 hour post TAP Block	1	88	18	36.7	125/80	-
2 hour post TAP Block	1	86	19	36.4	128/82	-
6 hours post TAP Block	2	90	20	36.8	125/86	Only nausea
12 hours post TAP Block	3	87	19	36.7	126/82	Only nausea
24 hours post TAP Block	2	84	19	36.8	120/70	-

DISCUSSION

The TAP block, as part of a post-operative multimodal analgesic regimen provides significant advantages in various abdominal surgeries, including for patients undergoing cesarean delivery, as in this case. It demonstrates efficiacy, especially in procedures where parietal pain holds substantial importance, leading to decreased pain ratings and avoiding opioid use that is associated with several side effects.[8] The USG-guided technique is used to enhance the precision of administering local anesthetics and avoid complications more common with the blind approach. The USG probe was placed transverse to the abdominal wall, which made the three muscle layers distinctly visible, after which the probe was moved to the mid-axillary line between the costal margin and iliac crest. The needle was then advanced between the internal oblique and transversus abdominis. This is referred to as the lateral approach. This approach is used in our study.[9,10] The use of TAP block was found to be superior in many literature. In a randomized controlled trial study by Kumar et al., TAP block was found to provide longer duration of analgesia and reduced rescue analgesic dose without any significant adverse effects as compared with caudal block after inguinal herniotomy.[11] Another study by Foldi et al. also shows that TAP block significantly decreases the time to post-operative bowel recovery, shortens the time to ambulate, decreases the length of hospital stay, and increases the satisfaction rate. It also has a relatively low risk of complications.[12]

The analgesic efficacy of levobupivacaine in TAP block has also been studied. Levobupivacaine, the pure S (−)-enantiomer of bupivacaine has has prominently emerged as a safer subtitute for regional anesthesia than its racemic counterpart, bupivacaine. It has a shorter duration of sensory and motor block which allows for earlier mobilization and lower incidence of intraoperative hypotension with less cardiac and neurotoxic adverse effect.[13] In clinical scenarios, levobupivacaine has demonstrated remarkable tolerance in regional anesthesia techniques, both when administered in a single bolus and as a continuous post-operative infusion. Previously, multiple trials have compared different local anesthetic concentrations (using constant volumes). Overall, these trials revealed minimal differences between low (0.125 to 0.25%) and high (0.5 to 0.75%) concentrations of bupivacaine, levobupivacaine, and ropivacaine in terms of postoperative pain and rescue analgesic consumption. However,

TAP block with 0.25 % levobupivacaine was found to be less toxic hence is recommended as a postoperative analgesic technique. In terms of volume, large injectates (15 to 30 ml per side) are commonly used to ensure adequate local anesthetic spread for transversus abdominis plane blocks. Although the minimal effective volume remains unknown, a trend toward superior analgesia was demonstrated with at least 15 ml per side in a previous meta-analysis study.[14,15] In our case, 15 ml of 0.25% levobupivacaine was administered in a single bolus per side of the abdomen wall and it was shown to be effective and safe in for postoperative pain relief.

Magnesium, as a calcium blocker and an NMDA receptor antagonist, although not a primary analgesic in itself, has been a subject to investigation as a cost effective adjuvant that enhances analgesic actions in anesthesia and pain management. By inhibiting the calcium influx and excitability of NMDA receptors, magnesium can diminish sensitivity to pain stimuli in both the central and peripheral regions.[7] The usefulness of magnesium for postoperative analgesia is not limited to general anesthesia. Recent studies suggested that MgSO4 can play a beneficial role also in spinal anesthesia. When small doses of MgSO4 is added to local anesthetics, it proved itself as an effective supplementary analgesic and muscle relaxation agent. This is shown by the fact that with addition of magnesium sulfate, the duration of anesthesia was prolonged, postoperative analgesic requirement was reduced and the side effects of high doses of local anesthetics and opioids were decreased. Remarkably, no serious consequences were reported as a result of its administration.[16] The concentration of MgSO4 used in TAP block is between 2.5% - 10%, while the volume used is between 150-500 mg in various studies. Most neurological damage was related to high dose and concentration of the drug, more than 15% in most reports. Therefore, 500 mg of 10% MgSO4 was used in this study, a reasonable and safe concentration.[17,18]

In previous trials, the efficacy of MgSO4 as a supplementary agent was established through its combination with bupivacaine for epidural anesthesia in diverse surgical scenarios, including cesarean delivery, as well as its integration with levobupivacaine for spinal anesthesia during significant orthopedic procedures.[19] In a randomized controlled trial by Al-Refaey et al. added MgSO4 as an adjuvant to bupivacaine in TAP block during anesthesia for laparoscopic cholecystectomy and significantly improved postoperative analgesia in the form of a lower mean visual analog scale score, increased duration of analgesia, decreased morphine consumption, and a lower occurrence of PONV.[20] Another study by Elsharkawy et al. that involving six partiurents with mild preeclampsia, supports this finding that show the efficacy of adding MgSO4 to epidural levobupivacaine in elective caesarean delivery.[21] These findings are similar to our case that shows the remarkable benefit of the combined approach of levobupivacaine and MgSO4 in TAP block for ERACS. In this case study, it shows that the analgesic profile was improved evident by the low NRS score; 0-1 in the first two hours while 2-3 during the 24 hours post operation. The hemodynamic of the patient was stable the whole time. There are no complications noted, only mild side effects such as nausea were observed.

Despite the significant benefits of MgSO4 as an adjuvant and levobupivacaine as the main active agent in TAP blocks, the exploration of adding MgSO4 to levobupivacaine for enhancing postoperative analgesia in TAP blocks remains limited. Therefore, this presents an important alternative to opiate-based analgesia, which is evident in this case study. Based on our previous experience with ERACS, only bupivacaine, levobupivacaine, or ropivacaine are used. To the best of our knowledge, this is the first case describing the combination of levobupivacaine and MgSO4 in a bilateral TAP block for ERACS. This case study showed that using Levobupivacaine and MgSO4 in the TAP block for ERACS patients resulted in a significantly better analgesic profile, a lower NRS score, lower analgesic consumption, a longer duration of analgesia, and lower PONV side effects with no recorded complications.

CONCLUSION

A 30-year-old female, Gravida 2 Para 1, Abortus 0, at 38 +1 weeks of gestational age, presented for an elective cesarean delivery. The patient had an uneventful prenatal course and no significant medical history. TAP block with a combination of levobupivacaine and magnesium sulfate is a safe and effective option for postoperative analgesia in ERACS patients. This technique offers improved pain control, longer analgesia duration, lower PONV side effects, no opioid consumption and early ambulation, contributing to enhanced recovery and improved maternal satisfaction. However, further research and larger studies are warranted to

validate these findings and explore the potential benefits of this combination in other cesarean delivery populations and to assess its impact on maternal-infant outcomes.

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PARASPINAL MUSCLE BLOCK IN ACUTE ON CHRONIC PAIN DUE TO CANCER PAIN: A CASE REPORT

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ABSTRACT

Background: Paraspinal muscle block is a successful method for managing pain in patients with fractures, although it is rarely performed. This method has the potential toreduce acute on chronic pain and avoid unfavourable side effect in surgery. This casereport investigates the application of paraspinal muscle block or paraverbal block for painmanagement in patient with acute on chronic pain due to cancer.

Case Illustration:A 62-year-old male presented with complaints of lower back pain radiating upwards, which had been ongoing for the past 2 years. The pain was describedas sharp and stabbing, and it radiated. The pain episodes could last for 10-30 minutesduring exacerbations. The symptoms improved when moving or changing positions. Thepain intensity during exacerbations was rated at 9 on a scale of 0-10, and while at rest, itwas rated at 3. Radiological examination found moderate spinal canal stenosis at C5-C6,L4-L5, due to bulging discs, cervicothoracolumbar spondylosis, thickening of theligamentum flavum, hypertrophy of the facet joints, and degeneration of the discs,endplates, straight cervicalis, as well as bilateral pleural effusion. The patient was administered intravenous paracetamol, intravenous ketorolac, and tramadol drip. Thepatient was diagnosed with Acute on Chronic Pain due to Cancer Pain resulting fromThoracic 10 and Lumbar 1 vertebral fractures with a bulging mass suspected to indicate metastatic bone disease. The patient subsequently underwent a Paraspinal MuscleBlock/Paravertebral block procedure with the following regimen. The post operativefollow up found pain resolution with VAS 0-1.

Conclusion: Patients with acute on chronic cancer pain can achieve favourable outcomes with paravertebral block interventions, as evidenced by improvements in the Visual Analog Scale (VAS) for pain.

Keywords:acute on chronic, pain, paravertebral, paraspinal, block

BACKGROUND

Cancer stands as one of the primary sources of illness and death on a global scale, accounting for 18.1 million fresh instances and 9.6 million fatalities in 2018. Around 55% of individuals receiving anti-cancer therapy and 66% of those grappling with advanced, metastatic, or end-stage ailments undergo pain. However, in the majority of instances, this discomfort can be alleviated through medications and alternative therapies.[1]

Most cancer patients who experience pain can be effectively treated with drugs includedon the WHO analgesic ladder. However, systemic analgesics are thought to be ineffective in controlling the pain in 2-5% of patients with advanced cancer. As an alternative, these patientsmight benefit from interventional methods such percutaneous cordotomy, sympathetic blocksfor stomach cancer pain, peripheral nerve blocks, minimally invasive procedures for vertebralpain, neuraxial analgesia, and minimally invasive treatments for vertebral pain. The proper therapy for the right patient must be chosen in order for these procedures to be effective.[2]

To achieve satisfactory results, a thorough evaluation of the patient is essential. This evaluation takes into account the patient's characteristics, prior treatments, the nature and mechanisms of pain, the patients' preferences, as well as the necessary skills and resources to carry out the chosen intrusive procedure.[3]

An ultrasound-guided multilevel paravertebral block reduced the incidence of chronic pain 3 months (35% vs. 51% of patients) and 6 months (22% vs. 37%) after partial mastectomywith or without axillary lymph node dissection, according to a recent single-centre, double- blind study involving 172 patients with similar outcomes to our study [4]. Another recent study that included 2,132 patients from 13 hospitals and examined the incidence of

persistent pain asa secondary outcome examined the recurrence of breast cancer after regional or general anaesthesia [5]. Incisional discomfort at 6 months (52% in each group) and 1 year (27% vs. 28%)was the same in the two groups. The paravertebral block reduced chronic pain following breastsurgery, according to a Cochrane evaluation of chronic pain, which gave the evidence a low grade[4]. The findings of a recent review and meta-analysis4 on chronic pain in paravertebral block patients were inconclusive. The lack of sufficient blinding was the key factor contributingto the low quality of the data. The role of paravertebral block in avoiding chronic pain followingbreast cancer surgery is gaining interest despite the fact that the available information is scantand contradictory.[6,7]

CASE ILLUSTRATION

A 62-year-old male presented with complaints of lower back pain radiating upwards, which had been ongoing for the past 2 years. The pain was described as sharp and stabbing, and it radiated. The pain episodes could last for 10-30 minutes during exacerbations. The symptoms improved when moving or changing positions. The pain intensity during exacerbations was rated at 9 on VAS of 0-10, and while at rest, it was rated at 3.

Radiological examination using whole spine cervico-thoraco-lumbar MRI on September 30, 2022, revealed evidence of compression fractures of less than 50% on vertebraeT10 and L1, accompanied by bone marrow replacement in vertebrae T6, T7, T8, T9, T10, T12,and L1, partially with bulging mass suspected to indicate metastatic processes causing moderate spinal canal stenosis at the T10 level and severe foraminal stenosis at T9-T10 on theright. Other radiological findings included moderate spinal canal stenosis at C5-C6, L4-L5, dueto bulging discs, cervicothoracolumbar spondylosis, thickening of the ligamentum flavum, hypertrophy of the facet joints, and degeneration of the discs, endplates, straight cervicalis, as well as bilateral pleural effusion. Subsequently, a BMD (bone mineral density) examination using DXA equipment on January 6, 2023, revealed a value of -3.8, which falls within the osteoporosis category. Furthermore, an examination of the lumbosacral AP/Lateral view indicated osteolytic-blastic lesions with more than 50% compression of the L5 vertebra, osteolytic lesions on the left ilium, left acetabulum, sacrum, obscuration of the L4-L5 pedicle due to metastatic processes, and anterolisthesis and lateral listhesis of L5-S1 with a grade 1.

The patient was administered intravenous paracetamol 3 times a day at 1 gram per dose,intravenous ketorolac 3 times a day at 30 mg per dose, and tramadol 100 mg drip over 24 hours. The patient was diagnosed with Acute on Chronic Pain due to Cancer Pain resulting from Thoracic 10 and Lumbar 1 vertebral fractures with a bulging mass suspected to indicate metastatic bone disease. The patient subsequently underwent a Paraspinal Muscle Block/Paravertebral block procedure with the following regimen: Paraspinal Muscle Block Regimen: Dextrose 15% + Lidocaine 1% 4cc + NaCl 0.9% 4cc - Total Volume 12 cc.

Figure 1. Paraspinal muscle block

After the Paraspinal Muscle Block procedure, the patient was evaluated on the following day and reported reduced pain. The patient was able to sit with support, and the painintensity was reduced to 0-1 on VAS scale, both at rest and during movement.

DISCUSSION

Blocking peripheral nerves with local anaesthetics and preventing the signalling of nociceptive input to the central nervous system is a logical strategy for pain that is otherwise difficult to treat. Depending on where the pain is coming from, a certain nerve block should beapplied. The innervation supplied by each nerve, as well as the anatomical placement and access to the nerve, must therefore be well-understood by the clinicians involved in giving peripheral nerve blocks. The paravertebral block, brachial plexus block, blocks of nerves in thehead area, and blocks of intercostal nerves are examples of peripheral blocks that have been reported to be used to treat cancer-related pain.[2]

Local anaesthetics are the medications used for nerve blocks, and due to their short duration of effect, they must be used continually or sporadically. Lidocaine, bupivacaine, and

ropivacaine are a few examples of the local anaesthetics in use. While the toxicity may vary depending on cardiac events and other local anaesthetic toxic events, the analgesic effect is comparable. The risk of toxicity is negligible, nevertheless, provided the local anaesthetic is administered in accordance with the suggested dosages. Each local anaesthetic's action has a different duration. Bupivacaine and ropivacaine are long-acting local anaesthetics, but lidocaine has an intermediate action and takes 1.5 to 3 hours to take effect [8]. The length varies depending on the location of the nerve block and may be affected by additions like epinephrineor clonidine [9]. As a result, bupivacaine or ropivacaine, of which bupivacaine is traditionally themost often reported agent in use, are best suited for long-term therapy with local anaesthetics.According to some stories, peripheral nerve blocks used neurolytic substances such glycerol, phenol, or alcohol. With just one injection, these substances permanently damage the nerve andstop the nerve impulse from signalling.[2]

There is little support for the use of peripheral blocks. In total, 79 cases were documented in 16 studies, according to a systematic review that was published in 2015[10]. Paravertebral blocks made up 10 of the nerve blocks, followed by blocks in the head area, plexus blocks, intercostal blocks, and other (11 cases) blocks. In most cases, the discomfort was relieved, often for several weeks. There were no negative effects, with the exception of catheter displacement and one report of toxic consequences related to injections of butamben,an ester local anaesthetic that was not utilised in any other cases. In this comprehensive review,no controlled studies were found. Two additional instances receiving interscalene continuous plexus blocks were detected in an update using the same techniques as in the systematic review indicated[9], which is referenced three cases of alcohol paravertebral neurolysis[11], two cases of plexus phenol neurolysis [12], and one case of a femoral nerve block.[13]

A paravertebral block is essentially a unilateral obstruction of the sympathetic chain ganglia, the dorsal and

ventral rami, and the spinal nerve. Any vertebral level can perform theseblocks. However, due to anatomical factors, they are typically carried out at the thoracic level. Consequently, the main focus of this subject is thoracic paravertebral blockage. The paravertebral space can be accessed via a variety of methods, such as lack of resistance, moving the needle 1.5–2 cm beyond the transverse process, nerve stimulation, ultrasound guidance, and fluoroscopy guidance. The procedure should have the patient's consent. A thorough discussion of the dangers, advantages, and alternatives is necessary. Intravenous access shouldbe acquired for an ultrasound-guided block, and standard monitors such pulse oximetry, bloodpressure, and an electrocardiograph should be used.[14]

The paravertebral space which is close to the spinal nerve, is the site of the paravertebralblock [15]. The anatomical structure of the paravertebral space is generally wedge-shaped and issituated on both sides of the spine. The front end of the connecting rib neck, the intercostal endometrium, the posterior surface of the intervertebral body, the intervertebral foramen, the parietal pleura, the anterior branch of the spinal nerve (intercostal nerve), the posterior branchof the spinal nerve, the sympathetic ganglion, and the grey communicating branch make up the boundary of the space.

To achieve ipsilateral somatic anaesthesia and the analgesic effect, the local anaestheticis administered into the gap using a puncture needle to block the motor, sensory, and sympathetic nerve fibres of the corresponding segment [17,18]. Although in this study, surgery should be done, it can trigger the body to respond with a significant stress response. Increasingthe opioid dosage is a common method for suppressing the stress response to simple general anaesthesia. However, doing so not only strengthens the cardiovascular system-inhibiting effects of opioids but also increases the risk of intraoperative cardiovascular accidents and postoperative complications like delayed awakening.[18]

Utilising paravertebral block can lessen the stress reaction brought on by surgery and limit the transmission of unpleasant signals brought on by surgery to the peripheral central nervous system [17,18]. Patients who had paravertebral block experienced less postoperative nausea and vomiting, used fewer analgesics, recovered faster after surgery, spent less time in the hospital, and paid less for their care [19]. The benefits of this pain control become more obvious after the first 24 hours of using the paravertebral block, which can deliver 72 hours ofeffective analgesia.

The published cases nevertheless show the potential advantages of using peripheral blocks. The installation of catheters for the delivery of local anaesthetics will be made easier by new techniques such ultrasound identification of nerves, which is already commonly used for usage of local anaesthesia during surgical procedures. Additionally, methods for preventingcatheter dislodgement can be improved.[20]

CONCLUSION

Patients with acute on chronic cancer pain can achieve favourable outcomes with paravertebral block interventions, as evidenced by improvements in the Visual Analog Scale (VAS) for pain.

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EXPLORATORY THORACOTOMY DUE TO CVC JUGULAR DEXTRA FALSE ROUTE

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ABSTRACT

Background: Central venous catheters (CVC) are cannulated devices designed to accessthe central venous circulation and are inserted via a wire guide. Central venous catheters(CVC) are commonly used to obtain vascular access for various clinical indications. Catheter malposition is a relatively common complication (5.01%), resulting in catheter failure. Successful catheter placement requires not only technical expertise but also awareness of potential complications.

Case Illustration:A 42-year-old woman with a diagnosis of suspected bilateral proximalureter stenosis and distal rectum cancer. The patient underwent Bilateral RPG (RetrogradePyelography) and DJ Stent Insertion. In the operating room and the patient was inducedby anesthesia, but the patient was not sedated, by administering the drug through the CVC. The patient underwent a C-arm at the CVC insertion area, aspiration was carried out through the CVC access, serous fluid came out, suspicious of a CVC false route. On chest x-ray radiological examination showed the presence the impression of the distal endof the CVC was in the projection of the inferior vena cava. After the urological procedurewas completed, the patient was prepared for exploratory thoracotomy with prior informedconsent from the family. During an exploratory thoracotomy, serohemorrhagic fluid wasfound and it was found that the CVC had penetrated the innominate artery of Dextra, evacuation of the CVC body and repair of the artery were carried out.

Conclusion: Methodological imprecision, anatomical variations, and interoperatorvariability are likely to result in catheter misplacement. Factors such as venous branches,venous tortuosity, acute angulation of vessels, congenital anatomic variations, and venousstenosis can lead to misplacement. Anterior-posterior chest radiography after CVCplacement is an important adjunct tool used to diagnose catheter malposition. Theconsensus among experts is that a malpositioned CVC is suboptimal. In mostcircumstances, if the catheter is malpositioned, the priority is to reposition, replace, orremove it as soon as possible. If the actions mentioned above do not get results or cannotbe carried out, a thoracotomy can be performed.

Keyword: Anesthesia; Central venous catheters; Thoracotomy; False rute; Malposition

BACKGROUND

Central venous catheters (CVC) are cannulated devices designed to access the central venous circulation and are inserted via a wire guide (i.e. via the Seldinger technique). In emergencies, CVCs are used to administer life-support fluids, potentially irritating medications, blood products, and parenteral nutrition. Elsewhere, CVCs are used to provide access for hemodialysis, transvenous pacing, and hemodynamic monitoring by measuring central filling pressure and cardiac output. 1 CVC placement requires training and experience and is not without risk to the patient, even when performed by experts. professional. [1,2]

The most common side effects associated with CVC placement in the neck and chest have been discussed extensively in the literature and include infection (5% to 26%),hematoma (2% to 26%), and pneumothorax (up to 30%).[2] Other complications CVC placement includes hemothorax, chylothorax, and IV extravasation, unknown artery placement, cardiac tamponade, and mediastinal hemorrhage. A rarely described but important complication of CVC implantation is malposition of the CVC tip in another vessel. compared to the superior vena cava (SVC). This event has been described in approximately 7% of cases of thoracic CVC placement in the literature3 and can cause serious complications if left untreated. Placing the CVC tip in a vessel other than the SVCincreases the risk

of catheter entrapment, erosion or perforation of the vessel wall, local venous thrombosis, catheter dysfunction, and cranial retrograde injection, in which the infusion is directed to the head instead of the center of circulation.[3]

Central venous catheters (CVC) are commonly used to obtain vascular access for various clinical indications. These include administration of drugs, renal replacement therapy, total parenteral nutrition, poor peripheral venous access, cardiac catheterization,and transvenous pacing. Central venous access involves large-hole catheters inserted intothe internal jugular, subclavian, or femoral veins in the neck, and the upper chest or groin (femoral) area.[3] The vein of choice for CVC is the right internal jugular vein (IJV) becauseof its narrow passage. straight to the right heart and has the lowest risk of venous stenosisand thrombosis. Successful catheter placement requires not only technical expertise but also awareness of potential complications.[5] Catheter malposition is a relatively commoncomplication (5.01%), resulting in catheter failure.[2] Misplacement of the superior vena cava (SVC) can lead to caval perforation or right atrium, which is associated with serious sequelae. The literature is in the form of isolated case reports or small series, which are complicated or time-consuming to access and do not provide pragmatic guidance or solutions to the problem. [1]

This report will present an illustration of a case of false route / misplacement of aDextra Jugular CVC and discuss practical management issues, avoiding misplacement and subsequent complications.

CASE ILLUSTRATION

A 42-year-old woman with a diagnosis of suspected bilateral proximal ureter stenosis and 1/3 distal rectum cancer T4N2aM0 post chemotherapy 12 Series (Oxaliplatin, Leucoverin, 5FU) with a history of 22 times Radiotherapy. The patient underwent Bilateral RPG (Retrograde Pyelography) and DJ Stent Insertion if failed bilateral PNS (percutaneous nephrostomy). The patient previously complained of low urination 1 week before entering the hospital. Urinary is approximately 1 glass per day (250cc) dark yellow in color. The patient previously complained of right and left low backpain since 1 month before entering the hospital and getting worse in the last 3 days beforeentering the hospital. The pain is persistent and does not radiate. Pain worsens with activity and decreases with rest. Denied complaints of fever, nausea and vomiting. PatientHistory HD 24-11-2022 UF 1.0 low heparin 2000 iu, qd 500, qb 180, 3 hours. The patienthas no history of allergies or previous medication history. The patient had a history of previous surgery, Operation history includes trephine sigmoidostomy with rectal biopsy for the indication of total bowel obstruction due to tumor recti 1/3 Distal, with the resultsshowing a signet ring cells carcinoma. On physical examination, edema was found in theextremities.

Laboratory tests showed an increase in urea and creatinine, and decreased after the patient was undergoing hemodialysis (Figure 1).

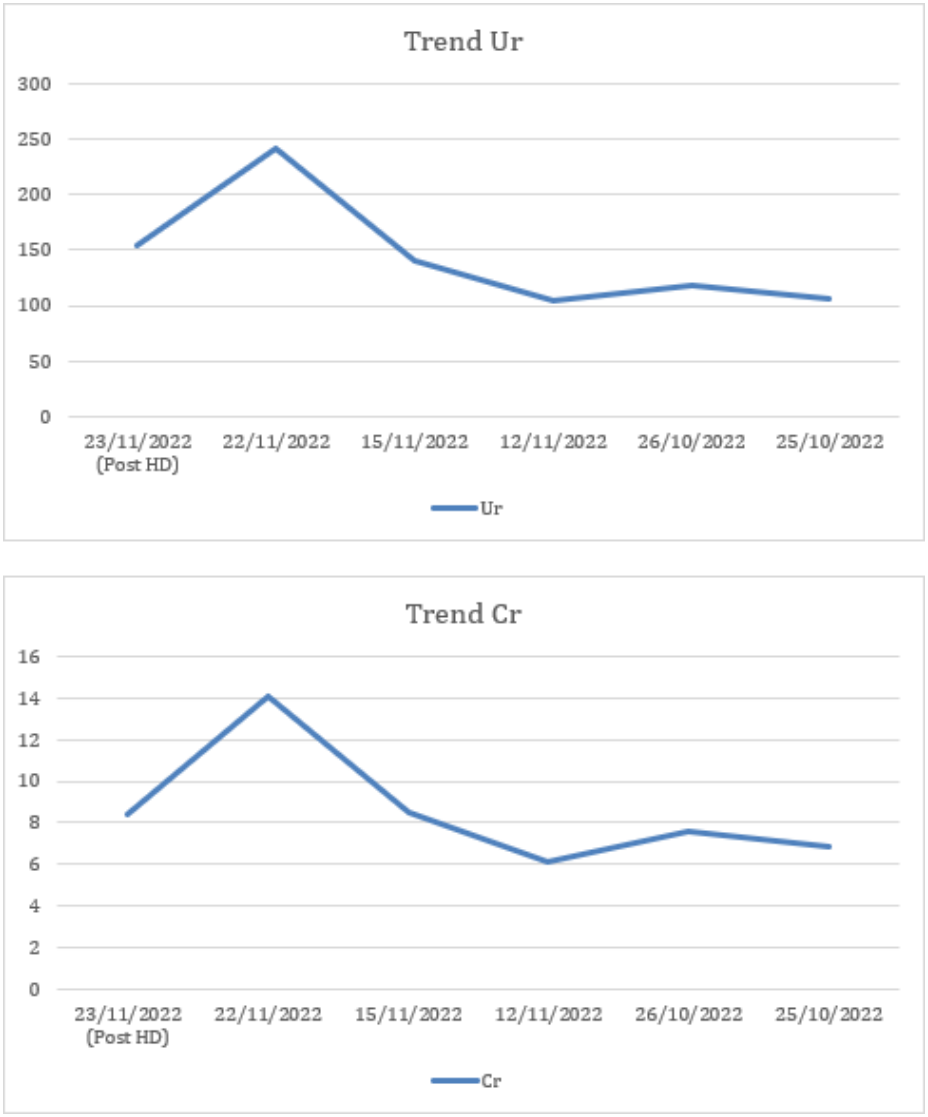

Figure 1. Trend Ureum and Creatinine

then on chest x-ray radiological examination showed the presence of aortic sclerosis and the impression of the distal end of the CVC was in the projection of the inferior vena cava (Figure 2).

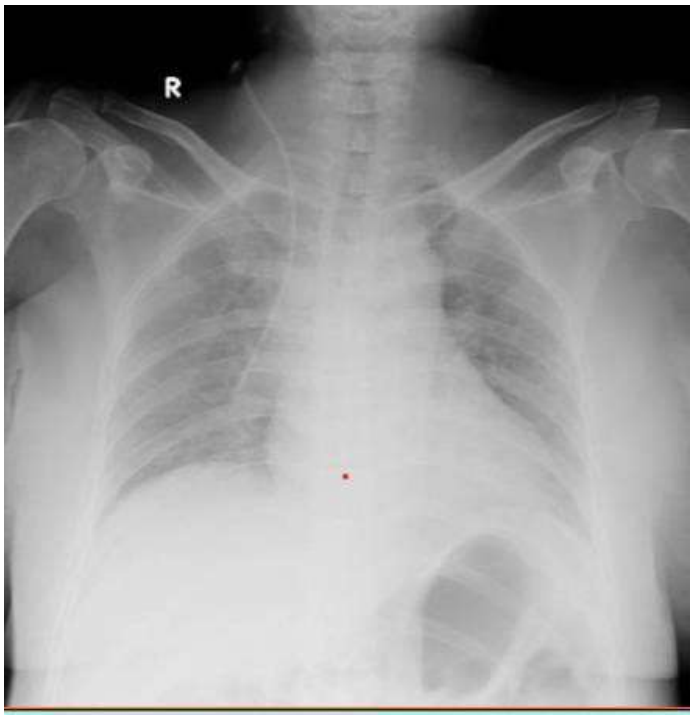

Figure 2. Chest X-ray Examination of the patient's. The impression of the distalend of the CVC is in the projection of the inferior vena cava

On ultrasonographic examination, bilateral mild-moderate hydronephrosis was obtained e.c post renal (Figure 3) and on MRI examination the abdomen showedthickening of the rectal wall involving the mucosa to the subserosa as high as L5-54, attached to the posterior wall of the uterus suspecting a residual mass, the presence of bilateral hydroureteronephrosis was suspended by due to ureteral stenosis proximal 1/3 level (level L4), bladder wall thickening suspected due to cystitis after radiation Bulgingdisc levels L4-L5, L5-S1 with mild narrowing of the spinal canal L5-S1, and there is degeneration of the lumbosacral corpus and L4 disc -L5, L5-S1 (Figure 4).

Figure 3. Ultrasonography examination of the patient's. Bilateral mild-moderate hydronephrosis due to post-renal causes. There was no visible metastatic process in thevisualized organs

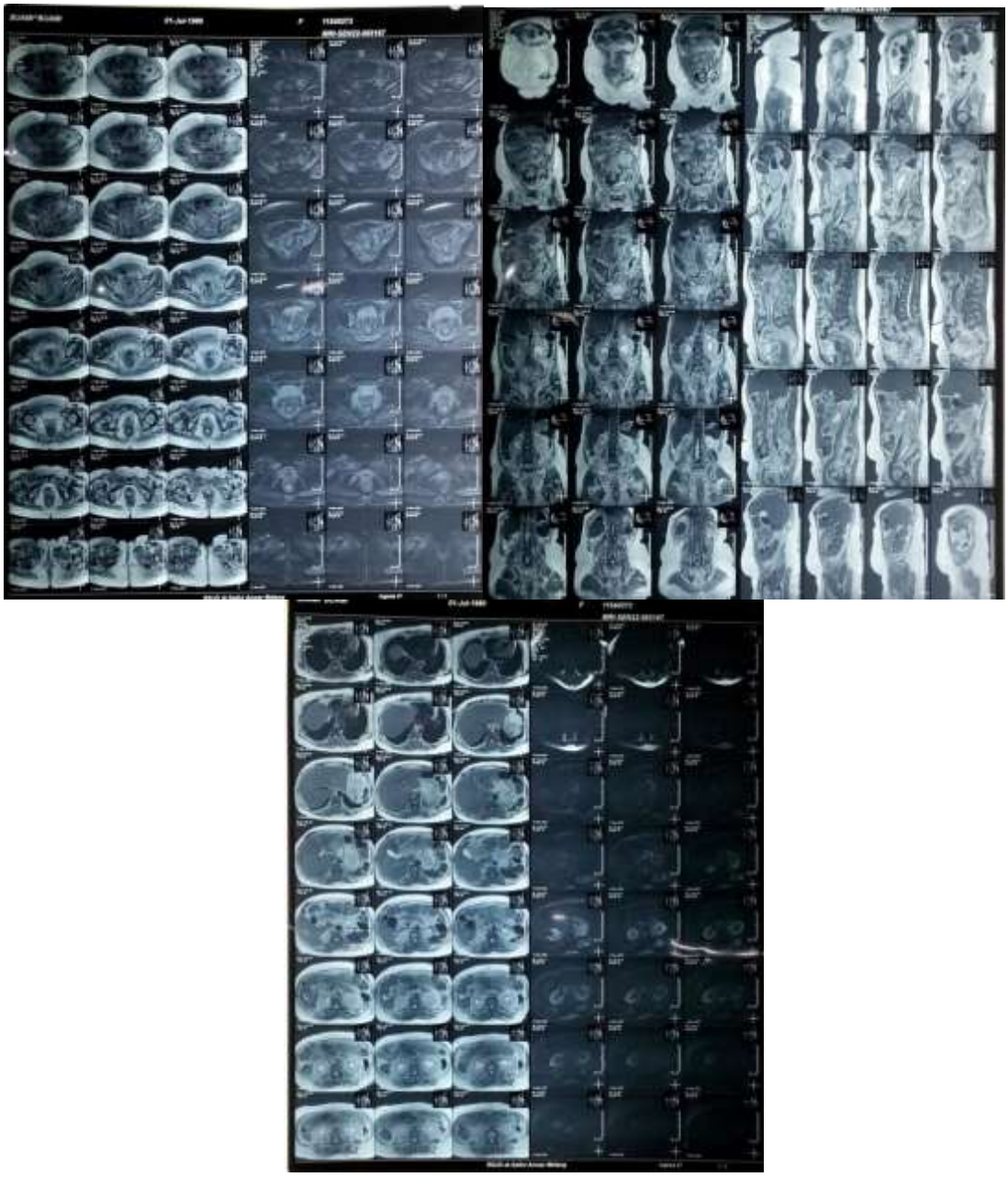

Figure 3.MRI Abdomen Examination of the patient's

Our patient was assessed with ASA 3, Moderate Hypoxemia (PF Ratio 201.6) Without Signs of Respiratory Distress, Malignancy dt Rectum Cancer 1/3 Distal, Anemia(8.1), CKD Stage V without signs of uremic syndrome. (Ur/Cr pre HD 242.5/14.09, UrCr post HD 154.8/8.38, the lowest Ur/Cr causes symptoms of decreased consciousness. Urcrpre HD 242.5/14.09). In addition, the chest x-ray image shows the impression that the distal end of the CVC is in the projection of the inferior vena cava, where previously thepatient had a CVC installed in the dextra jugular vein. This indicates that there is a false route so the patient will undergo an exploratory thoracotomy. According to the timeline

the patient came escorted by the staff to the operating room and the patient was induced by anesthesia, but the patient was not sedated, by administering the drug through the CVC. Then the drug is tried to enter through double lumen HD access, the patient can beinduced and GA intubation is carried out. Then the patient underwent a C-arm at the CVC insertion area, aspiration was carried out through the CVC access, serous fluid came out, suspicious of a CVC false route. After that, the patient underwent Bilateral RPG (Retrograde Pyelography) and DJ Stent Insertion. After the urological procedure was completed, the patient was prepared for exploratory thoracotomy with prior informed consent from the family. During an exploratory thoracotomy, serohemorrhagic fluid wasfound and it was found that the CVC had penetrated the innominate artery of Dextra, evacuation of the CVC body and repair of the artery were carried out. After the surgery and the patient is stable, the patient is prepared to move to the ICU.

Prior to surgery, the patient will be given informed consent, place an IV line 1 linewith 18 G, and administer IVFD Nacl 0.9% 20 cc/hour. Patients are also fasted for at least6 hours before surgery. Premedication was given omeprazole 40 mg (1 hour preop). Preoperative assessment did not show signs of uremic syndrome and did not finddisequilibrium syndrome post HD. Post operative planned return to HCU. Generalanesthesia uses fentanyl 100 mcg, Propofol 100 mg, Atracurium 25 mg. preoperative analgesia was given Paracetamol 1 gram, then during the operation intermittent fentanylwas given, and postoperatively with metamizole 3x1 gram plus paracetamol 4x750 mg.

DISCUSION

There are three possible locations for CVC placement in adult patients: the internal jugular, femoral, and subclavian. Ultrasound guidance can be useful for all approaches and is recommended for any CVC placement. However, when ultrasound guidance is not possible, the CVC can be located using anatomical markers without ultrasound. Misplaced catheters have been reported in almost every possible anatomical position, which can be of two types such as intra-caval malposition and extra-caval malposition at the base of the catheter site. The latter includes various structures such asmediastinum, pleura, pericardium, trachea, esophagus, subarachnoid, and other aberrant sites. Catheter malposition is usually associated with serious consequences while some of them remain unrecognized leading to incorrect diagnosis and delayed treatment. Recent methodological advances, increased availability of imaging, guidewire manipulation, and experience in the management of complications have had a major impact on morbidity and mortality in this area.[1,2]

Methodological imprecision, anatomical variations, and interoperator variability are likely to result in catheter misplacement. Factors such as venous branches, venous tortuosity, acute angulation of vessels, congenital anatomic variations, and venous stenosis can lead to misplacement. For example, the azygos vein will act as a collateral bypass to the right atrium during insertion provided the SVC obstruction lies beneath theazygos vein. On the other hand, the guidewire plays an important role in guiding successful catheter placement. path to the neck, arm, chest, or contralateral side. In addition, excessive force, applied inappropriately when the guidewire exits the vein, maycause the catheter to enter the pleura, mediastinum, or other structures, resulting in severeand fatal consequences. Hence any resistance. for part should raise suspicion of a problem, and further imaging will be required. [3,4]

A higher incidence of malposition of the left thoracic venous system than that of the right side has been documented, indicating that the right side of the circulation shouldbe considered as the first choice for CVC placement unless the insertion site is contraindicated. Ultrasound guidance can facilitate vessel identification but does not necessarily prevent CVC malposition. If distortion of the vascular anatomy is known or suspected, the affected vessel should be avoided. The presence of scar tissue, thoracic tumors, or a history of repeated cannulation or long-term catheter placement (e.g., in patients undergoing hemodialysis) should be alerted. [5,6,7]

The correct catheter length must be chosen based on whether a right- or left-sidedapproach has been chosen. Improper catheter length increases the risk of migration or displacement of the catheter in the blood vessels. When a subclavian approach is used, ensuring that the J tip of the guidewire is pointed caudad during insertion will increase the success of its guidance. 8 Additionally, when a subclavian approach catheter is attempted, lateral

flexion of the head toward the side of insertion narrows the internal jugular vein, preventing the tip of the jugular vein. internal jugular circulation. Likewise,if the patient's head is turned away from the insertion site, the internal jugular vein will stretch and constrict, which can maximize the success of CVC placement in the target vessel. Others describe a “finger in the fossa” technique that manually compresses the ipsilateral internal jugular vein to avoid unwanted cannulation. [1,3,7]

Proper CVC placement should be verified clinically, and also confirmed with diagnostic imaging. During internal jugular vein cannulation, a flush test may be useful to ensure adequate access. Flushing the CVC with 5-10 mL of normal saline will producea palpable sensation or a bruit on auscultation in the internal jugular area, indicating proper cannulation. Similarly, during subclavian vein catheterization, the flush test has been used to accurately confirm correct tip placement; its presence in the neck can identify looping to the ipsilateral internal jugular circulation. [9,8,10]

Once a CVC is placed in the neck or chest, chest radiography is the accepted wayto ensure that the tip is adequately positioned at the atrio-caval junction and to rule out complications related to the procedure. Although, based on radiographic landmarks thereis no clear consensus on the ideal position of the CVC tip, it is generally agreed that the tip should be located in the area of the junction of the SVC and the right atrium to avoid contact with the pericardial reflection. This position is believed to minimize the risk of complications during clinical use. In general, the tip of the CVC should be located in thelong axis of a wide vein with high blood flow, away from the vessel walls and their junctions. [9,8,11]

Additionally, advances in ultrasonography have shown promising results for verifying CVC tip position. Various studies have shown that ultrasound visualization of bubbles (seen as opacities) in the right atrium after injection of 10 mL of normal saline through the CVC port can be used to verify adequate placement of the CVC tip. Significant limitations of this technique include the inability to visualize catheter alignment, and the presence of aberrant pathways. [4,8,11]

Anterior-posterior chest radiography after CVC placement is an important adjuncttool used to diagnose catheter malposition. 33 Although chest radiography has high diagnostic accuracy for detecting CVC malpositions, correct interpretation of this radiograph requires knowledge of the normal course and associated mediastinal vasculartermination to CVC. [7,9]

Undoubtedly, the 2D projection produced by conventional radiography, in contrast to computerized tomography (CT), has limitations; for example, the anatomical proximity of the vessels to other structures can obscure whether the distal portion of the catheter is in the desired location. If CVC placement appears atypical on anterior- posterior chest x-ray, then a lateral x-ray may be helpful. If uncertainty remains, injectinga small amount of contrast material through the catheter during conventional radiographyor performing CT may be necessary for proper radiographic localization. [3,5]

Another imaging technique used to diagnose CVC malposition is real-time radiographic imaging, which uses image intensifiers. This technique can guide wires andcatheters centrally during CVC placement without injecting contrast; unfortunately, its limitations are similar to those of plain radiography. [5,11]

The consensus among experts is that a malpositioned CVC is suboptimal. In mostcircumstances, if the catheter is malpositioned, the priority is to reposition, replace, or remove it as soon as possible. In patients with difficult venous access and/or high-value catheters, an objective evaluation of the risk-benefit situation should be performed to determine whether to use a placed CVC. In addition, insertion of a new catheter can be performed after partial removal and transfer of the wire guide, which can correct the malposition. If the actions mentioned above do not get results or cannot be carried out, athoracotomy can be performed. Thoracotomy describes an incision made in the chest wallto access the contents of the chest cavity. Thoracotomies can usually be divided into twocategories; anterolateral and posterolateral thoracotomy. This action can be subdivided into supra-mammary and infra-mammary and, of course, further subdivided into right orleft thoracic. Each type of incision has its uses, given the specific circumstances. Thoracotomy is making a hole in the chest to be able to operate on one of the organs in the thorax, such as the heart and lungs or one of the structures in the mediastinum. Preparation for thoracic surgery is the same as for other major surgeries, including routine examinations, chest x-rays,

physiotherapy, and possibly bronchoscopy to determine the diagnosis. If there is an acute infection of the respiratory tract, the operation will be postponed until it is treated optimally. [2]

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CASE REPORT

ANESTHESIA FOR EMERGENCY CASE WITH ACUTE ISCHEMIC STROKE : LUMBAL PLEXUS BLOCK IN PATIENT BELOW KNEE AMPUTATION

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ABSTRACT

Background : Anesthesiologists will be faced with various kinds of cases and comorbidities in emergency surgery, one of them is a patient who have an acute stroke. In contrast to elective cases, emergency operations where there is little time for optimization, proper anesthetic techniques to avoid complications from comorbid patients are needed. Anesthesia for acute stroke requires minimal hemodynamic changes. These minimal hemodynamic changes can be achieved with peripheral nerve block anesthesia. However, anesthesia with a peripheral nerve block has challenges related to the target organ to be anesthetized and the block access performed. In this case the choice of possible access and target organ is lumbar plexus block.

Case Illustration : An 87-year-old woman with left gangrene pedis will undergo a below knee amputation. Two days earlier the patient experienced weakness in the left limbs, but had not received therapy. The results of the physical examination revealed weakness of the left side and left facial muscle weakness. The patient's left leg also has a contracture and cannot be straightened. CT Scan supporting examination found stroke infarction. The patient was then anesthetized using a lumbar plexus block in combination with a popliteal block. The choice of lumbar plexus block was due to the best possible access to the block site and the effect of the block on the contracted hip joint. During surgery the patient's hemodynamics were stable with a range of systolic blood pressure: 140-160 mmHg, diastolic blood pressure: 60-70 mmHg, HR: 70-80 bpm, RR: 20 bpm, Spo2: 99% on nasal cannula 3 lpm. Contractures in the hip joint can also be straightened so that the operator can perform the operation well. Evaluation 24 hours after surgery showed no decrease in GCS or increasing of the patient's hemiparesis.

Conclusion : Anesthesia with Lumbar plexus block combine popliteal block can be used in below knee amputation surgery and does not cause hemodynamic changes according to the target in acute stroke patients.

Keywords: Lumbal plexus block, popliteal block, acute stroke, amputation below knee, gangrene pedis

INTRODUCTION

Emergency surgery will often be encountered by anesthesiologists. The wide variety of cases and various comorbidities require accuracy in the selection of anesthesia. Anesthesiologists will have limited time to optimize emergency patients, one of which is gangrene pedis with comorbid acute stroke.

Anaesthetic management of the acute stroke patient demands consideration of the penumbra as the central focus. Recent studies have shown that patients who receive general anesthesia for endovascular therapy for acute ischemic stroke have worse outcomes than those who receive local anesthesia.[1] The question of how arterial pressure should be managed in early ischemic stroke, especially when there is still substantial penumbral, tissue at-risk remains unanswered by the current body of literature. A potential strategy for management supported by current literature is to avoid dramatically lowering arterial pressure during the first 12 h after stroke onset, when collateral circulation compromise is still a concern. This time period likely includes the period in which an endovascular procedure might be attempted.

In this case it is interesting to appoint where the patient needs immediate surgery but has comorbid acute stroke and limited access caused by contractures. The technical selection of lumbar plexus block anesthesia is

based on these criteria.

CASE ILLUSTRATION

An 87 year old woman came to the emergency room with complaints of leg pain and rot 3 weeks before entering the hospital, the foot was initially a small wound but enlarged to the cruris area. There were complaints of itching on the feet, it was denied that there was a fever, cough and runny nose. 2 days before entering the hospital the patient also complained of weakness on the left side, and also slurred speech. The patient had a previous history of hypertension, denied diabetes, asthma and chest pain.

From the physical examination, blood pressure was found: 150/75 mmHg, heart rate 100 x/minute, respiratory rate 22 x/minute, temperature 36.9 c. The general condition of the patient appears weak with cognitive impairment. Head to toe examination: head : conjunctiva anemis +, schlera icteric -, Pulmo : vesicular +/+, wheezing -/-, Cor : S1S2 regular, murmur -, abdomen : tenderness -, tympani, ascites -, extremities : left hip flexed, motion not free impression of stiffness. Local examination found an ulcer to the base of the bone and the tendon on the left foot extends to the cruris.

Picture 1. Left foot patient

Laboratory examinations results Hb: 7.2, Ht: 24.6, AL: 16.5, AT: 496, PT: 14.3, APTT: 30.7, INR: 1.31, Albumin: 2, 39, Bun: 24, Cr: 1.46, GDS: 137, Na: 134, K: 4.4, Cl: 104. Chest X-ray showed Cardiomegaly CTR 0.55 and head MSCT showed Stroke acute infarction in the corona radiata region, internal and external capsules. During pre-operation, Hb was corrected with a PRC transfusion of 2 colf containing 230 ml and a transfusion of 1 flag of 25% Albumin.

The patient was then subjected to anesthesia using a lumbar plexus block and a combination with a popliteal block. The choice of lumbar plexus block was due to the best possible access to the block site and the effect of the block on the contracted hip joint.

Lumbar plexus block is performed using guided ultrasound with a curve probe looking at the cross section transversely and with a shamrock view.

Picture 2. Patient position before lumbar plexus block

The patient is positioned in the right lateral decubitus position, aseptic procedures are carried out around the puncture area. Then local anesthesia of the injection area was carried out with 2% lidocaine 2cc. When the lumbar plexus is visualized, 20 cc of Bupivacaine isobaric 0.5% is injected into the lumbar plexus nerve area. The patient also underwent a popliteal block using ultrasound guidance with Ropivacaine 0.5% 15 cc anesthesia. 30 minutes after the nerve block injection, an evaluation was carried out on the lower leg area and the impression that the total block had been achieved.

During surgery the patient's hemodynamics were stable with a range of systolic blood pressure: 140-160 mmHg, diastolic blood pressure: 60-70 mmHg, HR: 70-80 bpm, RR: 20 bpm, Spo2: 99% on nasal cannula 3 lpm. Contractures in the hip joint can also be straightened so that the operator can perform the operation well. Evaluation 24 hours after surgery showed no decrease in GCS or weighting in the patient's hemiparesis.

DISCUSSION

Acute stroke is the second leading cause of death in the world and causes long-term disability, where ischemic stroke occurs in 87% of cases. Patients who suffer a perioperative stroke have an 8-fold increased risk for death within 30 days of surgery compared to those who do not suffer a stroke. Elective surgery should be delayed following a stroke for up to 9 months to allow for return of cerebral autoregulation, risk factor reduction, and treatment of a cause if one can be identified.[2]

Brain tissue is lost rapidly after stroke, and hence, time is brain concept was introduced to emphasize the need for emergent evaluation and treatment to limit its progress. Quantitative neurostereology and stroke neuroimaging show that for every minute of untreated large vessel stroke, the brain loses approximately 1.9 million neurons. Therefore, one of the significant anesthetic concerns is the preservation of the penumbra region. It lasts only a few hours on humans.[3]

There is an ongoing debate about the effectiveness of general anesthesia (GA) over conscious sedation and vice versa, as some studies have shown that GA is associated with a lower disability while others demonstrated worse outcomes with GA.[3]

Advantages of GA are immobility, pain control, and airway protection, while disadvantages are more hemodynamic changes. Advantages of local anesthesia are superior hemodynamics and neurological evaluation, while the disadvantages are patient movement, pain, and agitation, loss of airway control.[3]

American Heart Association/ American Stroke Association (AHA/ASA) guidelines recommend that the choice of anesthetic technique should be based on patient risk factors, clinical conditions, and technical

performance of the procedure. They recommend that either method, i.e., GA or procedural sedation is reasonable until more data is available for endovascular treatment. Society for neuroscience in anesthesiology and critical care (SNACC) expert consensus statement also recommends that the choice of anesthesia should be tailored according to the patient's clinical condition.[3]

Blood pressure, heart rate, electrocardiogram, oxygen saturation, end-tidal carbon dioxide concentration should be continuously monitored throughout the procedure. Hypertension is present in about 80% of patients presenting with acute ischemic stroke.[3]

A U-shaped relationship exists between blood pressure and neurological outcome, with hypertension and hypotension, with both associated with poor outcomes. Data shows that the best neurological outcomes are observed at a systolic blood pressure of 150 mmHg (range between 140 to 179 mmHg). Diastolic blood pressure should be maintained at < 105 mmHg. AHA/ASA guidelines recommend maintaining BP ≤180/105 mmHg during and for 24 hours after mechanical thrombectomy.[3]

For patients presenting with hypertension in the setting of AIS, the overall clinical picture should be taken into account, e.g., patients with acute coronary syndrome, acute heart failure, aortic dissection, or post thrombolysis symptomatic intracerebral hemorrhage. In these cases, the initial lowering of BP should not be more than 15% of baseline.[3]

In this case, the patient's condition is no movement, agitation and no airway obstruction, so the choice of Local or Regional Anesthesia technique is considered superior to GA for minimal hemodynamic changes. During surgery the patient's hemodynamics were stable with a range of systolic blood pressure: 140-160 mmHg, diastolic blood pressure: 60-70 mmHg, HR: 70-80 bpm, RR: 20 bpm, Spo2: 99% on nasal cannula 3 lpm

The choice of regional technique with a lumbar plexus block is based on the patient's condition where the block site can be accessed because the patient has hip joint contracture. The effect of this lumbar plexus block can also relieve pain when repositioning the patient's position to be straight.

The best anesthetic technique in acute stroke cases is still debatable, but clinicians can choose a technique based on the advantages and disadvantages of each technique and the patient's condition. In this case, the choice of lumbar plexus block and popliteal block combination had good results during surgery and minimal postoperative complications.

CONSLUSION

Anesthesia with Lumbar plexus block combine popliteal block can be used in below knee amputation surgery and does not cause hemodynamic changes according to the target in acute stroke patients.

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EPIDURAL ANESTHESIA MANAGEMENT FOR UNILATERAL SALPINGO-OOPHORECTOMY IN PATIENTS WITH OVARIAN MASS

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ABSTRACT

Background: Epidural anesthesia was needed in some gynecological operations combined with sedation and mainly used in elderly patients or those with medical problems, including those who had ovarian mass. Epidural administration of amide local anesthetics in combination with opioids is widely used for pain relief because of the dose minimizing and side effects reducing benefits.
Case: Patient was diagnosed with ovarian mass. The patient also had pleural effusion, ascites, and hypoalbuminemia. Epidural anesthesia used in this patient as a resource for perioperative and postoperative pain management.
Discussion: Patient underwent unilateral salpingo-oophorectomy for her ovarian mass. Anesthetic doses were given carefully due to patient conditions with pleural effusion and ascites. Opioid and Neuromuscular Blocking Agents (NMBAs) effects were absolutely decreased due to hypoalbuminemia, but were overcome with Naloxone and Sugammadex. Epidural anesthesia used to stabilize the drugs and pain management for this patient.
Conclusion: Epidural anesthesia is an excellent choice for unilateral salpingo-oophorectomy in patients with ovarian mass. It has been proven to provide excellent pain control after major surgeries and may be associated with a lower incidence of postoperative complications.
Keywords : Epidural anesthesia, Unilateral salpingo-oophorectomy, Ovarian mass

INTRODUCTION

Regional anesthesia is a specific technique that temporarily inhibits nerve conduction and pain senses in certain regions of the body with local anesthetic medication without causing loss of consciousness to avoid or relieve pain. Regional anesthesia (RA) reduces acute pain, chronic pain after some surgical procedures, postoperative nausea and vomiting, and pulmonary complications. Additionally, due to the increase in the use of ultrasonography, currently, regional anesthesia techniques are performed more reliably and effectively.[1]

There were 3 types of regional anesthesia including spinal and epidural anesthesia, nerve blocks, and intravenous regional anesthesia. Epidural anesthesia was needed in some gynecological operations combined with sedation and mainly used in elderly patients or those with medical problems, including those who had ovarian mass.[2] It may also be used at patient request if the surgery is suitable for this form of anesthesia. Epidurals may be combined with General Anaesthesia in major cases for postoperative pain management. Epidural administration of amide local anesthetics in combination with opioids is widely used for pain relief in labor because of the dose minimizing and side effects reducing benefits.[3] Bupivacaine is the most widely used long-acting amide local anesthetic.

Intravenous non opioid anesthetics have an important role in modern anesthesia practice. They are widely used to facilitate a rapid induction of general anesthesia and provide sedation during monitored anesthesia care (MAC) and for patients in intensive care settings. With the introduction of propofol, intravenous techniques are increasingly being used for maintenance of anesthesia.[4] However, similar to inhaled anesthetics, the currently available intravenous drugs do not produce only desirable effects. Therefore, the concept of "balanced anesthesia" evolved by using smaller doses of multiple drugs rather than using larger doses with one or two drugs.[5] The

fundamental drugs used with “balanced anesthesia” include inhaled anesthetics, sedative/hypnotics, opioids, and neuromuscular blocking drugs such as propofol, fentanyl, and rocuronium combination.

Opioid overdose and mortality have increased at an alarming rate prompting new public health initiatives to reduce drug poisoning. One initiative is to expand access to the opioid antidote naloxone. Naloxone has a long history of safe and effective use by organized healthcare systems and providers in the treatment of opioid overdose by paramedics/emergency medicine technicians, emergency medicine physicians and anesthesiologists.[6] Sugammadex is the first clinical representative of a new class of drugs called selective relaxant binding agents. It has revolutionized the way anesthesiologists think about drug reversal.[7] Sugammadex selectively binds rocuronium, thereby reversing their neuromuscular blocking action. Due to its 1:1 binding of rocuronium, it is able to reverse any depth of the neuromuscular block. We report a case with regional anesthesia in an oncology-gynecology patient.

Case

A 58-year-old woman with height 145 cm, weight 40 kg, and Body Mass Index (BMI) - 18 kg/m2 came with complaints of abdominal pain with mass enlargement and dyspnea during supine position. Patient diagnosed with ovarian cyst neoplasm, pleural effusion, and ascites. The patient had a history of ringer lactate 20 drops per minute, ranitidine injection 1 amp/12 hours, ketorolac 1 amp/8 hours, and albumin correction 25% 100 cc medication. Patient looks good with composmentis consciousness (GCS E4V5M6), blood pressure 130/80, pulse 89x/minute, respiratory rate 20x/minute, body temperature afebrile, oxygen saturation 98% room air. From the physical examination, it was found that the mouth was mallampati II with 3 fingers open, loose teeth (+), normal basic vesicular sound, abdominal dullness, and both leg edema. Lab examinations showed low hemoglobin (10,7 g/dL), high thrombocyte (885x103/µl), and low albumin (2,4 g/dL). Laboratory investigation results showed no other abnormalities. No malignant cells on ascites puncture pathology. Negative for intraepithelial lesion or malignancy (NILM), atrophic smear. On thoracic x-ray showed no heart enlargement, no infiltrate or nodule, and left pleural effusion. On abdominal USG with uterine view 3,96 x 3,90 x 3,54, with 28,55 cc volume, EL +0,13. Regular texture homogenous contour. A hypo hyperechoic lesion appears in the adnexal septum 6,31 x 5,24 x 8,54 with 147 cc volume and no neovascularization, partition thickness 0,31 cm, cyst wall thickness 0,13 cm, free fluid is seen in the Morrison Pouch. On 3 position BNO examination showed no ileus or pneumoperitoneum was seen, ground glass opacity on the right and left hemiabdomen accompanied by centration of intestinal loops, tends to an ascites.

The patient underwent a unilateral salpingo-oophorectomy with frozen section and complete surgical surgery, laparotomy biopsy. In the operating room, routine morning electrocardiography, non-invasive blood pressure measurement, and pulse oximetry was performed. I.V. analgesia was induced with propofol 70 mg, rocuronium 30 mg, fentanyl 100 mcg, dexamethasone 10 mg. Regional anesthesia was induced with bupivacaine 0,125% 3 mL. Intraoperatively, the patient was administered 500 mL Gelofusin, 1000 mL Ringer Lactate, 500 mL NaCl 0,9%, and her urine output was 200 mL. Sugammadex, naloxone, and tranexamic acid were also administered. The anesthetic problems in this patient were ovarian mass, ascites, pleural effusion, low hemoglobin (10,7 g/dL), high thrombocyte (885x103/µl), and low albumin (2,4 g/dL). After surgery the patient looked moderately ill, composmentis consciousness, blood pressure 129/74 mmHg, pulse 92x/minute, respiratory rate 20x/minute, saturation oxygen 99% room air.

DISCUSSION

In this case, the patient was dyspnea due to pleural effusion and ascites. Diaphragmatic splinting from ascites or the presence of pleural effusions restricts alveolar ventilation, reduces FRC, and predisposes to atelectasis and hypoxia. Associated gastro-oesophageal reflux disease, acute alcohol ingestion, and massive ascites may increase the risk of aspiration of gastric contents.[8] Intrapulmonary arteriovenous shunting may also occur. Patients experienced dyspnoea and hypoxaemia when sitting upright, which improves on lying flat (orthodeoxia).

There is an apparent resistance to nondepolarizing neuromuscular blockers (NMBs) in patients with liver disease, which may be due to an increased volume of distribution or to altered protein binding.[9] Rocuronium, steroid-based NMBs, have a prolonged elimination phase in severe liver disease. We used rocuronium as NMBs and were careful on giving doses to avoid respiratory failure.

Fentanyl, given in low doses, is suitable for intraoperative use as it does not have an active metabolite and is renally excreted. However, in repeated or large doses, fentanyl will accumulate.[10] All volatile anesthetics reduce cardiac output and mean arterial pressure and thereby reduce liver blood flow. Isoflurane, sevoflurane, and desflurane undergo minimal hepatic metabolism and can be regarded as safe.[11] In this case, we used fentanyl and sevoflurane due to its minimal hepatic metabolism.

Elective surgery should only be considered in patients who have well-compensated chronic liver disease. For patients needing emergency surgery, urgent optimization of the patient is mandatory and should include attention to intravascular volume status, coagulation function, neurological assessment and screening for infection.[12] In this case, the patient underwent elective surgery with dyspnea as the complication of pleural effusion and ascites, but the patient was still well-compensated due to ascites puncture with first puncture 3000 cc, then second puncture with 750 cc serous fluid.

Specific blood component therapy should be considered, depending on the results of thromboelastography and coagulation studies. Fresh-frozen plasma may be required if the PT is >1.5 times the control and platelets should be administered if the platelet count is <50 000 mm−3. Cryoprecipitate is usually only indicated if the fibrinogen concentrations are <1.0 g liter−1. Recombinant factor VIIa is increasingly being used for both prophylaxis and therapeutic management of perioperative bleeding;[13] Other pharmacological options include tranexamic acid. Coagulation function showed no abnormalities, we used tranexamic acid as management of perioperative bleeding due to ovarian large mass which had bleeding risk.

Sedative premedication should be avoided as it may precipitate encephalopathy; however, premedication with an H_2 receptor antagonist such as ranitidine is advisable.[8] Ranitidine was injected 1 ampoule in 12 hours in this patient. The goals of intraoperative management should be maintenance of adequate hepatic blood flow and oxygen delivery. Relative hypoperfusion or hypoxaemia may produce further hepatocellular injury and result in de-compensation. In the presence of portal hypertension, hepatic blood supply is dependent on hepatic arterial blood flow. All forms of anesthesia can reduce mean arterial pressure and thereby reduce hepatic blood flow.[8] Other intraoperative factors which can reduce hepatic blood flow include surgical traction on the liver, positive pressure ventilation, hypocapnia, alpha-adrenoceptor agonists. In this case the patient underwent laparoscopic surgery which also reduced hepatic blood flow.

The choice of drugs for anesthesia induction and maintenance is less important than the care with which they are used. A suggested technique is i.v. induction of anesthesia using propofol and remifentanil, in most cases using a modified rapid sequence induction with cricoid pressure and rocuronium 1 mg kg−1, followed by maintenance with oxygen/air/desflurane and remifentanil infusion.[12] From the case i.v. induction of anesthesia using propofol 70 mg, rocuronium 30 mg, fentanyl 100 mcg, dexamethasone 10 mg followed intraoperatively by rocuronium 10 mg, fentanyl 50 mcg. Propofol clearance is not significantly impaired by liver disease. Ventilation is controlled to maintain arterial PCO_2 between 4.5 and 5.3 kPa. Appropriate antibiotic prophylaxis is required before surgery.

Large-bore i.v. access is mandatory. All fluids should be administered via a fluid warming device and access to a rapid infusion device is important for all major surgery. Fluid replacement should be guided by cardiovascular variables, blood loss, and urine output; only when cardiac filling pressures are optimized should vasopressors such as metaraminol, phenylephrine, or norepinephrine be considered for the treatment of hypotension.[13] Maintenance of intravascular fluid volume and appropriate cardiovascular management are critical to achieve an adequate urine output; however, loop diuretics or mannitol are occasionally used.[14] Crystalloid solutions may be less effective than colloids in the presence of ascites, but a background infusion of 5−10% dextrose at 50–100 ml h−1 helps to avoid hypoglycaemia and protect against inadvertent increases in plasma sodium concentration.[15]

Fortunately, this case was using colloids including 500 mL Gelofusin, 1000 mL Ringer Lactate, 500 mL NaCl 0,9%, and her urine output was 200 mL.

I.V. patient-controlled analgesia using fentanyl is well tolerated in patients with compensated liver disease. A regimen of a fentanyl bolus of 10 μg with a lockout time of 10 min and no background infusion is effective. Regional analgesia may be very useful in reducing the need for systemic analgesia, but attention to coagulation status is essential. Epidural analgesia should be considered with extreme caution only if INR is <1.5 and platelet count is >100 000 mm−3.[16] This case using bupivacaine 0,125% 3 mL as regional anesthesia. Coagulation function showed no abnormalities, but platelet count is >100 000 mm−3.

Albumin is synthesized in the liver, and its synthesis may be decreased in liver disease. Low plasma albumin concentration results in decreased volume of distribution of some anesthetic drugs. Hypoalbuminemia is also associated with decreased plasma volume. A function of drug concentration is unbound at condition because it will determine the good pharmacological effect of both efficacy and toxicity because it is only a drug.[17] Those that are not bound to protein are able to penetrate the membrane and reach the target site. In a state of hypoalbuminemia fraction unbound drugs will generally increase.[18] This patient was hypoalbuminemia which affected decreased volume of distribution of some anesthetic drugs, but sugammadex was given to overcome the condition. Sugammadex is a selective relaxant binding agent indicated for the reversal of moderate to deep NMB, with a high affinity for rocuronium. Sugammadex encapsulates neuromuscular blocking agents (e.g., rocuronium), inactivating them, resulting in the reversal of the NMB.[19]

Perioperative optimization of patient care remains challenging due to many factors such as coexisting morbidities, progression of cancer disease, and an increasing number of elderly patients undergoing surgeries. A multimodal approach is required to provide an enhanced recovery pathway and improve patient outcomes. For years, general anesthesia with traditional opioid-based analgesia was the only option for most gynecological and breast oncology surgeries. The advances in anesthesiology and the development of novel RA techniques have provided an opportunity to tailor an individual analgesic plan to the patient and the surgery.[20] Regional anesthesia aims to provide selective, reversible sensation loss in a specific body part. It is a crucial element in the multimodal anesthetic management of many types of surgery. In parallel, with the increasing availability of ultrasonography, it has stopped being an arcane art limited to a narrow group of anesthesiologists. What has begun as a simple method of numbing body parts has evolved into a highly selective blockade of neural structures. Bupivacaine was the best selection for regional anesthesia..

Epidural anesthesia has been proven to provide excellent pain control after major surgeries and may be associated with a lower incidence of postoperative complications. A meta-analysis of 125 studies reported that epidural anesthesia reduces postoperative mortality and improves cardiovascular, respiratory, and gastrointestinal morbidity endpoints compared to systemic analgesia. However, this technique may be associated with side effects such as hypotension, urinary retention, and pruritus.[21] The study by Huepenbecker has shed more light on epidural anesthesia in gynecologic oncologic patients. The work compared the incidence of postoperative complications and opioid use after exploratory laparotomy with and without epidural anesthesia. The results confirmed improved pain control, shorter hospitalizations, no difference in venous thromboembolism, lower wound complications but more prolonged urinary catheter use, and higher postoperative hypotension.[22] Although epidural anesthesia is considered the cornerstone in ERAS pathways, its role is currently questioned. This neuraxial technique is beneficial in general, but it has some limitations. It is contraindicated in patients on anticoagulants, coagulation disorders, or hemodynamic instability. The incidence of severe complications is rare, including troublesome events such as epidural hematoma, epidural abscess, or postoperative neurologic deficits. In the laparoscopic technique, the surgical approach is less invasive; incisional pain is lower than open surgery and does not require such extensive analgesic methods. The specific context is essential to calculating the risk benefit ratio. The development of novel, easy-to-perform, increasingly safe, and comparably efficient regional techniques makes epidural anesthesia less and less popular.

CONCLUSION

Epidural anesthesia is an excellent choice for unilateral salpingo-oophorectomy in patients with ovarian mass. It has been proven to provide excellent pain control after major surgeries and may be associated with a lower incidence of postoperative complications.

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CASE REPORT

ACUTE FATTY LIVER OF PREGNANCY MANAGEMENT IN INTENSIVE CARE

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ABSTRACT

Background: Acute fatty liver of pregnancy (AFLP) is an obstetric emergency with high mortality that usually requires treatment in the intensive care unit (ICU). The cause of AFLP is not known with certainty, but it is suspected due to a deficiency of long chain 3-hydroxyacyl CoA dehydrogenase (LCHAD) in the fetus which causes accumulation of fatty acid metabolites from the fetus and placenta which are hepatotoxic. The clinical manifestations of AFLP are acute liver failure and progression to multiple organ dysfunction syndrome (MODS). This reported case was the only one successful case out of 3 incidences of AFLP recorded in RSUP Dr. Sardjito Yogykarta within a year of 2022.

Case Illustration: A 24-years-old postpartum woman at 38 weeks' gestation admitted to resuscitation room with hypovolemic shock due to early postpartum hemorrhage. Patient was resuscitated and then taken to emergency operating room for uterine exploration under general anesthesia. Patient was subsequently admitted to the intensive care unit (ICU). The patient's initial condition was intubated, requiring vasopressor support with epinephrine and norepinephrine, and the patient showed symptoms of encephalopathy, liver failure and kidney failure. AFLP diagnosis was then made with patient showing score 10 of Swansea criteria. Resuscitation, stabilization, and intensive care treatment was continued for up to eight days in the ICU. The patient's final condition was stable, there were no sequelae of AFLP and the patient was discharged from the hospital at the 14th day in good condition.

Conclusion: AFLP is a serious complication during pregnancy and postpartum period that is reversible with a chance of complete recovery but has a high mortality associated with delayed treatment. Adequate early intensive care treatment with multidisciplinary approach essential for successful treatment of AFLP.

Keywords: AFLP; hepatic impairment in pregnancy; intensive care; LCHAD; MODS

INTRODUCTION

Acute fatty liver in pregnancy (AFLP) is a rare complication in pregnancy but has the potential to cause high mortality. The prevalence of AFLP is estimated to occur every 1-3 cases from 7000-10,000 pregnancies. [1,2] There is no data on the prevalence of AFLP in Indonesia, but it was reported in Surabaya that the number of AFLP patients ranged from 2-3 patients in tertiary referral hospitals each year. [3] AFLP mortality rate was used to exceed 70%, but with increasing understanding regarding AFLP management, the mortality rate can decrease to 10-20%. AFLP mortality is associated with acute liver failure followed by other organ failure or multiple organ dysfunction syndrome (MODS).[3]

The cause of AFLP is not known with certainty, but is suspected due to a genetic defect in the chromosomes that causes long-chain 3-hydroxyacyl coenzyme α-dehydrogenase (LCHAD) deficiency in fetal hepatocyte mitochondria which is involved in fatty acid oxidation. LCHAD deficiency causes fatty acid metabolites from the fetus to burden mitochondrial oxidation pathways in the mother's liver cells and cause fat accumulation up to microvesicular fat steatosis which is hepatotoxic for the mother.[1,3,4,5] AFLP can occur in pregnant women without predisposing to maternal age and without previous comorbidities. Risk factors for AFLP mentioned in the literature include first pregnancy, presence of other comorbid liver diseases in pregnancy, male fetal sex, previous

history of AFLP, multiple pregnancies, and low body mass index.[1,5] Multiple pregnancies are believed to be at higher risk. due to increased production of fetal fatty acid metabolites by more than one fetus. The presence of liver disease in other pregnancies may predispose a woman to developing AFLP. Studies show that up to 20% of women with AFLP may also be diagnosed with hemolysis, elevated liver enzymes, low platelet syndrome (HELLP), which is associated with preeclampsia. Another study showed that there is a relationship between AFLP and intrahepatic cholestasis in pregnancy.[5]

The initial symptoms of AFLP are usually atypical, making it difficult to directly establish the diagnosis of AFLP. [3] Prodromal symptoms of AFLP such as malaise, fatigue appear within a few days until they develop into nausea, vomiting, abdominal pain, jaundice, and encephalopathy. [1] In addition, AFLP is a rare case in pregnant women so not much is known specifically about AFLP.[6] The diagnosis of AFLP is based on the Swansea scoring system when at least 6 points are found on these criteria with no explanation for other liver dysfunction (Table 1). The presence of signs in the form of hypoglycemia and coagulopathy in third trimester pregnant women is considered as a characteristic sign that distinguishes AFLP from other hepatic disorders in pregnancy and should be suspected as AFLP until proven otherwise.[7]

Guidelines on the management of AFLP so far does not exist due to the rare cases and the wide spectrum of clinical presentations.[1] However, the current literatures agree that prompt termination of pregnancy and postpartum intensive care in the ICU is very important to prevent further maternal deterioration.[8] AFLP postpartum management in the intensive care unit is for supportive therapy because hepatic failure can develop into fatal multi-organ failure. With early and adequate treatment, AFLP mortality can decrease from 85% to around 18%.[4]

Table 1. Swansea Criteria[4]

Feature	Parameter
Vomiting	Present
Abdominal pain	Present
Polydipsia/Polyuria	Present
Encephalopaty	Present
Elevated bilirubin	Bilirubin > 0.8 mg/dL
Hypogylcemia	Blood glucose < 72 mg/dL
Elevated urate	Uric acid > 960 mg/dL
Leucocytosis	Leucocyte > 11.000
Liver ultrasonography	Bright liver on ultrasound
Elevated transaminases	ALT > 42 IU/L
Elevated ammonia	Ammonia > 66
Renal impairment	Creatinin > 1.7 mg/dL
Coagulopathy	PT > 14 sec
	APTT > 34 sec
Liver biopsy	Microvesicular steatosis

CASE ILLUSTRATION

A 24-year-old woman, primigravida pregnant at 38 weeks' gestation with complaints of abdominal pain, vomiting, and fever for 3 days before being taken to the hospital. The patient's husband realized that the patient's eyes looked yellow and the patient then felt the fetal movements decrease so they came to the emergency room of a type C hospital. The patient was then examined and said the fetus had died in the womb so it was decided to be born by induction. The fetus was born spontaneously in a dead state (intrauterine fetal death - IUFD), but then the mother experienced heavy bleeding that was difficult to stop which was suspected to be due to uterine atony so that the patient was declared to be experiencing postpartum hemorrhage and was treated initially until inserting tampons and balloon catheters for efforts stop the bleeding. The patient was diagnosed as having hemorrhagic

shock so he was referred to a type A tertiary hospital for further treatment. The patient was compos mentis but in weak condition so she was resuscitated in the emergency room at a referral hospital and had emergency surgery under general anesthesia for the treatment of postpartum hemorrhage. The surgical findings found that bleeding could be controlled by packing tampons and repositioning the catheter balloon so that a hysterectomy was not performed. Postoperatively the patient was treated in the ICU.

On arrival at the ICU, the patient was intubated and sedated. The patient was put on a mechanical ventilator with PSIMV pressure control setting 14, pressure support 10, PEEP 5, FiO2 50%. A complete laboratory evaluation was carried out as initial data for patient care in the ICU.

On the first day of being admitted to the ICU, the patient began to be sedated and given blood transfusions, blood, urine and sputum cultures, as well as monitoring of fluid balance every 4 hours. Patients with coagulopathic problems, recurrent hypoglycemia, anemia, hypoalbuminemia and acute renal failure.

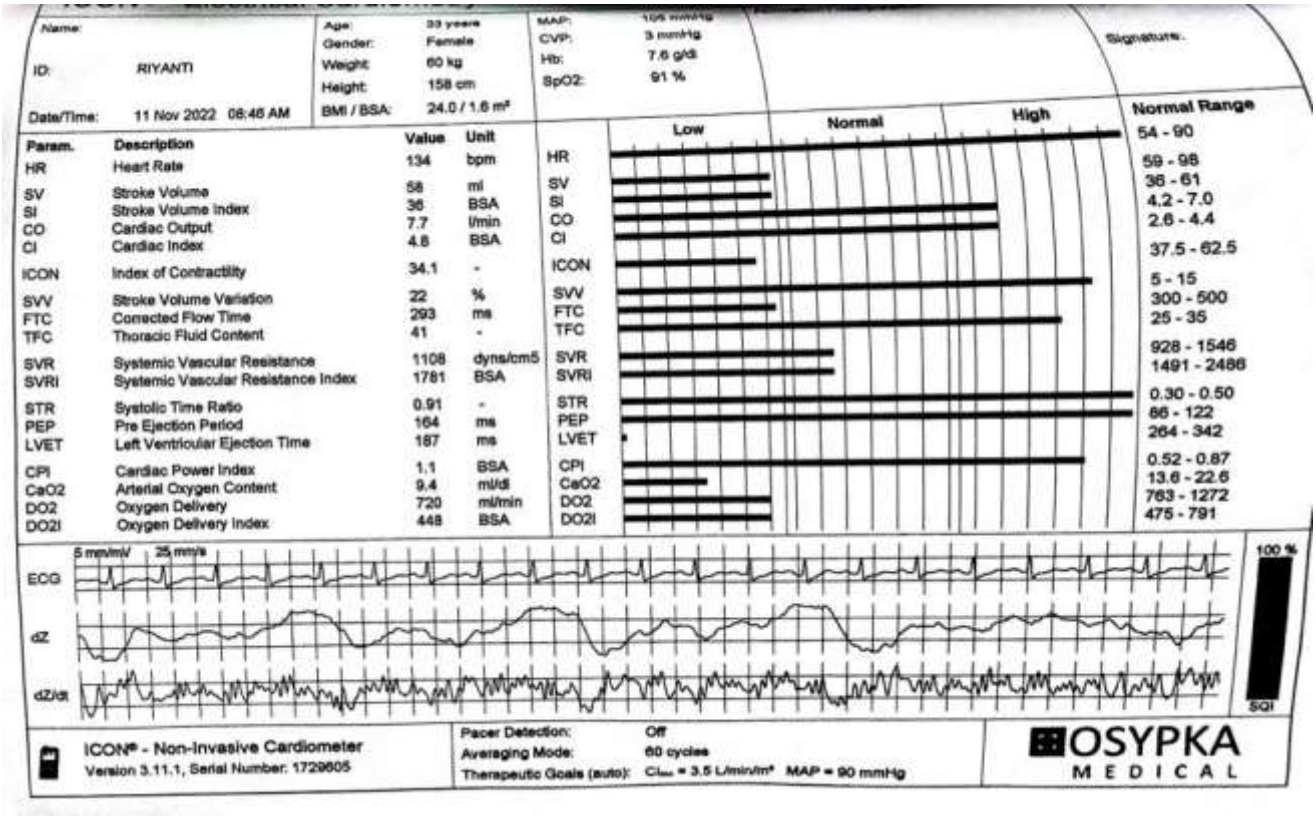

Figure 1. Non-invasive cardiometer monitoring at ICU admission

On the first day of treatment in the ICU, the patient had the problem of hemorrhagic shock and septic shock who needed support with norepinephrine vasopressors and titrated epinephrine to maintain MAP > 65. Patients were then treated for stabilization, resuscitation, and provision of supportive therapy according to the patient's condition. Strict hemodynamic monitoring with invasive monitoring in the form of CVC in the right subclavian vein and arterial line. From the history, physical examination, and complete laboratory examination results, it is suspected that the patient is headed for AFLP because there are signs in the form of vomiting, abdominal pain, encephalopathy, hyperbilirubinemia, hypoglycemia, leukocytosis, increased transaminase enzymes, increased ammonia, and coagulopathy with a total Swansea score of 10. Patient was closely monitored with strict evaluation of blood sugar, fluid balance and regular laboratory checks. Laboratory results obtained showed the patient in severe metabolic acidosis state and had coagulopathic problems, recurrent hypoglycemia, hypoalbuminemia, and acute renal failure. The initial chest x-ray in the ICU showed pulmonary edema so the patient's fluid balance needed to be closely monitored. The patient's hemodynamic condition was also evaluated statically with non-

invasive cardiometer ICON® and found that the patient's shock problem could be optimized by fluid resuscitation and blood transfusion. The patient was managed as sepsis by applying the hour one bundle of sepsis.
On the second day of treatment in the ICU, the patient was still in a somnolence condition despite no sedation was given. Vasopressor with norepinephrine continued without epinephrine. The patient showed decreasing urine output trend of less than 0.5cc/kg/hour even though they have been given diuresis with a fluid balance target of -500 cc. The patient still showed a trend of hypoglycemia with the lowest blood sugar level of 38, requiring boluses of 40% dextrose and the patient was treated with maintenance infusion of 5% dextrose. The coagulopathy worsened with an INR value of 2.43 so the patient received fresh frozen plasma transfusion.

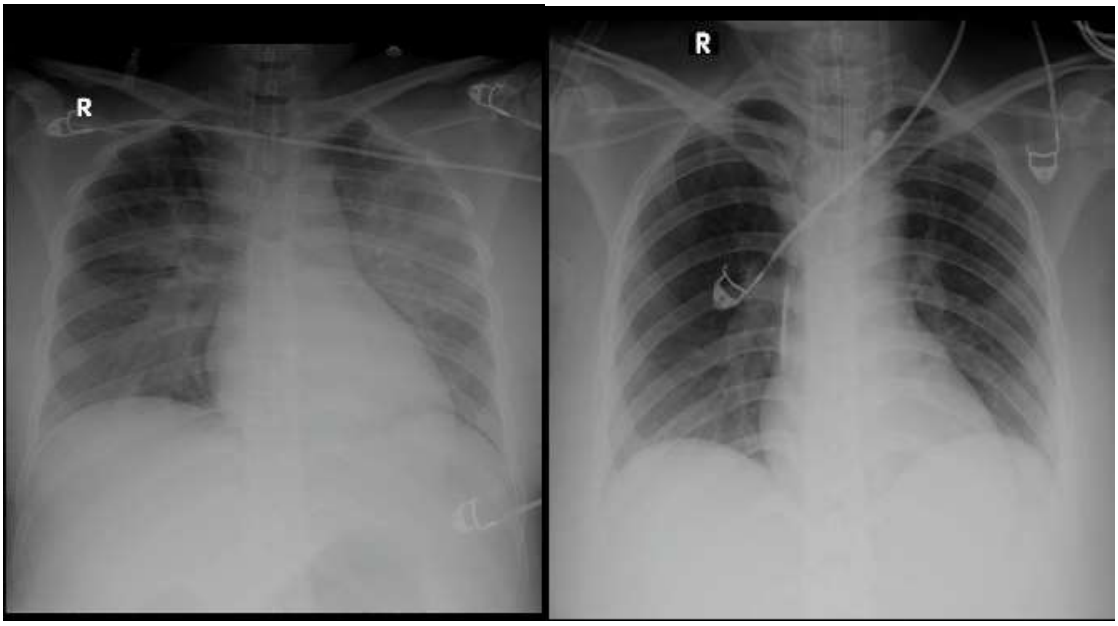

Figure 2. Initial chest x-ray on ICU admission showed pulmonary edema (left) and chest x-ray evaluation on the 7th day showed no pulmonary edema (right)

On the third day of treatment in the ICU, the patient was still somnolence. Obstetrician planned to take the uterine tampon and balloon catheter out and were carried out with preparation for an emergency operating room in case of re-bleeding after the tampon was removed. The tampon was successfully removed without complications. The patient still needs the support of a norepinephrine vasopressor titration down to achieve MAP > 65. The problem of acute kidney injury was accrued with decreasing urine output so that the patient is planned to undergo hemodialysis with continuous renal replacement therapy. A hemodialysis catheter was then placed in the left internal jugular vein. On the fourth day of treatment in the ICU, the patient's consciousness had not improved and blood was showed in the nasogastric tube indicating to upper GI tract bleeding so that the patient received parenteral nutrition and hemostatic agent tranexamic acid, proton pump inhibitor, and transfusion of packed red cells and blood components. AKI improved with an increase in urine output of 1.26 cc/kg/hour so that hemodialysis was postponed.

On the fifth day of treatment, the patient's consciousness improved, vasopressors could be stopped completely, gastrointestinal bleeding began to decrease and the coagulopathy problem improved with INR 1.31 and urine output 3.06 cc/kg/hour. On the sixth day of treatment, the patient was fully conscious, the patient was breathing well spontaneously so she could be weaned from the ventilator, and was able to start enteral intake. On the seventh day of treatment, the patient's general condition has improved, ventilator weaning is continued until the patient can be extubated. The coagulopathy problem improved but a decrease in the number of platelets was found so that a transfusion of platelet components was carried out. Evaluation of chest x-ray found pulmonary edema had subsided completely. On the eighth day of treatment, the patient was in stable condition, breathing well spontaneously with nasal cannula oxygenation support, and could be transferred to the high care unit. Patient was then transferred to ward at day the 13th day then safely discharged home at the 15th day of treatment.

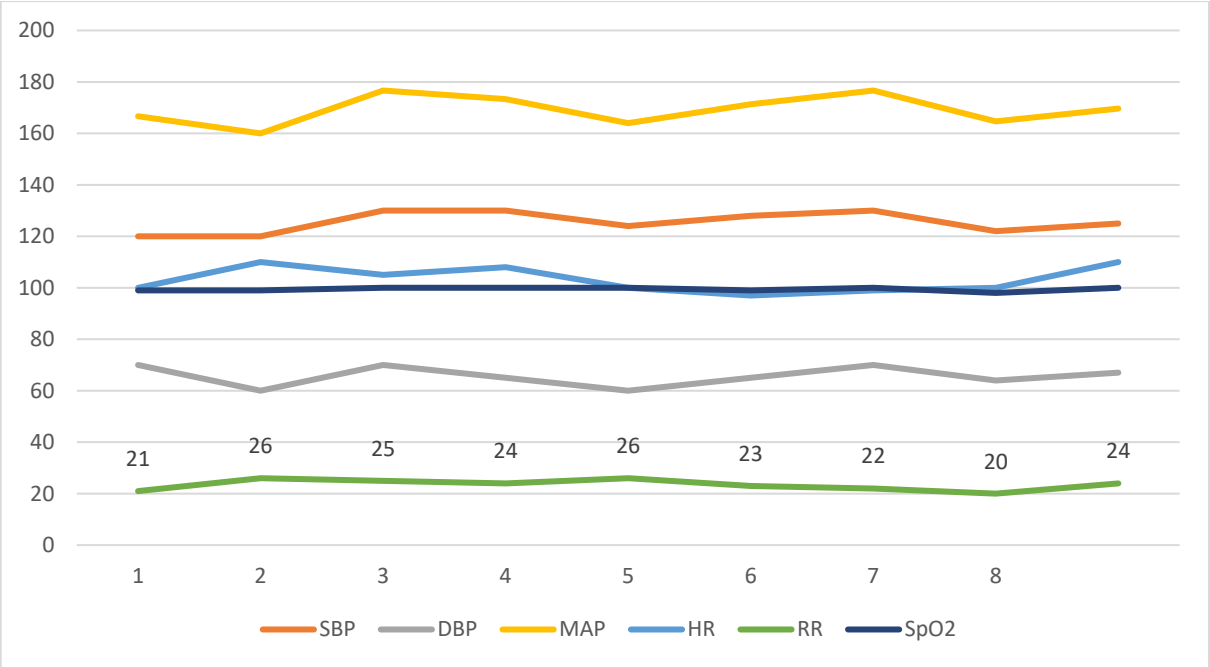

Figure 3. Daily hemodynamic monitoring chart during ICU stay

DISCUSSION

The suspicion of AFLP in this case was based on the clinical presentation and the results of investigations. The initial symptoms of AFLP are usually atypical so it is difficult to immediately establish a diagnosis of AFLP.[3] Prodromal symptoms of AFLP such as malaise, fatigue appear within a few days until they develop into nausea, vomiting, abdominal pain, jaundice and encephalopathy.[1] Apart from that, AFLP is a rare case in pregnant women, so not much is known specifically about AFLP.[6] Therefore, it is not surprising that in this case the suspicion of AFLP was only established when the patient arrived at the ICU of a tertiary referral hospital instead of from the start when the patient was treated at the previous referring private hospital even though prodromal symptoms had already begun. felt since 3 days before being taken to the hospital.

Although AFLP can be established based on clinical and laboratory manifestations such as the Swansea criteria, the gold standard for diagnosing AFLP is liver biopsy to find microvascular fatty steatosis in hepatocytes.[4,6] Invasive liver biopsy has a high risk of causing bleeding.[4,9] Research reports that liver biopsy was carried out on mothers with AFLP when the patient had recovered on the 16th and 23rd day postpartum and microvesicular fatty steatosis was found in the liver tissue.[9] Apart from biopsy liver, other AFLP diagnostic modalities with imaging examinations such as ultrasound and CT scan are also mentioned in the literature. The diagnosis of AFLP from ultrasound is the discovery of fatty liver and ascites. Research has found that these results are only found in around 25-50% of AFLP patients who undergo ultrasound.[4] CT scans are more difficult to do because of concerns about the impact of radiation and cannot be done bedside.[4] In this case, diagnostic examinations with liver biopsy or imaging was not performed due to the patient's coagulopathy and unstable hemodynamics.

The principle of treating postpartum patients with AFLP in the ICU is patients with acute liver failure who have the potential to deteriorate quickly. Resuscitation, stabilization, and correction efforts must be carried out aggressively to prevent patients from being in a condition of multiorgan dysfunction, septic shock, and DIC.[5] Several things that should be optimized are fluid status, correction of coagulopathy, correction of hypoglycemia, and support for other organ systems in accordance with patient's clinical condition.[1]

Coagulopathy is one of the most common and fatal complications in AFLP patients especially when falling into disseminated intravascular coagulation (DIC).[2] DIC is the systemic activation of the coagulation system, which results in microvascular thrombosis and, concomitantly, potentially life-threatening bleeding caused by

consumption of platelets and coagulation factors.[10] Coagulopathy in AFLP is the impact of liver failure in producing coagulation factors.[1] In addition, in liver failure, thrombocytopenia can also occur due to uremia and endothelial abnormalities and is associated with the degree of liver dysfunction. Decreased fibrinogen production, decreased levels of components of the antifibrinolytic pathway, and upregulation of tissue plasminogen activator were observed, all of which promote hyperfibrinolysis and disseminated intravascular coagulation. INR, and an increase in the amount of D-dimer and a decrease in the amount of fibrinogen.[1]

Coagulopathy occurs in at least 80% of patients with AFLP.[3,4] This coagulopathy has an impact on bleeding due to prolonged uterine atony even after uterine tone improves so that they fall into a state of hemorrhagic shock. Another spontaneous bleeding from the gastrointestinal tract resulting in a black residual NGT in this patient. Management of coagulopathy in these patients is by transfusion of blood products and monitoring the response to blood transfusion with daily coagulation panel evaluation. This patient had received blood product transfusions in the operating room before arriving at the ICU as many as 5 packs of TC and 5 packs of FFP. On the second day, the results of the coagulation panel still showed prolonged coagulation results even though there had been improvements. On the second day in the ICU the patient received a transfusion of 5 packs FFP and 5 packs TC. In the literature it is mentioned the importance of transfusion of blood clotting components in coagulopathy due to AFLP, namely by transfusion of TC, FFP, and cryoprecipitate.[5] In this case, cryoprecipitate was not successful due to problems with the unavailability of these blood products in the hospital's blood bank. Improvement in coagulation function was seen on day 4 of ICU stay, with normal PPT results on day 5. Improvement of PPT is an early sign of improved liver function.[5]

Hypoglycemia is a typical clinical manifestation of AFLP and differentiates it from the differential diagnosis of liver disorders in other pregnancies. The liver is a center for storing glycogen and producing glucose from the process of gluconeogenesis so that if the liver is dysfunctional it will also have an impact on hypoglycemia in AFLP patients.[1,11] Previous studies suggest that around 57–80% of patients with AFLP experience hypoglycemia.[3,4,12] Refractory hypoglycemia in these patients is managed by serial blood glucose monitoring every 4 hours, treated with D40% bolus administration if blood glucose is less than 80. Patients were given fluid maintenance with 5-10% glucose infusion fluid and administration of parenteral nutrition after the patient's condition was more stable and the patient's diuresis improves. Monitoring the patient's blood glucose showed an improvement trend on the fourth day of treatment in the ICU. Penurunan jumlah albumin pada ibu hamil secara fisiologis terjadi tetapi tidak mengubah nilai normal albumin pada pemeriksaan laboratorium.[6] Pada pasien ini, hipoalbumin diketahui sejak awal pasien dirawat di ICU dengan tren menurun pada hari perawatan ketiga. Hipoalbumin diduga diperberat oleh sepsis pada pasien yang meningkatkan permeabilitas vaskular dan kebocoran kapiler sehingga meningkatkan kehilangan albumin dari komponen intravaskular.[13] Adanya gangguan fungsi hepar diperberat dengan sepsis mengakibatkan penurunan sintesis albumin dan peningkatan katabolisme albumin sehingga terjadi hipoalbumin pada pasien ini. Hipoalbumin kurang dari 2.5 g/dl diterapi dengan infus albumin 25% pada pasien ini sesuai protokol rumah sakit. Hingga akhir perawatan di ICU, pasien masih hipoalbumin secara nilai laboratorium. Menurut literatur, nilai albumin pada pasien AFLP memerlukan waktu sekitar 3 minggu untuk kembali ke nilai normal.[1] Pada pasien ini tidak didapatkan data monitoring hasil albumin pada saat 3 minggu pasca perawatan.

A decrease in the amount of albumin in pregnant women physiologically occurs but does not change the normal value of albumin in laboratory examinations.[6] In this patient, hypoalbumin was discovered from the start of the patient's treatment in the ICU with a decreasing trend on the third day of treatment. Hypoalbumin is thought to be aggravated by sepsis in patients which increases vascular permeability and capillary leakage thereby increasing loss of albumin from intravascular components.[13] Liver dysfunction is aggravated by sepsis resulting in decreased albumin synthesis and increased albumin catabolism resulting in hypoalbumin in these patients. Hypoalbumin less than 2.5 g/dl was treated with 25% albumin infusion. Until the end of treatment in the ICU, the patient albumin was still low based on laboratory values. According to the literature, albumin values in AFLP patients take around 3 weeks to return to normal values.[1] In this patient there was no monitoring data on albumin results at 3 weeks after treatment.

Acute kidney injury (AKI) is a fairly common complication of AFLP. It is reported that at least 39 – 72% of patients with AFLP experience complications of AKI and 32% of them require renal replacement therapy (RRT).[5] AKI in AFLP is thought to occur as a result of direct fatty infiltration of the kidney or is a multifactorial complication related to hypoperfusion, septic shock, and in some severe cases is the result of hepatorenal syndrome.[1]

This patient was in a state of hemorrhagic shock for quite a long time, since about 12 hours before arriving at the ICU due to postpartum hemorrhage. Immediately upon arrival to the ICU, the patient required high vasopressor support with titrated norepinephrine and epinephrine. During the treatment, the patient was diagnosed with septic shock. Therefore, tissue hypoperfusion is thought to be the initial cause of AKI but is exacerbated by septic shock and coagulopathy in this AFLP patient.

Fluid status in patients with hepatic impairment such as AFLP must be adequate and closely monitored.[1] Immediately after the patient arrived in the ICU, a non-invasive cardiometer is examined with ICON® to assess the hemodynamic status of this patient. It was concluded that the patient was still in a state of shock and could be optimized with blood transfusions and vasopressor support which could be lowered slowly. Epinephrine was successfully tapered down and discontinued on the first day of treatment. Monitoring fluid adequacy can be done from strict fluid balance to the use of invasive monitoring to determine static and dynamic fluid adequacy. In this case, the effort to install an arterial line is difficult to carry out so that dynamic hemodynamic monitoring cannot be carried out either by pulse pressure variation or stroke volume variation. Hemodynamic monitoring was optimized with standard monitoring, non-invasive blood pressure, and fluid balance every 4 hours. Target daily fluid balance is negative 500 ml and urine output > 1 cc/kg/hour. Central venous access was made for safe access to administer nutrition and vasopressors. HD cathether was also placed in this patient for hemodialysis access or continuous RRT. However, as the patient progressed, the patient was able to improve with furosemide until urine output increased, AKI improved, so the patient did not require hemodialysis or continuous RRT.

AFLP has been reported to cause signs and symptoms that resemble puerpuric sepsis.[1,14] Septic shock in this patient occurred as a direct impact of multiorgan dysfunction related to AFLP and was exacerbated by infection. At the start of treatment in the ICU, the SOFA score was 16. The focus of infection in this patient was thought to originate from the uterine tampon and balloon catheter used to stop postpartum bleeding. From the beginning of treatment, patient was managed by administering broad-spectrum empiric antibiotics, fluid resuscitation and vasopressor support to ensure MAP > 65, checking lactate, and blood culture according to the hour one bundle of sepsis.[15] Monitoring of the response to therapy was carried out by monitoring hemodynamics and blood laboratories. On the third day of treatment, the dose of antibiotics was increased because there was an increasing trend of leukocytes. This is in accordance with the literature which states that broad spectrum antibiotics must be given adequately to AFLP patients who show symptoms of hypotension and encephalopathy.[1]

On the fifth day of treatment, the patient showed significant improvements in the form of increased consciousness, increased diuresis, and vasopressor support which could be stopped. On the sixth day of treatment the patient was fully conscious and ventilator support could be weaned off. This is in accordance with the literature that in general AFLP patients will experience clinical improvement within 3-4 days postpartum, but this recovery time is very dependent on the severity of the disease and accompanying complications. Clinical improvement will appear earlier than the improvement in laboratory values.[7]

Patients often experience worsening clinical and laboratory values in the early postpartum period. Laboratory results of markers of ongoing hepatocellular damage usually peak at delivery and begin to improve within 2 days. Clinically, jaundice often worsens after delivery in part because of ongoing hemolysis, and bilirubin tends to peak 1 to 5 days after admission. Elevated transaminase enzymes after delivery may indicate severe ischemic liver damage or a sign of developing sepsis. Albumin levels drop after delivery but return to normal 3 weeks after delivery. Most patients have normal liver function tests at 4 to 8 weeks after delivery.[16,17]

Most women affected by AFLP have a longer hospital stay than those with uncomplicated deliveries. Treatment in intensive care often takes a long time and causes many complications and requires adequate

supportive management. Coordinated management of obstetricians, nutritionists, and internists is needed as a multidisciplinary approach that increases the success of postpartum patient care with AFLP.[18]

CONCLUSION

Management of pregnant women with suspected acute fatty liver of pregnancy (AFLP) in the ICU is a rare case and is an obstetric emergency that requires special attention. The principle of management of pregnant women with AFLP is immediate termination of pregnancy and management in an intensive care unit for close hemodynamic monitoring, correction and evaluation of coagulopathy, hypoglycemia, hypoalbuminemia, acute renal failure, and other organ disorders as systemic manifestations of liver failure due to AFLP. A multidisciplinary approach is necessary to manage these complex patients safely and effectively.

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EARLY PERCUTANEOUS DILATATIONAL TRACHEOSTOMY IN COVID-19 ACUTE RESPIRATORY DISTRESS SYNDROME: OUTCOME AND TIMING

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ABSTRACT

Background

Managing a critically ill patient with COVID-19 Acute Respiratory Distress Syndrome (ARDS) necessitates a multidisciplinary approach and careful consideration of airway management strategies. Early Percutaneous Dilatational Tracheostomy (PDT) offers several advantages in this scenario.

Case Illustration

A 70-year-old male with confirmed COVID-19 presented to the emergency department with decreased consciousness and ARDS. Rapid sequence intubation was performed and the patient was assessed as having a difficult airway management. During treatment, the patient frequently experienced seizures during suctioning of the endotracheal tube, leading to the development of status epilepticus. Considering the prolonged need for ventilatory support, the presence of excessive sputum retention that increased the possibility of reintubation, and the desire to minimize seizure provocation, a decision was made to proceed with early PDT on the 5th day to optimize airway management and reduce the risk of complications associated with prolonged intubation. Following the PDT procedure, the patient's respiratory status improved significantly.

Conclusion

This case report demonstrates the successful utilization of early PDT in a critically ill patient with COVID-19 ARDS. In a timely manner, it is safe for both patient and healthcare professionals, optimized airway management, increased ventilatory support, expedited weaning from mechanical ventilation, and better nursing have been introduced in PDT.

Keyword

Airway management; acute respiratory distress syndrome; COVID-19; intubation; mechanical ventilation; percutaneous dilatational tracheostomy; status epilepticus

INTRODUCTION

Managing a critically ill patient with complex COVID-19 Acute Respiratory Distress Syndrome (ARDS) necessitates a multidisciplinary approach and careful consideration of airway management strategies. Data indicate that 5%–12% of patients with SARS-CoV-2 infection develop a severe illness such as ARDS requiring critical care, of whom 72%–81% require invasive mechanical ventilation (MV). [1]

From other causes, COVID-19 ARDS appears to have worse outcomes than ARDS. For COVID-19 ARDS, mortality ranged between 26% and 61.5% if ever admitted into a critical care setting, and in patients who received MV, the mortality can range between 65.7% to 94%.[2]

Over the last few years, tracheostomy has been generally considered necessary if initiation is expected for a period of up to several weeks. The decision to perform tracheostomy in critically ill patients must be based on the patient's medical condition and his or her pathology, balancing their wishes with anticipated recovery time, risk of continuation of translaryngeal intubation as well as surgical risks.[3,4]

Nevertheless, the role of tracheostomy in patients with COVID-19 who are mechanically ventilated is still controversial. Based largely on expert opinion, guidance at the start of the pandemic recommended avoiding or delaying tracheostomy until 14–21 days after intubation, 10–12 and to only proceed once the patient was COVID-19 reverse transcription (RT)-PCR test negative. These measures were intended to prevent nosocomial infections

between physicians and avoid unnecessary procedures in ventilated COVID-19 patients who have been identified as not likely to survive or benefit from the procedure. As the risk of transmission is now known to be reduced shortly after the onset of symptoms and the results of COVID-19 tests are not considered to be correlated with the risk of infection in the course of the disease, these recommendations have been challenged.[1]

Several important advantages in comparison with the continuation of translaryngeal intubations include increased comfort for patients, better dental hygiene, greater communication skills, more opportunities to feed orally and safer nursing care which can be achieved by tracheostomy. It may facilitate the weaning process and help prevent ventilator-related pneumonia, by reducing the need for sedation and analgesia and reducing upper respiratory resistance through endotracheal tubes.[3–6]

Preventing complications of prolonged translaryngeal intubations is a primary reason for placing tracheostomy. The lack of uniformity in the literature on the definition of early tracheostomy is one of the challenges in resolving the tracheostomy timing issue. However the timing of tracheostomy has changed in recent years, and it is increasingly recommended that they be performed within two to ten days.[3–6]

In this scenario, early onset Percutaneous Dilatational Tracheostomy (PDT) offers a number of benefits including improved respiratory support, better neurological response, and reduced risk of complications associated with prolonged intubation. In a patient with complicated problems, this case could offer valuable information on the use of early PDT.

CASE ILLUSTRATION

A 70-year-old male referred from another hospital with confirmed COVID-19 and a history of controlled diabetes and Alzheimer's dementia presented to the emergency department with decreased consciousness and respiratory failure. Rapid sequence intubation was performed by an anesthesiologist, and the patient was assessed as having difficult airway management (Cormack-Lehane III). Initial MV setting with Pressure Control Ventilation (PCV) and using sedation so that it is in sync with that mode. Subsequently, the patient was transferred to the Covid isolation Intensive Care Unit (ICU). Then, laboratory results showed hemoglobin 16.5 g/dl, White Blood Count (WBC) 10.7 x 10^3/uL, platelets 203 x 10^3/uL, creatinine 0.94 mg/dL, urea 31.2 mg/dl, Glucose 270 mg/dL, HbA1c 7.4%, Na/K/Cl/Ca/Mg 127/3.6/98/1.11/0.42 mmol/L, D-dimer 2.88 ug/mL, CRP 6.14 mg/dL, Interleukin-6 2562 pg/mL, procalcitonin 3.32 ng/mL, and blood gas analysis showed respiratory alkalosis. Chest X-ray results showed ground glass opacities in the lower lobes of both lungs, typical of COVID-19 pneumonia. CT Scan showed cerebral atrophy, no acute infarct lesions, bleeding, or space-occupying lesion (SOL) were seen. During the course of treatment, the patient frequently experienced seizures. Seizures often occur during suctioning of the endotracheal tube (ETT), leading to the development of status epilepticus. Seizure control with midazolam and propofol was initiated. Considering the prolonged need for ventilatory support, the presence of excessive sputum retention that increased the possibility of reintubation, and the desire to minimize seizure provocation, a decision was made to proceed with early PDT on the 5th day to optimize airway management and reduce the risk of complications associated with prolonged intubation. Following the PDT procedure, the patient's respiratory status improved significantly as shown in **Table 2**. Ventilatory support was optimized, allowing for more effective weaning from MV. The chest X-ray shows improvement as seen in **Figure 1**. Seizure activity did not reappear so the use of sedation could be stopped. The patient's condition gradually stabilized, and he was successfully weaned off from MV on the 6th day after PDT stepped down to the intermediate room, and later returned home with a length of stay of 21 days in the hospital.

Table 1. Patient's data during treatment (source: author's documentation)

Date		5/6/23 (upon admission)	5/11/23 (on tracheostomy)	5/20/23 (on tracheostomy)
Temperature	°C	36-37	37-38.5	36-37
Sputum		+++	++	+
WBC	x 10^3/uL	10.7	20.56	9.51
Neutrophils	%	85.4	86	76
CRP	mg/dL	6.14	91.8	
D-Dimer	ug/mL	2.88		
IL-6	pg/mL	2562		
PCT	ng/mL	3.32		

Table 2. Blood Gas Analysis (source: author's documentation)

Date		6/5/23 (upon admission)	6/5/23 (post intubation)	11/5/23 (on tracheostomy)
pH		7.5	7.49	7.38
pCO_2	mmHg	26.9	16.9	33.8
pO_2	mmHg	119.2	237.1	108.1
HCO_3	mmol/L	21.2	12.7	19.7
SaO_2	%	98.8	99.6	97.9
P/F ratio	mmHg	152.1	237.1	270

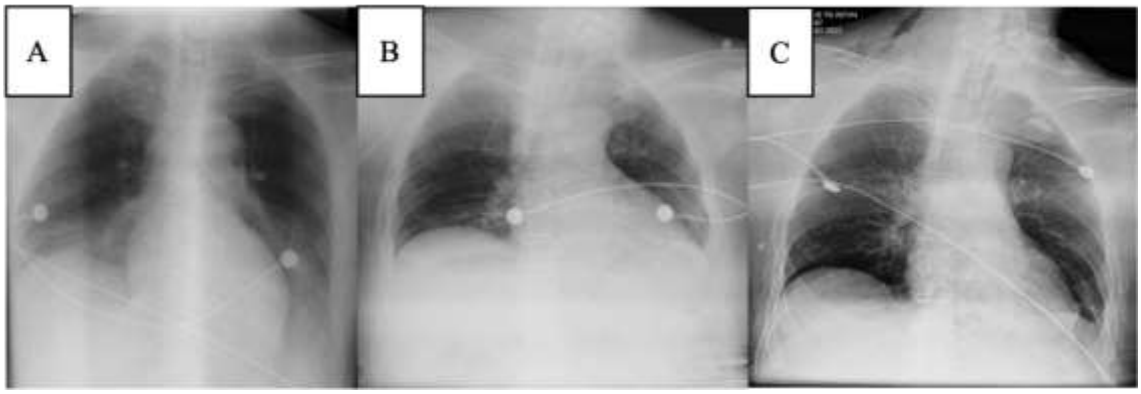

Figure 1. Chest X-ray upon admission showed ground glass opacities in the lower lobes of both lungs, typical of COVID-19 pneumonia (A). Chest X-ray post PDT on the 5th day (B). Chest X-ray on Spontaneous Breathing Trials (SBT) on day 14 of hospitalization showed no progressive infiltrate (C). (source: author's documentation)

DISCUSSION

Acute respiratory distress syndrome (ARDS) was first introduced in 1969 and re-defined as Berlin's definition in 2012 as acute respiratory failure in terms of acute onset, hypoxia, diffuse infiltrates on chest X-ray, and absence of cardiac failure, or pulmonary edema due to cardiac origin. ARDS is defined as a PaO2/FIO2 ratio of 100, 200, or 300 mmHg in severity, moderate, and mild respectively depending on oxygenation failure.[7]

There is still a lack of understanding of the pathogenesis of ARDS. Uncontrolled inflammatory reactions that affect lung parenchyma and many different types of immune cells are widely believed to be involved in the development of ARDS. The resulting injury leads to the breakdown of lung barrier function and the accumulation of protein-rich edema fluid in the interstitium and alveoli, ultimately leading to lung failure.[8]

In contrast, the pathogen responsible for COVID-19 is well-defined, namely SARS-CoV-2, which is a beta-coronavirus that can directly cause lower respiratory infection and induce an inflammatory response by attacking immune cells in the lungs. As the lungs have abundant blood vessels, SARS-CoV-2 infection can directly cause extensive damage to pulmonary vascular endothelium. This process, in addition to contributing to the severity of the disease, is likely to result in barrier damage, reduced diffusion function, and activation of coagulation.[8] These intravascular architectural modifications lead to longer MV and an increase in mortality.[9]

The majority of patients admitted to ICU will ultimately need some form of ventilator assistance and invasive MV. Patients undergoing invasive MV have significantly longer MV and ICU stays than those with ARDS of other causes, whereas mortality in those patients varies considerably in different reports. The management of COVID-19 patients with ARDS is challenging. It has been shown that MV relies mainly on strategies that have been proven protective for the lung concerning avoiding the development of ventilator-induced lung injury (VILI). The reported high respiratory compliance may be linked to the timing of the initiation of MV in some patients. In particular, the intubation times vary significantly according to institutional criteria as well as available resources for COVID-19 patients. As a result, patients who have been intubated prematurely in the early stages of COVID-19 disease may have a higher respiratory system compliance than patients who have delayed or delayed the start of MV.[10]

Tracheostomy is a major procedure in ICU. The tracheostomy is performed in about 24% of patients who have been admitted to ICU. Indications for tracheostomy in ICU include 1) patients requiring prolonged ventilator support, 2) patients who are unable to wean from mechanical ventilation, 3) patients with upper airway obstruction, and 4) patients with a secure airway. Tracheostomy ensures a secure airway, facilitates tracheal/bronchial hygiene, expedites weaning from MV, and reduces trauma to the larynx caused by ETT insertion.[5,6,11] The lack of pharyngeal and laryngeal stimuli due to ETT, as well as the reduction in tracheal stimulus, was one other clinical benefit that we highlighted on PDT compared with ETT. This allows a gradual reduction in vagal stimuli caused by suctioning ETT that can provoke seizure an also the continuously infused sedative agent and the dosages of the inotropic agent used to counteract arterial hypotension. Additionally, all relevant parameters for improving lung performance and achieving an earlier recovery in COVID-19 patients have shown statistically significant improvement in ventilation support according to PAO2/FIO2 ratio, FiO2, PEEP.[1]

The fact that the studies did not show any harm, and some even suggested better patient comfort and reduced need for sedatives might be one reason to consider early tracheostomy.[1,3,4,6,12] The PDT procedure is safe for both healthcare professionals and COVID-19 patients. Early PDT procedures had a beneficial impact on COVID-19 ICU patients in terms of ICU length of stay and time on MV. PDT should be preferred over the surgical technique in intensive care patients because it is the quicker procedure. This recommendation has a high level of evidence (GRADE 1+/strong agreement). [1,10,13]

Based on the explanation above, an important question arises, "When is the best time to perform PDT?". However, the optimal timing of the procedure has not been determined. Data on “early” vs “late” tracheostomy regarding outcomes such as mortality and length of ICU and hospital stay are conflicting, and no consensus has yet been reached. As the clinical trajectory of COVID-19 was unclear at the onset of the pandemic, the timing of tracheostomy was even more ambiguous.[10,13]

CONCLUSION

This case report demonstrates the successful utilization of early PDT in a critically ill patient with COVID-19 ARDS. In a timely manner, it is safe for both patients and healthcare professionals, optimized airway management, increased ventilatory support, expedited weaning from MV, and better nursing have been introduced in PDT. However, there is still no fixed recommendation to determine whether early PDT will improve outcomes and the appropriate timing for its implementation. Further research is still needed to establish guidelines.

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