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Perioperative Anaesthesia Management Strategy for Multiple Major Surgeries : Case Report

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Abstract

Background: Major surgery lacks a universally clear definition. The European Surgical Association (ESA) defines it based on factors like patient comorbidities, procedure complexity, and clinical outcomes. Globally, surgery-related one-year mortality is about 5–6%, rising to 14% in frail patients. Laminectomy, laparotomy, and myomectomy is classified as major surgeries, each with significant risks such as bleeding, infection, and readmission. When combined, these surgeries require thorough anaesthesia management to ensure patient safety and surgical success. **Objective:** The purpose of this study was to give a deep understanding of the case, identify key issues and solutions, and present insight for future action. **Methods:** Data were collected through direct observation and patient medical records, covering the period from before surgery to three days post-operation. This included medical history, test results, and detailed treatment records. **Results:** Haemodynamic stability and intraoperative bleeding were well managed and anticipated. Careful repositioning was carried out, partly to maintain airway patency. The patient reported mild postoperative pain and was able to start sitting and walking exercises three days after the surgery. **Conclusion:** Patients undergoing multiple surgeries require careful monitoring and personalised anaesthetic management. Maintaining physiological stability, proper positioning, and effective fluid and pain control are key to preventing complications.

Keywords: Multiple Surgerie; Anaesthetic Management; Haemodynamics; Position Change.

Introduction

Major surgery is a frequently used term, but its definition is unclear. The European Surgical Association (ESA) experts define major surgery based on the patient's pre-existing comorbidities, the extent and complexity of the procedure, its pathophysiological effects, and the clinical results that follow. In this study, the preoperative factors retained to define major surgery were preexisting significant comorbidities in patients, defined as a Charlson score >3 or ASA class >2. Comorbidities are associated with worse health outcomes, more complex clinical management, and increased healthcare costs. The expert panel identify intraoperative blood loss >1000 mL, haemodynamic instability, duration of surgery, organ ischaemia, post-operative metabolic stress response, 30-day morbidity >30%, mortality >2%, and the need for intensive care or intermediate care as criteria for defining major surgery[1].

Globally, the one-year mortality rate following surgery is around 5–6%. Postoperative deaths represent the third most common cause of mortality worldwide. Among patients with frailty undergoing major surgical procedures, the one-year mortality rate is approximately 14% nearly three times higher than that of non-frail patients[2]. A study in Asia by Lydia Q. Liew and colleagues showed that the one-year mortality in the surgical population was 5.9% in adults, with the highest rate observed among Indian ethnicity at 10.1%, while Malay ethnicity reached 7.5%[3]. The mortality rate in various hospitals in Southeast Asia ranges from 7–46% associated with surgical site infections (SSI). Surgical site infections (SSI) are not only associated with significantly elevated morbidity but also mortality[4].

According to ESA criteria, laminectomy, laparotomy, and myomectomy are classified as major surgeries. Laminectomy is a common procedure to relieve spinal canal compression caused by conditions such as degenerative stenosis, fractures, tumours, abscesses, or deformities, while also reducing morbidity associated with low back pain. Postoperative complications like haematoma, infection, and wound dehiscence are leading causes of readmission, often requiring further intervention and increasing morbidity, costs, and mortality[5–7]. Laparotomy for tumour excision is used in managing presacral tumours, which are rare estimated at 1 in 40,000 hospital admissions (0.014%). In cases of presacral tumors, the anesthesiology team must prepare blood for the possibility of intraoperative blood transfusion due to the high risk of bleeding[8,9]. Myomectomy involves removing uterine fibroids and repairing the uterine and abdominal walls. Though often successful, Intraoperative and postoperative bleeding is one of the major complications of myomectomy. Bleeding related to myomectomy can significantly complicate the surgery, with around 20% of women requiring blood transfusions and a progressive increase in the risk of conversion to hysterectomy and uterine rupture[10,11].

Each of the three procedures mentioned above carries its own risks as major surgery. When all three operations are performed simultaneously, the risks and surgical burden shouldered by the patient increase. To ensure the success of the surgery, as well as the comfort and safety of the patient, comprehensive perioperative anaesthesia management is required. Anaesthesia management includes assessing the patient's condition and comorbidities before surgery, selecting the appropriate anaesthesia technique, managing post-operative pain, and monitoring for both symptomatic and asymptomatic complications. This study seeks to illustrate perioperative anaesthesia management strategies for patients undergoing laminectomy, laparotomy, and myomectomy simultaneously. Its primary objective is to evaluate how this approach can help minimize intraoperative and postoperative complications. The findings are expected to provide a useful reference for healthcare professionals in formulating safe and effective anaesthetic plans for highly complex surgical cases, while also contributing to the advancement of knowledge in multidisciplinary perioperative care.

Materials and Methods

Study Design

This study was designed as a case study with a descriptive approach, discussing one patient case. The objective of this case report is to present a detailed description of a unique approach to anaesthesia management, with an emphasis on the challenges and specific considerations that may provide insights for

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future clinical practice and contribute to the broader anaesthesia literature. Furthermore, this report aims to highlight practical strategies that can guide anaesthesiologists in managing similar complex cases.

Sample

The sample in this study is one patient admitted to Dr. Soebandi Hospital with a primary diagnosis of Presacral Tumor + HNP + Leiomyoma with physical status ASA 2 with stage I hypertension. This sample was chosen to analyze the therapeutic approach and its clinical outcomes.

Data Collection Technique

Data was obtained through direct observation and medical records of patients. The data collection process included monitoring the patient's condition from before surgery to three days after surgery. The information obtained included medical history, test results, and detailed records of treatment during the care period.

Data Analysis Techniques

Descriptive analysis was performed to evaluate the appropriateness of the treatment received by patients. This evaluation included an analysis of the effectiveness of treatment, the improvement of patients' clinical conditions, and the presence or absence of side effects during the medication period.

Ethical Consideration

In this case report, informed consent was obtained from the patient and family. This informed consent states the patient's willingness and agreement to have their data collected and published for research purposes. The informed consent also explains the mechanisms for maintaining the confidentiality and privacy of patient data and a statement about the participant's right to refuse or withdraw without consequence.

Results

A 25-year-old woman (82 kg, 162 cm) complained of lower back pain since falling off a motorcycle 1 year ago. The pain is felt while sitting and lying down. The patient sought treatment at a private hospital, and an L5-S1 disc herniation with left paracentral protrusion was found, causing moderate canal narrowing. Incidentally, a presacral mass measuring 7.4 x 5.3 x 4.5 cm was discovered during an MRI of the lumbar spine (03/23/24) (Figure 1). Subsequently, on May 15, 2024, the patient underwent a contrast-enhanced abdominal CT scan, revealing a heterogeneous mass in the right pelvic cavity attached to the pelvic brim, measuring 7.9 x 5.8 x 5.6 cm, along with a leiomyoma in the anterior uterine corpus measuring 4.1 x 5.0 x 3.2 cm. The patient reported having received treatment for the HNP and felt that the pain had subsided. She is scheduled for laparotomy tumor excision and histopathological confirmation. On physical examination, the patient's general condition is good, consciousness is compos mentis, elevated BP 131/85 mmHg, RR 20x/minute, HR 90x/minute, SpO2 99%, with VAS 3. Preoperative laboratory evaluation showed Hb 14.2 g/dL, WBC 10.9 × 10^3/µL, HCT 44.5%, platelets 337 × 10^3/µL, Na 137.9 mmol/L, K 4.03 mmol/L, and Cl 108.2 mmol/L. Chest X-ray was within normal limits.

Figure 1. Lumbar Sagittal MRI

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The working diagnosis of the patient is Presacral Tumor + HNP + Leiomyoma with physical status ASA 2 with stage I hypertension. The patient is planned to undergo tumor excision laparotomy, laminectomy, and myomectomy. Before the surgery, the patient is given informed consent regarding the patient's condition and is fasted for 6 hours prior to the operation. The patient is positioned in supine and given preoxygenation for 5 minutes with 100% O2.

Figure 2. Non-Contrast Abdominal CT Scan

Induction of anesthesia for the patient was performed with a combination of midazolam 5 mg, propofol 150 mg IV, fentanyl 150 mcg IV, and rocuronium 50 mg IV. Anesthesia maintenance was done with sevoflurane (1 MAC = 2%). Monitoring during the surgery involved evaluating blood pressure (systolic/diastolic), pulse, respiratory rate, and oxygen saturation. The patient's blood pressure dropped immediately after anesthesia induction. First, the patient underwent laminectomy for 1.5 hours in the prone position, followed by laparotomy tumor excision for 1.5 hours in the supine position. Some tissue was taken for cryostat section and confirmed as benign. Then, myomectomy was performed for 1 hour. The total duration of the surgery was 6.5 hours. Intraoperatively, the patient received 4 mg IV ephedrine for blood pressure drop, crystalloids Ringer's lactate intake of 3500 mL, NaCl 0.9% 500 mL, colloid gelafusal 500 mL, and PRC 2 units. Fluid output during the surgery was 1700 mL of urine and a total of 1100 mL of bleeding. As a reversal of the muscle relaxant, the patient was injected with 2 mg IV neostigmine and 0.75 mg atropine sulfate.

After surgery, the patient is transferred to the post-anesthesia care unit for further monitoring and receives ICU backup. Postoperative monitoring is conducted by reassessing the patient's clinical symptoms and vital signs. The patient did not experience any side effects from perioperative and intraoperative therapy, including nausea, vomiting, pruritus, hypotension, or headache during the postoperative period. The patient received 1 unit of PRC transfusion in the post-anesthesia care unit. During ICU care, the patient was administered infusion fluids: Clinimix 1000 cc/24 hours, D5 6x50 via tube, B-Fluid 1000 cc/24 hours, fentanyl 20 mcg/hour, dexketoprofen 3x90 mg, and paracetamol 3x500 mg as analgesics, ceftriaxone 2x1 g as antibiotics, ranitidine 2x50 mg as a gastroprotector, tranexamic acid 3x500 mg as an antifibrinolytic, methylergometrine 3x1 within 24 hours as a uterotonic, and metoclopramide 3x10 mg as an antiemetic. Postoperative laboratory evaluation showed Hb 15.9 g/dL, WBC 21.0 × 10^3/µL, HCT 47.8%, platelets 307 × 10^3/µL, Na 137.3 mmol/L, K 4.45 mmol/L, and Cl 107.6 mmol/L. The patient was in the ICU for two days. The patient experienced one episode of yellowish vomiting. During the first 6 hours post-surgery, the patient's condition was stable. The patient reported moderate pain with an NRS score of 4 at the surgical site. Blood pressure was 139/78 mmHg, pulse 93 bpm, RR 14 bpm, temperature 36.5°C, and oxygen saturation 100% NRBM. At 12 hours post-surgery, the patient complained of moderate pain at the surgical site in the lower back with an NRS score of 4, and relatively less pain in the abdomen with an NRS score of 2. Blood pressure was 125/74 mmHg, pulse 90 bpm, RR 28 bpm, temperature 36.5°C,

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and oxygen saturation 100% NRBM. At 24 hours post-surgery, the patient reported reduced pain with an NRS score of 3 in the lower back and 2 in the abdomen, with the drain containing approximately 190 cc of blood. At 36 hours post-surgery, pain in the lower back and abdomen had completely reduced with an NRS score of 2. Blood pressure was 123/72 mmHg, pulse 77 bpm, RR 20 bpm, temperature 36.5°C, and oxygen saturation 100% NRBM. At 72 hours post-surgery, the patient was transferred to a regular ward. The patient reported reduced pain at the surgical site in the lower back and abdomen. Blood pressure was 120/78 mmHg, pulse 78 bpm, RR 20 bpm, temperature 36.5°C, and oxygen saturation 99% room air. During the stay in the regular ward, the patient had learned to sit and walk.

Figure 5. Pre-sacral tumour (a) and myoma (b) after excision

Discussion

The patient underwent three different surgical procedures (laminectomy, laparotomy for tumor excision, and myomectomy) in a single operative session. Each of these procedures carries its own risks. Performing all three surgeries in one session increases the complexity and overall risk of the operation, both intraoperatively and postoperatively. Key concerns in the anesthetic management of this patient include position changes, operative duration, risk of complications, bleeding, and postoperative pain management.

General anesthesia was administered using fentanyl, midazolam, propofol, and rocuronium for induction. The patient first underwent a laminectomy in the prone position, which required repositioning the patient from supine to prone after anesthesia induction and endotracheal intubation. In anesthetized patients, the prone position can benefit respiratory function as long as abdominal movement is not impeded. This position may increase functional residual capacity and partial oxygen pressure without changing the compliance of the chest wall and lungs. However, the prone position may reduce cardiac output due to a decreased stroke volume[12]. Cardiac index may decrease by up to 24% in the prone position. This reduction is associated with decreased venous return, reduced arterial filling, and lower left ventricular compliance caused by increased intrathoracic pressure[13]. A drop in blood pressure significantly below baseline can reduce cerebral perfusion, potentially causing fatal outcomes. It has also been postulated that head rotation may reduce cerebral blood flow (CBF) and increase intracranial pressure due to partial occlusion of the internal carotid and vertebral arteries, spinal vessels, or venous drainage compression. Vascular distortion may occur from external pressure during positioning (e.g., from pillows) or from neck flexion or extension. Management of hypotension in this patient can be achieved through adequate fluid administration and the use of norepinephrine to increase total peripheral vascular resistance. Besides cardiovascular issues, patients in the prone position are also at risk for complications such as pressure injuries, corneal abrasions, and even vision loss. Therefore, appropriate padding especially for the eyes is crucial. During repositioning from supine to prone, it is essential to ensure airway safety and patency to prevent accidental extubation[12–15]. Case reports have documented the use of supraglottic

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devices in airway rescue. In most instances, insertion of the LMA secured a patent airway on the first attempt (87.5%), rising to 100% on the second attempt[16].

In addition to the position change, the fact that three surgeries were performed in one session extended the overall duration of the procedure. The total surgery time was approximately 6.5 hours. Prolonged surgical duration increases the risk of complications. The underlying mechanisms behind this association are not fully understood and may vary depending on the type of complication. For example, the correlation between surgical site infections (SSIs) and longer operative times could be due to prolonged microbial exposure, reduced efficacy of prophylactic antibiotics over time, increased tissue handling leading to ischemia, necrosis, and desiccation, and a higher likelihood of breaches in sterile technique. The risk of SSIs increases linearly with operative time across surgical specialties with estimated increases of 13%, 17%, and 37% in SSI risk for each additional 15, 30, and 60 minutes, respectively[17]. Intravenous ceftriaxone can be administered for the treatment of infections ranging from mild to severe and may also be used as a postoperative prophylactic antibiotic[18,19]. The risk of venous thromboembolism (VTE) is also elevated with prolonged surgery due to enhanced coagulation, blood stasis, and endothelial injury. Longer procedures may also lead to surgical team fatigue and extended anesthesia exposure factors that heighten the risk of multiple complications. Conversely, intraoperative complications such as bleeding may also prolong surgery and thus contribute to the observed association between duration and complication rates. This concept is particularly applicable to intraoperative complications, such as surgical bleeding, rather than postoperative complications like infections, VTE, and pneumonia[20–24]. Therefore, close monitoring is crucial for early detection and management of both symptomatic and asymptomatic complications, including preparation of an intensive care unit backup if needed.

One of the most important yet challenging tasks in anesthesia is estimating blood loss to guide fluid therapy and transfusions. Hidden bleeding into the surgical field, internal cavities, or under drapes can make this estimation difficult. In addition to blood loss, fluid loss due to evaporation and internal redistribution must be considered during intraoperative fluid management. Evaporative loss is most significant in large wounds, especially burns, and correlates with surface area exposure and procedure duration. Intraoperative fluid therapy must meet basic fluid needs and compensate for preoperative deficits and intraoperative losses (blood loss, redistribution, evaporation). The type of IV fluid should be selected based on the surgical procedure and estimated blood loss. Patients with normal hematocrit levels generally require transfusion only after losing more than 10–20% of blood volume. The decision to initiate transfusion depends on the type of procedure, comorbidities, and the degree of blood loss[25]. In this case, a female patient weighing approximately 80 kg experienced a blood loss of 1100 mL (>20% of her estimated blood volume) during the second procedure (tumor excision) and was scheduled for another surgery (myomectomy). Given the extent of blood loss and the risk of further hemorrhage, red blood cell transfusion was administered.

In the postoperative period, pain is among the most frequently reported patient complaints. Not only is pain distressing, but poorly controlled pain can increase the risk of complications, leading to prolonged hospital stays or even reoperations[26]. According to a previous report by the U.S. Institute of Medicine, approximately 80% of patients

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report some form of postoperative pain, especially those undergoing soft or hard tissue surgery. Poorly managed postoperative pain is associated with several adverse effects, including delirium, delayed recovery, increased morbidity, and chronic pain syndrome development[27,28]. Persistent postoperative pain, which arises from inadequately treated acute pain, has serious long-term implications for patients[29].

After the initial rise in opioid use as a "miracle drug" for pain control, it became evident that widespread use could be more harmful, particularly due to risks of dependence and misuse. Therefore, modern anesthetic practice has shifted toward opioid-sparing strategies through a multimodal approach. Perioperative pain management should incorporate paracetamol and NSAIDs or COX-2 selective inhibitors, which should be continued into the postoperative period. Opioids should be reserved as rescue medication for breakthrough postoperative pain[26,30]. In this case, the patient reported a pain score of NRS 4 between 6 and 12 hours after surgery, which decreased to NRS 2–3 at 24 hours postoperatively. An NRS score of 4 indicates moderate pain, while a score of 2–3 reflects mild pain[31]. These findings demonstrate the effectiveness of multimodal anaesthesia in alleviating postoperative pain.

Conclusion

In conclusion, patients undergoing more than one surgical procedure require extremely close monitoring and management before, during, and after the operation. Anaesthetic management must always be tailored to the patient's condition and any comorbidities. The patient must be maintained in as physiological state as possible. Technical aspects, such as repositioning the patient, must also be carefully managed to avoid intraoperative issues or accidents. Fluid and pain management are crucial in preventing complications. Therefore, a multidisciplinary approach involving surgeons, anesthesiologists, and nursing staff is essential to ensure patient safety and optimal surgical outcomes.

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Conflict of Interest Statement

The author(s) declare no commercial, financial, or personal conflicts of interest related to this research. All authors approved the final manuscript and consented to its publication in *Healthy Tadulako Journal*.

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