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Generalized Peritonitis due to Multiple Perforation and Necrotic of Ileum: A Case Report

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Abstract

Peritonitis is a life-threatening condition with a mortality rate according to WHO of 5.9 million per year. We report the case of an elderly man who complained of severe pain in the entire abdominal region and the results of a plain abdominal radiograph showed peritonitis and small bowel obstruction. Exploratory laparotomy and ileal resection were performed, and multiple ileal perforations, 120 cm of necrotic ileum and grade IV adhesions were found. There were post-surgical complications of sepsis and the patient died on the seventh post-operative day. Histopathological examination shows images that was not contributory to the diagnosis. There were no features of malignancy or tendency to a specific infection. Non-specific small bowel perforation can be considered as the etiology of peritonitis because there are no specific pathognomonic characteristics. Diagnostic and management of surgical emergencies plays a very important role in patient prognosis.

Keywords: generalized peritonitis, small bowel perforation, small bowel obstruction.

Introduction

Peritonitis is an infectious disease of peritoneum which is the protective layer originating from serous membrane that lines the abdominal cavity and organs. This disease is a life-threatening condition. According to the World Health Organization (WHO), the mortality rate of peritonitis is 5.9 million per year. Peritonitis can be classified according to its cause, i.e. primary or secondary, the extent can be localized or general, and the presence of infectious agents (Volk, 2015). Common causes of peritonitis are gastroduodenal ulcers, appendicitis and intestinal perforation due to typhoid infection. Other causes of peritonitis can be abnormalities in the organs in the cavum peritoneum, one of which is intestinal perforation (Enrico et al., 2022).

Peritonitis generally develops if there is a perforation or rupture of the organ into the abdominal cavity. Perforation of the gastrointestinal tract involves the organs of the stomach, duodenum, small intestine, or colon due to damage to the walls of the gastrointestinal tract accompanied by the release of intraluminal contents into the peritoneal or retroperitoneal cavity. This condition is an emergency with a high mortality rate, and usually requires emergency surgery (Widayana, 2022). Common causes of perforation include trauma, iatrogenic injury, inflammation, infection (typhoid fever, tuberculosis), ischemia (intestinal obstruction, necrosis), obstruction (appendicitis, diverticulitis), and erosion (malignancy, peptic ulcer) (Sharma et al., 2019; Widianiti et al., 2019).

Case Report

A 63-year-old man came to the emergency room of dr. Haryoto Lumajang Hospital (02/01/2024) with the primary complaint of severe abdominal pain in the entire abdominal region. After heteroanamnesis, the patient complained of abdominal pain since ± 10 days ago. The patient complained of dizziness and diarrhea with a frequency of 2-3 times a day, the consistency is watery for ± 5 days, and normal urination. Patient also complained of fever but tended to be at night. On the 6th day, because he felt uncomfortable and pain in the abdomen, the patient asked to be massaged. Massage was performed on the whole body, especially the abdomen. After

being massaged, the complaints of pain decreased, but suddenly the abdomen enlarged accompanied by vomiting and inability to eat. Complaints were followed by vomiting and abdominal pain that was worse than before. A history of trauma, prolonged coughing, and cold sweats at night is denied. The patient had a history of inguinal hernia surgery 20 years ago.

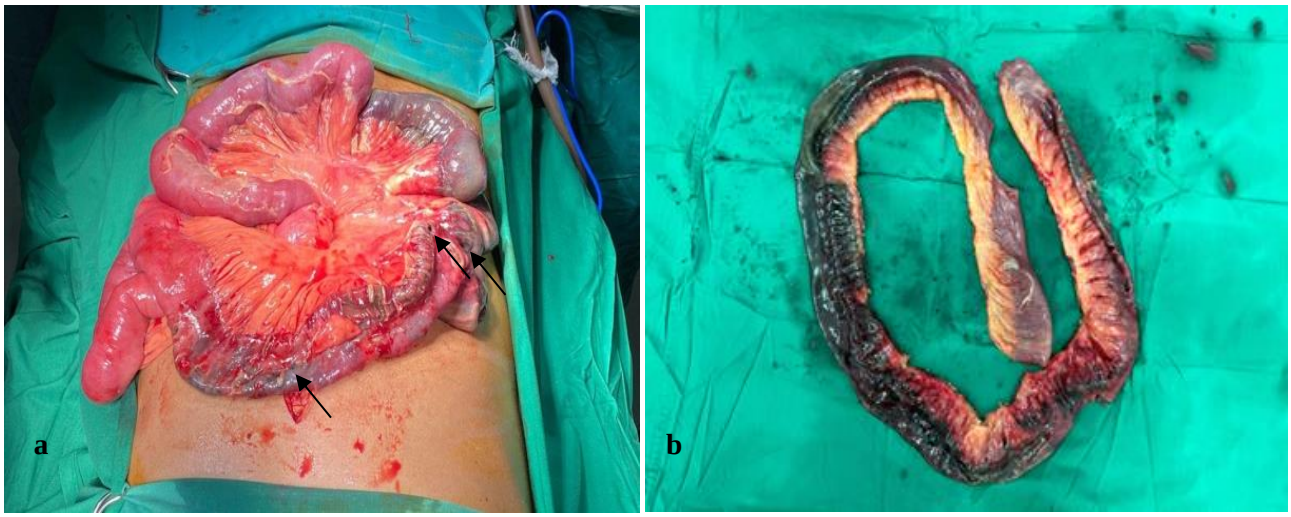
The initial examination of the patient's consciousness was compos mentis and the vital signs on admission were as follows; blood pressure 151/72 mmHg, pulse rate 137 times/min, respiratory rate 20 times/min, temperature 36°C, SpO2 94% (room air). The general physical examination of eyes, nose, ear, heart, lungs, and extremity were within normal limit. Abdominal inspection reported a distended appearance, auscultation highlighted a declined in bowel sounds. On palpation and percussion, abdominal pain throughout the abdominal area was found and liver dullness was difficult to assess.

The initial laboratory results revealed an increased white blood cell count 26.73 x 10^9 /L, hemoglobin count and platelet count in the normal range. Electrocardiography shows atrial fibrillation dan chest x-ray is within normal range. Abdominal x-ray was performed showing an air distribution outside the contour of the intestine between the abdominal wall and the liver (Decubitus Abdominal Sign) which leads to the pneumoperitoneum on lateral decubitus position. On erect position showing an increased picture of gas distribution in the peritoneal cavity and coiled spring, which leads to the picture of intestinal obstruction.

The initial management at the emergency room was nasal oxygenation, 1000 mL of RL liquid IV, ranitidine IV 2x25 mg, antrain IV 3x50 mg, ondancetron IV 2x4 mg and ceftriaxone IV 2x1000 mg. Abdominal Ultrasound showed the impression of severe hydronephrosis of right kidney suspected of partial obstruction in the right ureter accompanied by multiple nephrolithiasis if the right kidney. Multiple nephrolithiasis of the left kidney was accompanied by 3 cysts of the left kidney. The pancreas was not visualized and covered by prominent intestinal air. The urinary bladder was not validly assessed. There were no abnormalities in the liver, bladder and spleen.

Exploratory laparotomy was decided to be performed. After informed consent was given from the patient and family, the surgery was carried out in general anesthesia. During the operation, the patient was given amiodarone 15 mg and fentanyl 30 mg through syringe pump to stabilize blood pressure and heart rhythm. The results of the exploratory laparotomy showed multiple ilea adhesion, 120 cm of necrotic ileum and grade IV adhesion. Furthermore, 120 cm of ileal resection was performed with end-to-end anastomosis and adhesiolysis. The results of ileal specimen resection were sent to the histopathology department. The results of histopathology examination showed microscopic results of ileal tissues with almost the entire surface of mucosa was eroded, necrotic with extensive infiltration of neutrophil inflammatory cells, lymphocytes, plasma cells and histiocytes, with 2 atypical cells, prominent impression of nucleus and several mitoses and several focal mucosal gland tissues with columnar lining epithelium. There was no malignancy or specific infection process. At the end of resection, necrotic tissues are still visible, with the conclusion of histopathology results being chronic suppurative inflammation with atypical cells at the end of resection, necrotic tissues are still visible.

After the exploratory laparotomy, the patient was admitted to the intensive care unit with an open NGT installed and ordered to fast for 5 days. Post exploratory laparotomy, patient received 1 bag of PRC immediately and patient also received albumin transfusion on the 4th day. On the 5th day of post exploratory laparotomy, blood test was performed with laboratory results showed leukocytosis, hypo albumin, hypernatremia, hyperchloremia and increased BUN creatinine. On the 7th day, the patient's clinical condition declined, marked by decreased consciousness and vital signs. At 19.20 WIB the patient was declared decease.



Picture 1. (a) multiple perforation on the ileum; **(b)** ileum specimen that has been resected

Discussion

Gastrointestinal perforation (GIP) is a surgical emergency with a high risk of mortality (30-50%) despite many scientific developments in the fields of antibiotics, radiography, resuscitation, and surgical techniques (Liu et al., 2021). Intraabdominal infection is the cause of secondary peritonitis which has an impact on increasing mortality and high morbidity due to the main complication, namely septic shock. Generalized peritonitis in developing countries is generally dominated by perforation of the upper gastrointestinal tract. In this case report, we reported a 64-year-old male patient with generalized peritonitis due to ileal perforation. It was recorded that around 1% of patients came to the Emergency Department with clinical symptoms of peritonitis which is the second leading cause of death in the intensive care unit due to sepsis. The number of peritonitis patients in Indonesia is around 9% of the population or around 179,000 patients. Mortality rate due to peritonitis in Indonesia reaches more than 60% (Sayuti, 2020).

Peritonitis is found to be at a higher risk if experienced by male patients, over 60 years old, have comorbid diseases, and have multiple organ dysfunction syndrome (MODS) (Dananjaya et al., 2019). Based on research by Njarekkattuvalappil et al. (2021), Sayuti, (2020) dan Tian et al. (2017) It was found that peritonitis was experienced by more male patients than female patients. The underlying reasons for this may be that compliance and personal hygiene are worse in male patients and the activity level of men is higher than in female patients. (Sayuti, 2020; Tian et al., 2017).

Age is also one of the risk factors, in which the age of more than 60 years has a greater risk of mortality in patients with perforated peritonitis (Dananjaya et al., 2019). Research by Dananjaya in 2019 showed that out of 49 patients ≥ 60 years old, as many as 41 patients experienced postoperative death. On the other hand, out of 67 patients < 60 years old, only 18 patients died. In a study conducted by Thomas, it was found that patients with older age have a worse prognosis, especially at the age of over 60 years. This happens because the number of comorbidities owned by patients is in line with increasing age triggered by risk factors such as smoking, alcohol consumption, and the use of NSAIDs. In this study, the patient denied the history of alcohol consumption, NSAID use, or comorbidities, but the patient had a history of smoking for 10 years. Research by Terada et al. (2021) found that smoking can affect the adaptive and innate immune system which then worsens immunity. Smoking triggers angiogenesis and damages the epithelial barrier of the gastrointestinal tract. Some studies also mention that smoking affects the gastrointestinal microbiota. When the epithelium of the gastrointestinal tract is damaged, commensal bacteria come out of the lumen of the gastrointestinal tract, invade the peritoneal cavitary and cause peritonitis (Lobo et al., 2016; Terada et al., 2021).

The patient has a history of previous abdominal massage. Research conducted by Mori et al. (2020) said that abdominal massage can trigger perforation of hollow organs. Abdominal blunt trauma is a rare case in which a small intestinal obstruction occurs which is thought to arise from a small intestine perforation or mesenteric injury and then causes adhesions (Shalhoub et al., 2021). Blunt abdominal trauma can lead to intestinal obstruction due to mesentery injury triggering ischemia of the intestinal segment, fibrosis and stenosis of the segment involved. Dull trauma can also cause paralytic ileus where the intestine fails to channel peristaltic waves, resulting in functional obstruction, and allowing fluid and gas to accumulate in the intestine causing paralytic ileus (Weledji, 2020). Another possible mechanism is micro perforation of the gastrointestinal tract with the highest risk affecting shorter bowel segments and relatively fixed with mesentery, especially the proximal jejunum and terminal ileum. These micro perforations usually close immediately after trauma and heal through fibrosis, which can later lead to adhesion obstruction (Shalhoub et al., 2021).

The history of traditional massage experienced by this patient can also cause volvulus. This condition has also been reported in research conducted by S et al. (2019)**,** in which reported traditional massage causes extensive ligament tears in the sigmoid colon. Volvulus is most prevalent in the sigmoid part especially in male patients with the elderly, adults with chronic constipation and neuropsychiatric disorders. Colon volvulus accounted for 2% of intestinal obstruction cases in the United States between 2002 and 2010 and 8% of intestinal obstruction cases were dominated by sigmoid volvulus (Musyarifah & Alfa Saputra, 2024; Sahu et al., 2019)**.**

Segmental small bowel volvulus can occur primarily and secondary. Secondary segmental small bowel volvulus occurs due to the process of peritoneal adhesions, Meckel's diverticulum and other causes. Segmental small bowel volvulus can rapidly progress to intestinal ischemia, this condition is rare in children and adults. Signs and symptoms that occur in neonatal patients are abdominal distension and vomiting of bile which are common signs of midgut and segmental volvulus. While in adults, common signs and symptoms are colicky or persistent abdominal pain (Heidtmann et al., 2021). In this patient, no radiologic images were found that led to a picture of volvulus, but an image of intestinal obstruction was found in the results of plain photographs of the abdomen and multiple perforations of the ileum, necrotic ileum along 120 cm and grade IV adhesion during the exploratory laparotomy surgery. With the result that the author suspects that intestinal obstruction that occurs in patients is not caused by volvulus but micro perforation due to intestinal adhesion or attachment.

Peritonitis can occur due to primary, secondary and tertiary causes (Akçakaya, 2023). Primary peritonitis is a spontaneous inflammation of the peritoneum without a definite source of intra-abdominal infection, one of the types of primary peritonitis is tuberculous peritonitis. Secondary peritonitis is caused by intraperitoneal sources, usually hollow internal organ perforations. Secondary peritonitis develops as a result of infection of any organ in the peritoneum of the peritoneal cavity such as acute appendicitis, diverticulitis, pancreatitis. In addition, secondary peritonitis can also occur due to

inflammatory bowel diseases, namely Crohn's disease. However, perforation is rare in Crohn's disease, except in areas of active Crohn's disease that have been obstructed for a long time, where an increase in luminal pressure due to obstruction easily causes perforation (Kambouri et al., 2014). Perforated peritonitis is the most common form of acute intra-abdominal infection. While necrotic lesions of the gastrointestinal tract and other intra-abdominal organs are detected as causative agents in 80% of patients (Akçakaya, 2023)(Thirumalagiri et al., 2017). It is reported that ileal perforation is the fifth most common cause of abdominal emergencies due to the high incidence of typhoid fever and tuberculosis in these countries. Mortality from ileal perforation remains high in developing countries, despite improvements in critical care and timely surgical intervention. Typhoid fever often causes intestinal bleeding leading to increased mortality and morbidity. Ileal perforation usually occurs in the third week of typhoid fever if not treated adequately or left untreated. In general, intestinal bleeding and perforation tend to occur in the terminal ileum due to patch payer necrosis (Njarekkattuvalappil et al., 2021).

In this patient after exploratory laparotomic surgery, multiple perforations of the ileum and necrotic of the ileum were obtained, which is one of the causes of secondary peritonitis, examination of the results of anatomical pathology examination showed a picture of chronic suppurative inflammation with atypic cells at the end of resection and necrotic tissue and did not show a typical picture of specific infection. Since there are no pathognomonic features of various previous conditions, the diagnosis of non-specific small bowel perforation can be considered.

Septic shock is one of the types of complications that are often found in peritonitis, usually this condition is also accompanied by organ failure or multiple organ failure and often ends in death. In this patient, a complete blood test was carried out on the 5th day postoperatively with results showing the discovery of leukocytosis (29.590 /cm^2) and in physical examination of the patient's respiratory rate was 30 times/min, heart rate 161 times/min, temperature 38°C. According to The American College of Chest Physicians and Society of Critical Care Medicine The four signs above are included in the SIRS criteria. Then on the 7th postoperative day, the patient's clinical condition decreased, indicated by decreased consciousness and vital signs with GCS 13, systolic blood pressure 60 mmHg and respiratory rate 30 times/min in which showed that he was in a state of shock suspected to be due to sepsis (Nurdin & Muchtar, 2022).

Conclusion

Generalized peritonitis caused by non-specific small bowel perforation generally has a cause that is no different than the common perforation. Knowledge of the clinical manifestations of patients with peritonitis is very important for health workers considering that delays in handling peritonitis due to small bowel perforation increase the risk of death from septic shock.

Conflict of Interest

The author stated that there was no conflict of interest in this study.

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