

Perianesthesia management in laparotomy for patients with ileus obstruction leukocytosis using general anesthesia: a case report

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Abstract. Obstructive ileus is a serious condition that requires immediate and appropriate management to prevent dangerous complications. This case study examines the management of perianesthesia in a patient with obstructive ileus and leukocytosis using general anesthesia. This research method used a descriptive observational design with a case study technique in a 22-year-old female patient who underwent laparotomy. Data were collected from the patient's medical record, physical examination, laboratory results, and intensive monitoring of vital signs during the preoperative, intraoperative, and postoperative phases. Results showed that a comprehensive approach, which included fluid therapy, antibiotic selection, appropriate anesthesia induction, and careful postoperative monitoring, successfully stabilized the patient's hemodynamics and decreased the risk of perioperative complications. Postoperative monitoring in the intensive care unit supports a better recovery process with maintained hemodynamic stability and vital signs. In conclusion, comprehensive perianesthesia management in this case provided a positive recovery prognosis. This study emphasizes the importance of collaboration between the surgical team and anesthesia team in managing obstructive ileus cases with leukocytosis and demonstrates the benefits of similar protocols for high-risk patients. In addition, further research is needed to develop more advanced anesthetic techniques in gastrointestinal conditions.

1 Introduction

One of emergencies in the field of digestive surgery is obstructive ileus. Research conducted in Ethiopia showed that from 1,200 patients treated with diagnoses related to stomach conditions, 242 were diagnosed with obstructive ileus [1]. Ileus obstruction constitutes one of the prevalent intra-abdominal complications encountered by general surgeons within their clinical practice [2].

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The condition of obstructive ileus can be life-threatening and requires immediate treatment, even surgery. One of common complications of obstructive ileus is leukocytosis, which indicates the presence of an inflammatory or infectious process [3]. Anesthesia management of patients with obstructive ileus and leukocytosis poses a challenge to the medical team as it is associated with higher risks and potentially significant complications [4].

The anesthesiologist is responsible for managing perioperative factors such as vital signs, hydration, and medication administration to reduce stress and keep the patient's hemodynamics stable throughout the procedure. The anesthesiologist's authority in managing the patient's response to anesthesia is crucial to reduce complications in patients with comorbidities such as leukocytosis and the risk of infection from obstructive ileus [5].

Typical signs of obstructive ileus include abdominal pain, nausea, vomiting, distension, constipation, and inability to pass gas or stool [2]. Intermittent abdominal pain, initially colic-like, may persist and become more severe as the obstruction progresses [6].

Obstructive ileus can cause serious and life-threatening complications if not treated properly. The main risk that can occur is intestinal perforation, which can cause intestinal contents to leak into the peritoneal cavity, causing peritonitis and sepsis [7]. In addition, prolonged obstruction can inhibit intestinal blood flow, causing intestinal ischemia and tissue necrosis. This condition requires immediate surgical intervention to prevent death. Persistent vomiting can also cause dehydration and severe electrolyte imbalance, which can worsen the patient's clinical condition [8].

Obstructive ileus that cannot be treated with conservative treatment requires extensive surgery to treat the cause of the obstruction and restore gastrointestinal continuity. The common surgical procedure performed is exploratory laparotomy, with the possibility of further procedures such as adhesiolysis (removal of adhesions), bowel resection, or stoma formation depending on intraoperative findings [9].

According to recent research findings, the management of obstructive ileus continues to evolve with new technologies. With the application of minimally invasive technologies such as laparoscopy and colorectal stents have been developed to reduce postoperative morbidity and mortality. These advances have the potential to improve patient recovery and reduce hospitalization time, but their application should be tailored to each patient's clinical situation [10] [11].

In obstructive ileus with leukocytosis, infection control is one focus of perioperative treatment. Appropriate administration of antibiotics and control of the source of infection through surgical intervention are essential to prevent further complications [12].

Careful anesthetic consideration is required in laparotomy cases of obstructive ileus. Preoperative assessment, optimization of the patient's health status, and selection of the appropriate anesthesia method are very important to minimize the risk of complications and ensure patient safety and comfort during the procedure [13] [14].

This study aims to report the use of general anesthesia for comprehensive perianesthesia care in a case of obstructive ileus with leukocytosis. This study intends to improve the medical literature on the best course of action in the care of comparable patients and assess how well the anesthetic method used prevents perioperative problems.

2 Method

This study used a descriptive observational design using case study technique in a 22-year-old female patient diagnosed with obstructive ileus with leukocytosis and underwent laparotomy under general anesthesia. The sample was carefully selected based on specific parameters related to the study objectives. The instruments used in this study were patient assessment with data collected from the patient's medical records, B6 (Breathing, blood,

brain, bladder, bowel, and bone) physical examination, perioperative notes, laboratory results, and radiology imaging, as well as intensive monitoring of vital signs (heart rate, blood pressure, respiratory rate, oxygen saturation, and body temperature) during the preoperative, intraoperative, and postoperative phases. To strengthen the methodology, this case report has been declared to meet the ethical clearance criteria at the ethics committee of Harapan Bangsa University with No.B.LPPM-UHB-230/02/2024. Data analysis was performed descriptively, which involved observation and interpretation of clinical data to understand the patient's physiological response to perianesthetic interventions, evaluate the effectiveness of anesthetic and surgical strategies in managing obstructive ileus with leukocytosis, and compare the results with relevant literature.

3 Result and Discussion

3.1 Results

3.1.1 Case Report

A 22-year-old woman came with severe abdominal pain rated at 7 on the Numerical Rating Scale. She described the pain as stabbing and had been experiencing it for a week along with nausea and brownish-green vomiting. In addition to the pain, she complained of abdominal distension causing shortness of breath.

The physical examination revealed dominant pain symptoms in the right lower abdomen, with intestinal peristalsis at 10x/minute and normal tone. The patient's general condition was assessed by a GCS score of 15 (V5M6E4), with vital signs within the normal range. Laboratory tests indicated leukocytosis, thrombocytosis, neutrophilia, lymphocytopenia, and elevated liver enzymes (refer to Table 1). Radiological findings displayed an obstructive ileus with significant gas accumulation throughout the colon (see Figure 1).

Based on the history, clinical examination, laboratory examination and radiological findings, the patient was diagnosed with obstructive ileus, classified as American Society of Anesthesiologist (ASA) II status. Therefore, an open laparotomy was performed.

In the preoperative room, 500 ml of Ringer's lactate (RL) fluid therapy was administered (Tutosol 500 ml at 20 drops per minute). Premedication included IV injection Ondansetron (8 mg/4 ml) and dexamethasone (5 mg/ml), along with IV administration of Meropenem antibiotic (1 g/10 ml).

Intraoperative anesthesia was considered using general anesthesia with ETT. Induction was carried out with analgesics IV Fentanyl (100 mcg/2 ml), IV Propofol sedation (200 mg/20 ml) and IV Rocuronium muscle relaxant (50 mg/5 ml). Intubation was carried out 3 minutes after administering IV Rocuronium, using ET No. 7.0 mm, kinking + cuff type, using a 5-cc stylet and fixation, installing OPA no. 11. After induction, Sulfas Atropine IV was injected (0.5 mg/2 ml). During intra-anesthesia, colloid fluid therapy was given; Terastarch 500 ml (20 drops per minute). Then, the patient was given maintenance therapy of sevoflurane 2% anesthesia and N₂O (2L/m): O₂ (2L/m)

At the end of the operation, the patient was given the antidote anesthetic agent Neostigmin IV injection (1mg/2 ml) and Naloxone IV (0.8 mg/ 2 ml). The patient was given post-operative analgesics with IV Ketorolac injection (60 mg/6 ml), IV Dexketoprofen (50 mg/ 2 ml) and IV Paracetamol Infusion (1 gr/ 100 ml). Antibiotics were also given post-operatively using Ceftriaxone IV (1g/ 5 ml). In the recovery room, the Aldrete Score was evaluated periodically for 60 minutes postoperatively, which showed a score of 7, indicating that the patient had not met the recovery criteria to be transferred from the recovery room. Therefore, the patient was transferred to the ICU for further monitoring.

Despite early surgical recovery problems, the patient's prognosis was deemed favorable based on the comprehensive treatment. The patient's health improved and the danger of more complications was decreased because to the combination of proper hydration management, the choice of antibiotics and anesthetics, and careful postoperative monitoring in the intensive care unit. Following a period of close observation, the patient's recovery demonstrated better hemodynamic stability and stable vital signs, suggesting a favorable prognosis.

Table 1. Laboratory examination results

Test	Results
Leukocytes	11.88 $10^3/uL$
Hematocrit	7.52 million/mm ³
Platelets	44210 ³ uL
RDW	20.1%
MVC	75.5 fl
MCH	25.0 p.m
Neutrophils %	74.3%
Lymphocytes %	17.1%
Eusonophiles	0.1%
Neutrophil#	8.8110 ³ Deut
NLR	4.3310 ³ uL
SGOT	122 u/L
SGPT	45 u/L

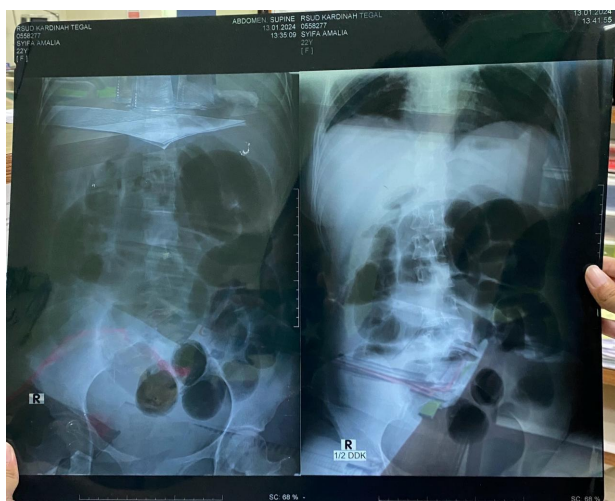


Figure 1. CT Scan of the Abdomen

Leukocytes: White Blood Cells; Hematocrit: Packed Cell Volume/Erythrocyte Volume Fraction; Platelets: Thrombocytes; RDW: Red Cell Distribution Width; MVC: Mean Corpuscular Volume; MCH: Mean Corpuscular Hemoglobin; Neutrophils %: Percentage of

Neutrophils; Lymphocytes %: Percentage of Lymphocytes; Eosinophils: Eosinophils; Neutrophil#: Neutrophil Count; NLR: Neutrophil-to-Lymphocyte Ratio; SGOT: Serum Glutamic Oxaloacetic Transaminase; SGPT: Serum Glutamic Pyruvic Transaminase.

3.2 Discussion

Surgery is recommended for this patient due to the failure of conservative measures to resolve the obstruction within 48 hours, aiming to prevent potential complications [15]. In line with the previous argument, laparotomy surgery is often used to treat obstructive ileus by considering visualization, exploring the abdominal cavity and directly identifying the location and cause of the obstruction and detecting complications that were not detected on diagnostic examination [16].

Apart from surgical techniques, anesthesia techniques also need to be considered. General anesthesia (GA) is the preferred method in cases of obstructive ileus because of its ability to reduce stress, maintain high oxygenation levels, and allow invasive monitoring. This ensures optimal management of the patient during surgery and leads to better results when compared with other techniques [17].

Patients with obstructive ileus tend to experience leukocytosis which is characterized by an inflammatory or infectious process in the body due to obstruction. The obstruction causes a buildup of food, fluid, gas, inhibits the absorption of nutrients and can trigger excessive bacterial growth. Obstructions in the digestive tract can lead to suboptimal blood flow to surrounding tissues, causing ischemia or hypoxia. The release of pro-inflammatory cytokines leads to an increase in leukocytes into the circulation as mediators in the inflammatory response. This can worsen the patient's condition and complicate perioperative therapy. Modern techniques to manage this disease include prophylactic antibiotic use and appropriate fluid resuscitation to address infection, dehydration and electrolyte abnormalities. Antibiotic treatment and vigilant monitoring are essential in patients with leukocytosis to prevent secondary infections and subsequent surgical problems. Leukocytosis in these patients is a focus for establishing treatment methods and influences the selection of more aggressive perioperative medications, especially in terms of infection control and electrolyte stability [18-21].

Before surgery, 500 ml of Tutosol fluid therapy is given to prevent intraoperative complications. Tutosol fluid helps maintain intravascular volume without causing harmful fluid deficiency or excess and can contribute to effective fluid management and better surgical outcomes [22].

Prophylactic antibiotic administration with IV Meropenem (1 g/10 ml) preoperatively and IV Ceftriaxon (1g/5ml) postoperatively aims to reduce the risk of intraanesthesia, postanesthesia and complications. Prophylactic antibiotics help to prevent translocation of bacteria from the intestinal lumen to the bloodstream or peritoneal cavity, reducing the risk of systemic bacterial infection as well as to reduce the risk of these infections, which could potentially worsen the postoperative inflammatory response and increase morbidity [23].

Administration of IV Meropenem antibiotics (1 g/10 ml) and Ceftriaxone IV (1g/ 5 ml) as a prophylactic antibiotic before and after surgery aims to reduce the risk of continued infection after surgery and complications [12].

During induction of general anesthesia (GA), administration of fentanyl, propofol, and rocuronium was used to manage various aspects of patient care. Studies have demonstrated the superiority of fentanyl over ketamine in reducing hemodynamic reactions to laryngoscopy and intubation, thereby ensuring stable hemodynamics during the maintenance phase. Propofol, in combination with fentanyl, facilitates adequate induction of anesthesia while effectively controlling the hemodynamic response [24]. Rocuronium was used in the

procedure to induce relaxation of the abdominal muscles, thereby reducing gas formation within the digestive tract and facilitating the performance of surgical maneuvers [25].

IV neostigmine (1 mg/2ml) was administered in the final period of surgery to reduce the effects of anesthesia induction and also secondary effects that were expected to treat ileus. The mechanism of action involves reducing severe ileus by increasing gastrointestinal motility through acetylcholine stimulation [26].

Apart from Neostigmine, IV naloxone (0.8 mg/2 ml) was administered at the end of the operation. Naloxone, a competitive antagonist targeting opioid receptors, helps counteract opioid overdose effects, potentially mitigating respiratory depression induced by opioid pain management during anesthesia. By reversing this response, individuals can attain adequate respiratory function, reducing the likelihood of postoperative respiratory issues [27].

This study is useful for anesthesiologists as a comprehensive practical guide in managing obstructive ileus cases with leukocytosis, especially to maintain hemodynamic stability and reduce the risk of perioperative complications. Proper selection of induction drugs, fluid therapy, antibiotics, and monitoring techniques can accelerate patient recovery and improve care in the intensive care unit. This study also adds to our understanding of this topic. Moreover, the findings of this study support the standards for anesthetic care in gastrointestinal cases and act as a guide for future research regarding new anesthetic techniques for high-risk situations.

4 Conclusion

The perianesthesia therapy in this case study demonstrated a positive prognosis for the patient's recovery through comprehensive approaches. The use of tailored fluid treatment, strategic antibiotic administration, adequate anesthetic induction, and attentive postoperative monitoring all helped to stabilize the patient's hemodynamics, reduce potential problems, and speed up recovery. Key findings emphasize the significance of collaboration between the surgical and anesthetic teams, particularly in difficult patients such as obstructive ileus with leukocytosis. Broader implications suggest that similar protocols may benefit high-risk patients, while more research is needed to investigate advanced anesthetic techniques and protocols tailored for gastrointestinal conditions, which could reinforce standards and improve patient care outcomes in similar situations.

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