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Sepsis Management in Post Exploratory Laparotomy due to Total Bowel Obstruction and Gaster Perforation: A Case Report

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ABSTRACT

Background: Sepsis remains a leading cause of mortality worldwide despite the advancement of intensive care, particularly in low- and middle-income countries (LMICs) where resources are limited. Early recognition as well as timely and intensive management is necessary to lower the mortality. This case report aimed to highlight the critical role of early sepsis detection and timely management in successful outcomes, even in resource-constrained environments.

Case Report: We reported a case of 64-year-old woman presented with chief complaints of not being able to defecate and has not passed gas for 5 days, accompanied with stomach ache, bloating, and mucus in the stool. The patient was diagnosed with total bowel obstruction due to suspect intussusception, sepsis, hyponatremia hypovolemic and acute kidney injury. An exploration laparotomy with right hemicolectomy and end-to-end anastomose procedures were then performed. Blood culture showed *Escherichia coli* and Extended Spectrum b-Lactamase (ESBL) while urine culture showed *Candida tropicalis.* Intensive management comprised of resuscitation, antibiotics and antifungal treatment lead to improvement within eight days of admission. The patient was discharged fourteen days after surgery.

Conclusion: The successful outcome of this case highlights the importance of early recognition and aggressive management of sepsis, especially in resource-limited environments.

Keywords: *sepsis, laparotomy, intensive care unit*

1. INTRODUCTION

Sepsis is a life-threatening condition characterized by organ dysfunction resulting from a dysregulated host response to infection.[1] It is recognized as a medical emergency that necessitates prompt identification and management due to its high rates of morbidity and mortality.[1] Sepsis accounts for a significant proportion of admissions to intensive care units (ICUs), where it remains a leading cause of death despite advancements in critical care.[2] Globally, it is estimated that 15% of all ICU patients are admitted with a diagnosis of sepsis.[3] The global burden of sepsis is staggering, with estimates suggesting that sepsis affects 20 million people annually, and 20-50% of those treated in hospitals for sepsis do not survive.[4, 5]

However, much of the existing epidemiological data on sepsis comes from high-income countries, which have better access to diagnostic tools and advanced medical care.[6] This leaves a significant knowledge gap in understanding the true burden of sepsis in low- and middle-income countries (LMICs).[6] Limited research alongside poor healthcare infrastructure, contributes to higher sepsis mortality rates in LMICs compared to wealthier nations.[7] Southeast Asia, including Indonesia, is one region where data on sepsis prevalence and outcomes are sparse, further complicating efforts to address this critical healthcare issue.[8]

Abdominal infections rank as the second most frequent cause of sepsis in ICU patients. These infections, especially when arising from surgical complications such as bowel obstruction or gastrointestinal perforation, can quickly lead to peritonitis and subsequent sepsis if not managed appropriately.[9] The etiological agents in abdominal sepsis are often diverse, but gram-positive bacteria such as *Staphylococcus* and gram-negative bacteria like *Escherichia coli* are frequently implicated in postoperative infections.[10] Despite advances in surgical techniques and critical care, sepsis following abdominal surgery remains a major challenge. Surgical procedures such as laparotomy for bowel obstruction or gastric perforation are high-risk due to the potential for bacterial translocation and widespread infection. Without timely intervention, patients may rapidly

deteriorate into septic shock, a state associated with multi-organ failure and extremely poor outcomes. Mortality rates for patients with septic shock can exceed 40%, especially in resource-limited settings where access to essential critical care interventions is limited.[11-13]

Effective sepsis management relies on the early recognition of the condition, rapid initiation of resuscitative measures, appropriate antimicrobial therapy, and support of organ dysfunction. In this case report, we describe the successful management of a patient who developed sepsis following an exploratory laparotomy for total bowel obstruction and gastric perforation. The patient was admitted to the emergency room with signs of septic shock, including hypotension and altered mental status. Prompt intervention in the form of aggressive fluid resuscitation, broad-spectrum antibiotics, and surgical intervention led to the resolution of the infection and stabilization of the patient's condition. Despite the challenging setting of a resource-limited ICU, the patient survived, highlighting the importance of timely and intensive sepsis management. The objective of this case report is to emphasize the critical role of early sepsis detection, beginning at the time of admission to the emergency department (ED), and to illustrate how aggressive management can lead to successful outcomes, even in resource-constrained environments. This report also aims to contribute to the growing body of literature on sepsis management in LMICs, where further research is necessary to tailor treatment protocols that reflect local epidemiological and healthcare challenges.

2. CASE REPORT

A 64-year-old woman presented to the emergency room Panglima Sebaya hospital, Paser Regency, East Kalimantan-Indonesia with chief complaints of not being able to defecate and has not passed gas for 5 days, accompanied with stomach ache, bloating, and mucus in the stool. Physical examination showed increased blood pressure (140/100 mmHg) with increased peristaltic. Blood work showed slight decreased of hemoglobin (11.6 mg/dl [normal range 12-15 gr/dl]), leukocytosis (16.330/µl [normal range 4.500-11.000/µl]), increased creatinine serum (1.75 mg/dl [normal range 0.5-1.1 mg/dl]) and hyponatremia (128 mEq/L [normal range 135-145 mEq/L]). Three positions abdominal X-ray suggested high-level obstructive ileus, however no signs of pneumoperitoneum were observed during the examination.

The patient was then diagnosed with total bowel obstruction due to suspect intussusception, sepsis, hyponatremia hypovolemic and acute kidney injury. Initial therapy included 500 cc intra venous 0.9% Sodium Chloride, administered twice. An exploration laparotomy with right hemicolectomy and end-to-end anastomose procedures were then performed. A 20 cm ileo-ileocoliaca intussusception was found during the surgery, located 230 cm from Treitz ligament. In addition, a 10x15 cm solid-hard tumor was also found 20 cm from Treitz ligament.

The patient was admitted to the intensive care unit (ICU) post surgery, in which she was intubated with BIPAP mode FiO2 30% . Physical examination on the first day of ICU showed Glasgow Coma Scale (GCS) of 9 (Eye 3 Verbal X, and Motoric 6), normal blood pressure (101/58 mmHg), edema in both legs, and 24 hours urine production of 1.516 ml. Blood gas analysis indicated metabolic acidosis (PH 7,3, PCO2 20 mmHg, PO2 104,4 mmHg, pO2/FiO2 348,1 mmHg) while blood exam showed severe infection (Hb 9,4 mg/dl, leucocyte: 23.160/µl, platelet: 247.000/µl), impaired liver function (AST 94 U/L [normal range 7-55 U/L], ALT 85 U/L [normal range 8-48 U/L]), and impaired kidney function (ureum 81 mg/dl, creatinine 5,43 mg/dl, albumin 2,1 g/dl), although electrolytes were in normal range. A 1000 ml intravenous amino fluid every 12 hours, 1,5gr of ampicillin sulbactam every 8 hours, and 500 mg of metronidazole every 8 hours were administered. Blood culture showed *Escherichia coli* and Extended Spectrum b-Lactamase (ESBL) while urine culture showed *Candida tropicalis*.

On the 8th day of ICU treatment, the GCS was E1VxM4, the ventilator was on spontan mode, with blood pressure of 101/70 mmHg with 75 ng/hour of norepinephrine. Edema on bilateral legs were still found, with urine production of 1500 ml/24 hours, and NGT feeding showed 130 ml retention. The patient was given intravenous Clinimix 20E 1000 ml/24 hours and 1000 ml/24 hours of Sodium Chloride. Intravenous antibiotics – Ampiciline Sulbactam 1.5 gr/8 hours, Metronidazole 500 mg/8 hours – were also administered. In addition to antibiotic, the patient was also given intravenous Fluconazole 400 mg/24 hours and tranexamic acid 500 mg/8 hours plus oral vitamin K per 8 hours. Blood gas analysis on the 8th day showed improvement with ph 7,3, PCO2 30 mmHg, PO2 86,4 mmHg, and pO2/FiO2 288 mmHg. Blood examination also indicated improvement of infection with leucocyte reduced to 14.350//µl, although reduced in hemoglobin and platelet were still observed (Hb 9,2 gr/dl, platelet 194.000/µl). improvement of kidney function was also observed on this day (creatinine 1,49 and albumin 2,2). The patient stepped down from the ICU on the 10th day as being clinically stable, and was discharged on the 14th day post surgery.

3. DISCUSSION

This case presents the complex management of a 64-year-old woman who arrived at the emergency room Panglima Sebaya hospital, Paser Regency, East Kalimantan-Indonesia with a total bowel obstruction, later complicated by sepsis and multiple organ dysfunctions, including acute kidney injury, anemia, and hyponatremia. Prompt surgical intervention, followed by intensive care management, was crucial for the patient's survival. The case demonstrates the importance of early detection and intervention in sepsis, especially in resources-limited settings as found in LMICs.

Bowel obstruction is a common cause of emergency surgical intervention, and in this case, it was caused by intussusception, a rare condition in adults that accounts for only 1-5% of intestinal obstructions.[14, 15] The patient's non-specific symptoms of abdominal pain, bloating, and inability to pass stool or gas led to the diagnosis of total bowel obstruction, confirmed by abdominal X-ray and intraoperative findings. During surgery, a 20 cm ileo-ileocolic intussusception and a 10x15 cm solid-hard tumor were discovered, suggesting the tumor as the underlying cause. Surgical management with right hemicolectomy and end-to-end anastomosis was performed to relieve the obstruction and prevent further complications such as bowel ischemia or necrosis.

Sepsis, defined as life-threatening organ dysfunction caused by a dysregulated host response to infection, was a significant complication in this case.[16] The patient exhibited classical signs of sepsis, including leucocytosis, fever, and acute kidney injury, as seen in the elevated serum creatinine levels. The likely source of infection was the obstructed bowel with the intussusception and tumor, providing a pathway for bacteria to enter the bloodstream.

Sepsis is a leading cause of mortality, particularly in surgical patients. Early surgical intervention, fluid resuscitation, and antimicrobial therapy were crucial in this patient's survival.[17] Broad-spectrum antibiotics, including ampicillin-sulbactam and metronidazole, were administered empirically to cover both gram-positive and anaerobic organisms. Despite initial improvement, the patient's condition remained critical, requiring ICU care, hemodynamic support, and mechanical ventilation. Vasopressors, such as norepinephrine, were needed to manage septic shock, a condition that often leads to refractory hypotension.[18]

The patient also developed acute kidney injury (AKI), likely due to a combination of sepsis-related hypoperfusion, dehydration, and electrolyte imbalances. Her serum creatinine peaked at 5.43 mg/dl, indicating significant renal impairment. Early fluid resuscitation was essential in managing the AKI, helping to restore intravascular volume and improve renal function.[19, 20] By the eighth day of ICU care, creatinine levels had decreased to 1.49 mg/dl, indicating partial renal recovery. AKI is a common complication in sepsis, associated with higher morbidity and mortality, which underscores the importance of early fluid management and careful monitoring in critically ill patients.[21-23]

The patient’s blood culture revealed *Escherichia coli* producing extended-spectrum beta-lactamase (ESBL), while urine culture identified *Candida tropicalis*. ESBL-producing organisms pose a challenge due to their resistance to many antibiotics, necessitating the use of broader-spectrum agents or combination therapies. Although the initial antibiotic regimen included ampicillin-sulbactam, which may have limited efficacy against ESBL-producing bacteria, the patient’s clinical improvement suggests that rapid surgical intervention and appropriate ICU care were crucial in preventing further deterioration.[24] Additionally, antifungal therapy with fluconazole was initiated in response to the fungal infection, which is a common complication in critically ill patients receiving prolonged antibiotic treatment.[24]

Hemodynamic instability is a hallmark of septic shock, and in this case, the patient required continuous vasopressor support with norepinephrine to maintain adequate blood pressure. Septic shock often results in persistent hypotension despite fluid resuscitation, as seen in this patient, who required ongoing norepinephrine support until day eight of ICU care.[25] Ventilatory support was also critical, with the patient initially intubated and managed on BiPAP, later weaned to spontaneous mode by the eighth day. The gradual reduction in ventilatory and vasopressor support indicated a positive response to treatment and stabilization of the patient’s condition.[26]

Sepsis can result in multi-organ failure, and this patient’s case was no exception.[27] In addition to acute kidney injury and cardiovascular instability, the patient experienced respiratory compromise, requiring mechanical ventilation and vasopressor therapy for several days. Intensive care management, including fluid therapy, vasopressors, antibiotics, antifungals, and nutritional support, helped stabilize the patient’s condition. By the eighth day, improvements in leukocyte count, renal function, and hemodynamic stability were observed, indicating successful management of septic shock and multisystem organ involvement. These outcomes are particularly notable given the high mortality associated with sepsis and septic shock, especially in patients with comorbidities and organ dysfunction.

4. CONCLUSION

This case highlights the importance of early recognition and aggressive management of sepsis, especially in post-surgical patients with complex comorbidities. The successful outcome of this case, despite the presence of ESBL-producing E. coli, septic shock, and AKI, underscores the critical role of early surgical intervention, appropriate antimicrobial therapy, and intensive care management. In low-resource settings, where sepsis remains a significant challenge, timely and coordinated care is essential for improving patient outcomes.

5. CONTRIBUTIONS

All authors contributed to the research process, including conception and design, analysis and interpretation of data, manuscript preparation, critical review of the manuscript for important intellectual content, and approval of the final version.

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Conflict of Interest

There is no conflict of interest to be declared.

Ethics

None

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