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Anesthesia at Laparotomy Indications for Peritonitis

Ferianto Ferianto[1*], Matdhika Sakti[2], Nur Ammy Tamara Putri[3]
[1,2]Department of Anesthesia, Regional General Hospital Dr. Suhatman MARS, Dumai, Indonesia,
[3]Medical Professional Study Program, Faculty of Medicine, Abdurrab University, Pekanbaru Indonesia
*Author correspondence: ferianto@univrab.ac.id**

Abstract. *Peritonitis is an inflammation of the peritonium which consists of a serous membrane that lines the abdominal cavity and visceral organs in it and is an emergency that can be accompanied by sepsis. Inflammation in peritonitis can be localized or generalized in the peritoneum cavity which is generally caused by bacteria or fungi, but can also be caused by non-infectious substances such as the contents of the stomach or bile contents. Peritonitis due to infection is classified as primary, secondary, or tertiary. This is rare, but it generally appears in teenage women. 90% of SBP cases occur due to monomicrobial infections. Streptococcus pneumoniae is usually the causative organism. It has been reported that a 15-year-old woman was brought to the emergency room complaining of severe abdominal pain. The pain is felt continuously as if it were pricked. Previously, the patient had taken Chinese medicine given by the patient's mother but it did not decrease. On physical examination, signs of peritonitis were obtained and a laparotomy was planned. The patient is categorized as an ASA II patient, due to the absence of a history of systemic disease.*

Keywords: *peritonitis, ASA, infection*

1. INTRODUCTION

Peritonitis is inflammation of the peritoneum which consists of the serous membrane that lines the abdominal cavity and the visceral organs within it and is an emergency that can be accompanied by sepsis (Pramana Okaniawan and Setyawati Sri Krisna Dewi, 2022). Peritonitis is localized or generalized inflammation in the peritoneal cavity which is generally caused by bacteria or fungi, but can also be caused by non-infectious substances such as gastric contents or bile contents. Peritonitis due to infection is classified as primary, secondary, or tertiary. Peritonitis is classified based on the anatomical integrity of the abdominal cavity (Najamuddin, Nurdin and Muchtar, 2020) .

Based on WHO data, the mortality rate for peritonitis reaches 5.9 million per year with a death rate of 9,661 people, where the highest country suffering from peritonitis is the United States. In Indonesia, the number of peritonitis sufferers is around 9% of the population or around 179,000 sufferers. Appendicitis is a common cause of peritonitis with an estimated prevalence of approximately 43.1%. (Ganesha Medicina Journal, 2022).

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2. LITERATURE REVIEW

Peritonitis is generally caused by bacteria, but can also be caused by chemicals (aseptic), bile, tuberculosis, chlamydia, drug-induced or other rare causes. Bacterial peritonitis can be classified as primary or secondary, depending on whether the integrity of the gastrointestinal tract has been compromised or not. (Schwartz, 2015) Primary bacterial peritonitis (Spontaneous Bacterial Peritonitis/SBP) is a widespread bacterial infection of the peritoneum without loss of integrity of the gastrointestinal tract. This is rare, but generally occurs in teenage women. 90% of SBP cases occur due to monomicrobial infections. Streptococcus pneumoniae is usually the causative organism. Risk factors that play a role in peritonitis are malnutrition, intra-abdominal malignancy, immunosuppression, and splenectomy. High risk groups are patients with nephrotic syndrome, chronic renal failure, systemic lupus erythematosus, and liver cirrhosis with ascites. Secondary bacterial peritonitis is an acute peritoneal infection that occurs due to loss of integrity of the gastrointestinal tract. Aerobic and anaerobic germs are often involved, and the most common germs are Escherichia coli and Bacteroides fragilis. Bacteria can invade the peritoneal cavity in four ways: (1) direct invasion from the external environment (eg in abdominal stab wounds, infection during laparotomy); (2) translocation of damaged intra-abdominal internal organs (for example in duodenal ulcer perforation, intestinal gangrene i.e. in appendicitis, trauma, or iatrogenic leaking of the anastomosis); (3) via the bloodstream and/or intestinal translocation, for example in primary peritonitis which occurs without a clear source of infection (for example primary Streptococcus β-hemolyticus peritonitis and post-splenectomy patients, SBP in patients with liver failure and ascites); and (4) through the female reproductive tract (e.g. direct spread from the external environment, primary pneumococcal peritonitis, acute salpingitis, uterine perforation due to intrauterine devices). (Schwartz, 2015) Peritonitis due to chemical (aseptic) substances occurs in approximately 20% of all cases of peritonitis, and is usually secondary to perforation of duodenal or gastric ulcers. Sterile peritonitis will progress to bacterial peritonitis within a few hours due to transmigration of microorganisms (for example from the intestine). Biliary peritonitis is a rare form of sterile peritonitis and can have various causes: iatrogenic (eg slippage during fusion of the cystic duct during cholecystectomy), acute cholecystitis, trauma, and idiopathic. Other forms of peritonitis that can occur are tuberculous peritonitis, chlamydial peritonitis, and peritonitis due to drugs and foreign bodies. (Schwartz, 2015)

Pathophysiology

Gram-negative and/or anaerobic organisms are usually the cause of infection if the inoculation mechanism is perforation. The intestinal flora (E. coli, K. pneumoniae, etc.) releases endotoxins that are responsible for the overreactive inflammatory cascade that causes sepsis. Inflammation of the abdominal cavity in the absence of an infectious pathogen (aseptic peritonitis) most often occurs in response to exposure of the peritoneum to sterile fluids (i.e., stomach, bile, or urine), pancreatic enzymes, or foreign bodies. (Ganesha Medicina Journal, 2022) Aseptic bile and urine cause minimal peritoneal inflammation, while leakage of gastric fluid and pancreatic enzymes causes a more intense peritoneal reaction. Secondary peritonitis is identified as a septic process resulting from contamination from the gastrointestinal (GI) tract. GI leaks can occur through the walls of the stomach and intestines due to ulceration, foreign body obstruction, neoplasia, trauma, ischemic damage, or dehiscence from a previous surgical incision. Spontaneous gastroduodenal perforation may be associated with nonsteroidal anti-inflammatory drugs or corticosteroid administration, neoplastic and nonneoplastic GI infiltrative diseases, gastrinomas, and liver disease. The initial reaction of the peritoneum to invasion by bacteria is the release of fibrinous exudate, pockets of pus (abscesses) form between the fibrinous adhesions that limit the infection. The adhesions usually disappear, but if they do, the infection persists, causing intestinal obstruction. Can occur locally, diffusely, or generalized. Local peritonitis can occur due to the body's strong immune system and the body's defense mechanism by localizing the source of peritonitis with the omentum and intestines so that a "walling off" or muscular defense mechanism occurs. In non-localized peritonitis, diffuse peritonitis can occur, the peritonitis then becomes generalized and adhesions occur to intra-abdominal organs and the visceral and parietal peritoneal layers. The emergence of these adhesions causes peristaltic activity to decrease until paralytic ileus occurs. Fluids and electrolytes are lost into the intestines resulting in dehydration, shock, impaired circulation and oliguria. In advanced conditions, sepsis can occur, due to bacteria entering the blood vessels. (Ganesha Medicina Journal, 2022)

Case Report

Patient Ms. F came to the emergency room brought by his parents with complaints of severe stomach pain in the lower right side since 4 days of SMRS (Thursday, May 23 2024). The pain feels like being stabbed and the pain is felt continuously. The pain gets worse, especially when the patient walks. The patient said that the pain was reduced when lying still with the knees bent. Initially the patient said the pain was in the pit of the stomach and then spread to the lower right abdominal area. Complaints accompanied by nausea and vomiting.

The patient also stated that he had complained of fever 2 days before entering the hospital. Defecation is within normal limits and urination is within normal limits. Previously the patient had taken Chinese medicine given by the patient's mother but it did not decrease. So the patient's mother took the patient to the midwife and it did not decrease. The patient was then immediately taken to a general practitioner's clinic and advised to see a specialist for an X-ray. After being X-rayed, the patient is advised to immediately take him to the hospital.

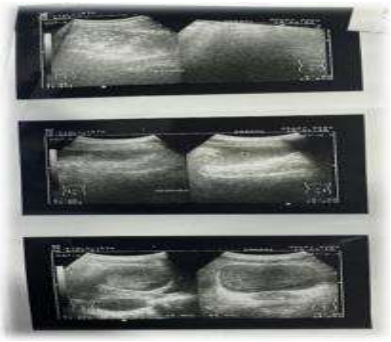

Figure 1. Ultrasound of the Abdomen

Figure 1. Ultrasound of the Abdomen. Excess turbid fluid appears in the abdominal cavity. Excess turbid fluid appears in the lower abdominal cavity. Dilatation of the intestine appears. Weak intestinal peristalsis.

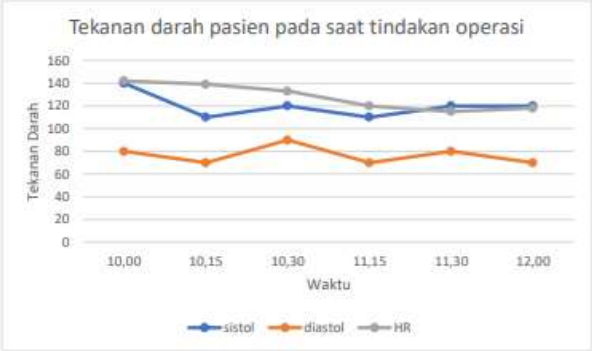

Figure 2. Patient's blood pressure at the time of surgery

3. RESULTS AND DISCUSSION

The patient's initials are Ms. 15 year old F came to the emergency room at Dumai City Regional Hospital on May 23 2024 at 20.00 WIB with complaints of severe abdominal pain since 4 days at SMRS. The pain is felt continuously as if being stabbed. Initially the pain was in the pit of the stomach then spread to the lower right abdominal area. Complaints accompanied by nausea and vomiting. Previously the patient had taken Chinese medicine given by the patient's mother but it did not decrease. The patient was categorized as an ASA II patient, because there was no history of systemic disease. In preoperative preparation, the patient is in a composmentis condition, can breathe spontaneously, is fasting and not wearing dentures or

jewelry, and an intravenous access has been installed in the patient's left hand. The patient admitted that he had no allergies to drugs and denied any other diseases. The operation is carried out on the same day the patient comes to the ER. Before anesthesia, oxygenation was given using a face mask with 100% oxygen, then fentanyl 100 mcg and propofol 80 mg were given (in stages). After the patient fell into deep sleep which was characterized by the absence of eyelash reflexes, the patient was given atracurium 10 mg, sevoflurans 2%, and ventilated again. Anesthesia was performed by intubation using a direct laryngoscope and endotracheal tube (ETT) number 7.0. During the operation, the patient was given 2 lpm oxygen, and maintenance O2 : N2O, namely 2:3. After surgery, the patient was transferred to the surgical Inpatient Unit (IRNA).

4. CONCLUSION

Peritonitis is localized or generalized inflammation in the peritoneal cavity which is generally caused by bacteria or fungi, but can also be caused by non-infectious substances such as gastric contents or bile contents. Peritonitis due to infection is classified as primary, secondary, or tertiary. This peritonitis is classified based on the anatomical integrity of the abdominal cavity. Peritonitis patients require attention from preoperative to postoperative. General anesthesia is an act of central pain relief accompanied by loss of consciousness (reversible). There are many general anesthetic procedures, one of which is intubation, namely the installation of an endotracheal tube

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