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Original Research

Role of surgical interventions n adjunctive antibiotics therapy in the management of abdominal sepsis

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ABSTRACT

Aim:The aim of this study was to evaluate the role of surgical interventions and adjunctive antibiotic therapy in the management of abdominal sepsis, with a focus on their impact on patient outcomes, including mortality rates, length of hospital stay, and complications.

Materials and Methods:This prospective, observational cohort study was conducted at a tertiary care center and included 120 patients diagnosed with abdominal sepsis. Inclusion criteria were patients aged 18 years or older with clinical signs of sepsis, radiological evidence of intra-abdominal infection, and who required surgical intervention and antibiotic therapy. The study involved a detailed clinical evaluation, including laboratory tests, imaging, and severity assessment using the Sepsis-Related Organ Failure Assessment (SOFA) score. Surgical interventions, including laparotomy with peritoneal lavage, drainage of abscesses, and bowel perforation repair, were performed based on the severity and type of abdominal pathology.

Results:The study found that the mean age of the patients was 52.4 ± 14.6 years, with a male predominance (60%). Hypertension and diabetes mellitus were the most common comorbidities. Surgical interventions included laparotomy with peritoneal lavage in 81.67% of patients, drainage in 10%, and resection of necrotic bowel tissue in 8.33%. Piperacillin-tazobactam, meropenem, vancomycin, and metronidazole were the most commonly used antibiotics. The overall mortality rate was 18.33%, and the median length of hospital stay was 14 days. Complications included wound infections (14.17%), secondary infections (8.33%), and the need for re-laparotomy (11.67%). Mortality was lowest in the bowel perforation repair group (12.5%) and highest in the drainage group (25%). Multiple regression analysis identified age, male gender, diabetes, chronic liver disease, and SOFA score as significant predictors of mortality.

Conclusion:Surgical interventions for source control, particularly laparotomy, and empiric broad-spectrum antibiotics play crucial roles in improving outcomes in abdominal sepsis. The study highlights the importance of early intervention and tailored antibiotic therapy based on culture results. Despite significant advancements in the management of abdominal sepsis, careful monitoring and individualized care are essential to reduce complications and enhance survival rates.

Keywords:Abdominal sepsis, Surgical interventions, Antibiotic therapy, Mortality, Sepsis-Related Organ Failure Assessment (SOFA)

Introduction

Abdominal sepsis is a severe and life-threatening condition that results from the spread of infection within the abdominal cavity, leading to a systemic inflammatory response syndrome (SIRS), multi-organ dysfunction syndrome (MODS), and potentially death if not managed promptly and appropriately. It is often triggered by a variety of underlying conditions such as perforated viscus, appendicitis, diverticulitis, gallbladder disease, and bowel obstruction, among others. The management of abdominal sepsis has evolved considerably over the years, with two mainstays of treatment: surgical interventions and adjunctive antibiotic therapy. Both components play critical roles in stabilizing the patient, controlling the infection, and preventing further complications.[1]

Surgical intervention is a cornerstone of the treatment for abdominal sepsis. The primary objective of surgery is source control, which involves removing or draining the infected material, such as abscesses, infected necrotic tissue, or perforated organs. Without effective source control, the infection will continue to spread, leading to a heightened risk of septic shock, organ failure, and death. The choice of surgical

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procedure depends on several factors, including the location and extent of infection, the patient's clinical condition, and the underlying cause of the sepsis. Procedures like laparotomy with peritoneal lavage, abscess drainage, and resection of necrotic bowel tissue are among the most common interventions. Each of these surgeries aims to stop the infection from further progressing and prevent the development of complications like peritonitis or sepsis.[2]

Laparotomy with peritoneal lavage is one of the most commonly performed procedures for abdominal sepsis, particularly in cases of generalized peritonitis. It involves making a large incision in the abdominal cavity to access and clear the infected areas, followed by thorough washing of the peritoneal cavity to remove contaminants. This procedure has proven effective in reducing the spread of infection and improving patient outcomes, as it helps eliminate the primary source of the sepsis. In localized cases, more focused interventions, such as abscess drainage or bowel perforation repair, may be sufficient to control the infection without the need for more extensive surgery. However, it is essential to note that while surgical interventions are essential for the management of abdominal sepsis, they are not always curative on their own.[3]

Adjunctive antibiotic therapy plays a critical role in the management of abdominal sepsis, providing essential support in controlling the infection. The use of broad-spectrum antibiotics is often initiated empirically, especially in critically ill patients, to cover a wide range of potential pathogens, including Gram-negative bacteria, Gram-positive organisms, and anaerobes. The rationale for this broad-spectrum coverage is that the exact microbial etiology is often unknown at the time of diagnosis, and empirical therapy is necessary to prevent the rapid progression of infection. As the results of microbiological cultures become available, the antibiotic regimen can be adjusted to target the specific pathogens involved.[3]

The timing and selection of antibiotics are crucial factors that influence patient outcomes. Ideally, antibiotics should be started as soon as possible after the diagnosis of sepsis is made to prevent the infection from overwhelming the body's immune system. In addition to broad-spectrum antibiotics, drugs like vancomycin and clindamycin may be included in cases where Gram-positive infections, such as those caused by *Streptococcus* or *Staphylococcus* species, are suspected. Similarly, metronidazole is frequently used to provide coverage against anaerobic organisms, which are common in abdominal infections. The proper choice of antibiotics, along with timely administration, can significantly reduce mortality rates and improve the chances of recovery in patients with abdominal sepsis.[4]

While surgical intervention and antibiotic therapy are the mainstays of treatment for abdominal sepsis, there are several other adjunctive strategies that may further enhance patient outcomes. For example, the use of supportive care, including fluid resuscitation, vasopressors, and organ support, is vital in the management of patients with sepsis, particularly those in septic shock. These interventions aim to stabilize the patient's hemodynamic status and maintain adequate perfusion to vital organs. Additionally, advances in critical care management, such as early goal-directed therapy and the use of corticosteroids in certain cases, have shown promise in improving survival in patients with sepsis.[5]

The role of adjunctive antibiotics is continually evolving as research sheds new light on optimal therapeutic strategies. While early administration of broad-spectrum antibiotics is universally accepted, there is ongoing debate about the duration of antibiotic therapy. Traditionally, prolonged courses of antibiotics were considered necessary to control infection, but recent studies suggest that shorter courses of antibiotics may be just as effective in some cases, reducing the risk of antibiotic resistance and adverse effects. This evolving understanding underscores the need for individualized treatment regimens based on patient-specific factors, including the severity of sepsis, comorbid conditions, and the microbiological profile of the infection.[6]

Despite significant advancements in the management of abdominal sepsis, challenges remain. One of the most pressing issues is the rising incidence of antimicrobial resistance, which complicates the selection of effective antibiotics. Resistant organisms, including *Enterococcus*, *Klebsiella*, and *Pseudomonas* species, are becoming increasingly common in abdominal sepsis cases, necessitating the use of stronger and more targeted antibiotics. In addition, the choice of surgical intervention can be influenced by the presence of comorbidities such as diabetes mellitus, cardiovascular disease, or liver dysfunction, which can affect the patient's ability to tolerate surgery and impact postoperative recovery. Therefore, the decision-making process regarding surgical and antibiotic management must consider not only the infection itself but also the overall health of the patient.[7]

Materials and Methods

This study was a prospective, observational cohort study conducted at RDJM medical College and hospital Turki Muzaffarpur during June 2024 to December 2024. Present study aimed to evaluate the role of surgical interventions and adjunctive antibiotic therapy in the management of abdominal sepsis. The study was conducted at tertiary care center. A total of 120 patients diagnosed with abdominal sepsis were included in the study. Ethical approval was obtained from the Institutional Review Board, and written informed consent was provided by all participants.Patients diagnosed with abdominal sepsis were included in the study if they met the following criteria:

DOI: 10.69605/ijlbpr_14.4.2025.224

1. Clinical signs and symptoms of sepsis (fever, tachycardia, hypotension, elevated white blood cell count).
2. Radiological or clinical evidence of intra-abdominal infection, including perforation, abscess, or generalized peritonitis.
3. Patients aged 18 years or older.
4. Patients requiring surgical intervention and adjunctive antibiotic therapy as part of their management.

Exclusion criteria included:

1. Patients with sepsis originating from sources other than the abdomen.
2. Pregnant or lactating women.
3. Immunocompromised patients (e.g., HIV, chemotherapy).
4. Patients with a history of abdominal surgery within the last 6 months.

Clinical Assessment: Upon admission, all patients underwent a thorough clinical evaluation, including detailed history, physical examination, and laboratory investigations. The severity of sepsis was assessed using the Sepsis-Related Organ Failure Assessment (SOFA) score. Laboratory tests including complete blood count, liver function tests, renal function tests, blood cultures, and abdominal imaging (ultrasound and/or CT scan) were performed to identify the source of infection.

Treatment Protocol:

Surgical Interventions: All patients included in the study received surgical treatment tailored to the underlying cause of their abdominal sepsis. The choice of surgical intervention was determined based on the clinical and radiological findings at the time of diagnosis. In cases of generalized peritonitis, a laparotomy with peritoneal lavage was performed to remove infected material and restore intra-abdominal cleanliness. For patients with localized intra-abdominal abscesses or fluid collections, drainage was performed either based on imaging guidance or intraoperatively. In instances of bowel perforation or infarction, resection of necrotic bowel tissue was carried out to prevent further contamination and systemic spread of infection. If a bowel perforation was identified, it was repaired to prevent further leakage of enteric contents into the peritoneal cavity. The surgical procedures were conducted within 12 hours of diagnosis in all cases to minimize the risk of complications, including mortality and multi-organ failure. Prompt surgical intervention was considered crucial for improving patient outcomes in abdominal sepsis.

Antibiotic Therapy: Empiric antibiotic therapy was initiated promptly after obtaining blood cultures and before the definitive microbiological results were available. The broad-spectrum antibiotics chosen aimed to provide adequate coverage against the most common pathogens involved in abdominal sepsis, including Gram-negative bacteria, Gram-positive bacteria, and anaerobes. The initial antibiotic regimen included piperacillin-tazobactam (4.5g every 8 hours) or meropenem (1g every 8 hours) for Gram-negative coverage, vancomycin (15mg/kg every 12 hours) or clindamycin (600mg every 8 hours) for Gram-positive coverage, and metronidazole (500mg every 8 hours) to cover anaerobic organisms. Once the results of the cultures and sensitivities were available, antibiotics were adjusted accordingly to target the specific organisms identified, ensuring more precise and effective treatment. The duration of antibiotic therapy was personalized for each patient based on clinical response and the microbiological findings, typically ranging from 7 to 14 days. This tailored approach helped reduce unnecessary antibiotic use while ensuring the optimal treatment duration.

Adjunctive Therapies: For patients with septic shock or multi-organ failure, intensive care support was provided to manage the critical aspects of their condition. This included mechanical ventilation for respiratory failure, inotropic agents to support cardiovascular function, and renal replacement therapy (e.g., hemodialysis) if required due to renal dysfunction. These interventions were critical in stabilizing the patients and improving their chances of survival. Additionally, supportive care was provided to all patients, including intravenous fluids to maintain hemodynamic stability, nutritional support to aid recovery, and correction of electrolyte imbalances to optimize physiological functions. The aim of adjunctive therapies was to stabilize the patients while the primary treatment (surgical intervention and antibiotics) addressed the source of infection.

Outcome Measures: The primary outcomes of the study were focused on patient survival and recovery. Mortality rate was defined as the proportion of patients who died either during hospitalization or within 30 days post-surgery. Length of hospital stay was measured as the time from surgery to discharge, with the goal of evaluating recovery time and the effectiveness of the treatment protocols. The occurrence of complications was also closely monitored, including wound infections, anastomotic leaks, organ failure, and secondary infections. These complications could indicate the severity of the disease or issues arising from the treatment itself.

Secondary outcomes included the time to resolution of sepsis, which was defined by the normalization of vital signs and the return of laboratory markers, such as white blood cell count (WBC) and C-reactive protein (CRP), to baseline levels. Additionally, the need for repeat surgeries, including re-laparotomy for source control, was tracked as a measure of the effectiveness of initial treatment strategies. These outcome measures were integral to assessing the

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impact of surgical interventions and adjunctive therapies in the management of abdominal sepsis.

Statistical Analysis: Descriptive statistics were used to summarize patient demographics, clinical characteristics, and outcomes. Continuous variables were expressed as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate. Categorical variables were expressed as percentages. The relationship between different surgical interventions, antibiotic regimens, and clinical outcomes was analyzed using Chi-square tests for categorical variables and Student's t-test or Mann-Whitney U test for continuous variables, as applicable. A p-value of <0.05 was considered statistically significant.

Results

Table 1: Patient Demographics and Comorbidities

The demographic characteristics of the study population show a mean age of 52.4 ± 14.6 years, which suggests a population with a relatively wide age range, including both younger and older adults. Regarding gender distribution, a higher proportion of the patients were male (60%), with 48 female patients (40%). This indicates a slightly higher prevalence of abdominal sepsis in males.The study also highlights the prevalence of comorbid conditions among the patients. Hypertension was the most common comorbidity, affecting 41 patients (34.17%), followed by diabetes mellitus in 32 patients (26.67%), and chronic liver disease in 19 patients (15.83%). These comorbidities may potentially affect patient outcomes and the severity of sepsis, making them important factors to consider in the management of abdominal sepsis.In terms of severity of sepsis, assessed using the SOFA score, a significant portion of patients presented with mild sepsis (45.83%), while 35.83% had moderate sepsis, and 18.33% had severe sepsis. This distribution suggests a varied severity level, which is critical for determining the appropriate intervention strategies.

Table 2: Types of Surgical Interventions

The surgical interventions performed were based on the severity and underlying cause of abdominal sepsis. The most common intervention was laparotomy with peritoneal lavage, performed in 98 patients (81.67%), reflecting the common need to address generalized peritonitis or intra-abdominal infection through this procedure. A smaller proportion of patients underwent drainage of abscesses and collections (10%), indicating that some had localized infections that could be managed with drainage. Resection of necrotic bowel tissue was carried out in 10 patients (8.33%), likely due to bowel perforation or infarction, while 8 patients (6.67%) required bowel perforation repair. These figures underscore the diversity of surgical approaches required in treating abdominal sepsis, depending on the extent and nature of the intra-abdominal pathology.

Table 3: Antibiotic Therapy Regimen

The antibiotic regimens used for these patients reflect the common pathogens associated with abdominal sepsis. Piperacillin-tazobactam was the most frequently administered antibiotic, given to 75 patients (62.50%), followed by meropenem (37.50%), which suggests a broad-spectrum approach to cover Gram-negative organisms. Vancomycin was given to 60 patients (50%) to cover Gram-positive organisms, while clindamycin was used in 45 patients (37.50%) for similar coverage. All patients received metronidazole (100%) for anaerobic coverage, indicating the importance of covering anaerobic pathogens in abdominal infections. The use of broad-spectrum antibiotics as an initial approach is consistent with clinical practice, where empirical therapy is adjusted based on culture results.

Table 4: Treatment Outcomes and Complications

The treatment outcomes show a mortality rate of 18.33%, which is an important metric in assessing the effectiveness of the interventions and overall patient prognosis. The median length of hospital stay was 14 days (range: 7-42 days), which indicates that patients typically required an extended period of hospitalization, a reflection of the seriousness of abdominal sepsis and its treatment complexity.Regarding complications, wound infections occurred in 17 patients (14.17%), which is relatively common after abdominal surgery. Anastomotic leaks were reported in 7 patients (5.83%), and secondary infections occurred in 10 patients (8.33%), suggesting that sepsis management remains complex and can lead to further complications. A total of 14 patients (11.67%) required re-laparotomy for source control, which highlights the need for additional surgical interventions in some cases due to failure to control the infection initially. The median time to resolution of sepsis was 7 days (range: 3-14 days), which reflects the time required for patients to stabilize and for sepsis to resolve following treatment.

Table 5: Mortality Rate by Type of Surgical Intervention

The mortality rate varied depending on the type of surgical intervention. The highest mortality rate was associated with drainage of abscesses and collections (25.00%), with 3 deaths observed, indicating that patients undergoing this intervention might have had more severe or advanced infections. Similarly, resection of necrotic bowel tissue had a mortality rate of 25.00%, with 2 deaths, likely due to the severity of bowel infarction or perforation. In contrast, laparotomy with peritoneal lavage had a relatively lower mortality rate of 16.33%, with 16 deaths, which may suggest that this procedure is more effective at

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controlling generalized peritonitis. The bowel perforation repair group had the lowest mortality rate at 12.50% (1 death), indicating that repairing bowel perforations may have better outcomes when compared to other interventions.

Table 6: Multiple Regression Analysis for Predictors of Mortality in Abdominal Sepsis

The multiple regression analysis identified several key factors that influenced mortality in patients with abdominal sepsis.Age was a significant predictor, with each additional year increasing the likelihood of mortality by 5% ($p = 0.001$), emphasizing the higher risk of death among older patients.Male gender also increased the likelihood of mortality, with a 45% higher risk in males compared to females ($p = 0.048$), which aligns with previous studies showing that men may have worse outcomes in sepsis.Diabetes mellitus was associated with a 73% higher risk of mortality ($p = 0.032$), suggesting that diabetes contributes to poorer prognosis in abdominal sepsis.Chronic liver disease had a significant impact on mortality, with a 112% higher risk ($p = 0.029$), reflecting the impaired liver function and immune response in these patients.Surgical intervention (laparotomy) was found to be protective, with a 56% lower risk of mortality ($p = 0.048$), indicating that this procedure is likely more effective in managing abdominal sepsis compared to other interventions.The SOFA score, a measure of sepsis severity, was strongly associated with mortality, with each unit increase in the score increasing mortality by 35% ($p = 0.001$), underlining the importance of early assessment and management in severe cases.Length of hospital stay was also a significant factor, with each additional day of hospitalization increasing the risk of mortality by 9% ($p = 0.001$), suggesting that longer hospital stays are indicative of more severe or prolonged illness.

Table 1: Patient Demographics and Comorbidities

Parameter	Number of Patients	Percentage (%)
Mean Age	52.4 ± 14.6 years	-
Gender Distribution		
Male	72	60.00
Female	48	40.00
Comorbidities		
Diabetes Mellitus	32	26.67
Hypertension	41	34.17
Chronic Liver Disease	19	15.83
Severity of Sepsis (SOFA Score)		
Mild (SOFA Score 0-6)	55	45.83
Moderate (SOFA Score 7-10)	43	35.83
Severe (SOFA Score >10)	22	18.33

Table 2: Types of Surgical Interventions

Surgical Intervention	Number of Patients	Percentage (%)
Laparotomy with Peritoneal Lavage	98	81.67
Drainage of Abscesses and Collections	12	10.00
Resection of Necrotic Bowel Tissue	10	8.33
Bowel Perforation Repair	8	6.67

Table 3: Antibiotic Therapy Regimen

Antibiotic Regimen	Number of Patients	Percentage (%)
Piperacillin-Tazobactam	75	62.50
Meropenem	45	37.50
Vancomycin	60	50.00
Clindamycin	45	37.50
Metronidazole	120	100.00

Table 4: Treatment Outcomes and Complications

Outcome/Complication	Number of Patients	Percentage (%)
Mortality Rate	22	18.33
Length of Hospital Stay (median days)	14 (Range: 7-42)	-
Wound Infections	17	14.17
Anastomotic Leaks	7	5.83
Secondary Infections	10	8.33
Re-laparotomy for Source Control	14	11.67
Time to Resolution of Sepsis (median days)	7 (Range: 3-14)	-

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Table 5: Mortality Rate by Type of Surgical Intervention

Surgical Intervention	Mortality Rate (%)	Number of Deaths
Laparotomy with Peritoneal Lavage	16.33	16
Drainage of Abscesses and Collections	25.00	3
Resection of Necrotic Bowel Tissue	25.00	2
Bowel Perforation Repair	12.50	1

Table 6: Multiple Regression Analysis for Predictors of Mortality in Abdominal Sepsis

Variable	Coefficient (β)	Standard Error (SE)	p-value	95% Confidence Interval (CI)
Age (Years)	0.05	0.01	0.001	0.03 to 0.08
Gender (Male)	0.45	0.23	0.048	0.01 to 0.89
Diabetes Mellitus	0.73	0.34	0.032	0.06 to 1.40
Hypertension	0.25	0.30	0.414	-0.34 to 0.83
Chronic Liver Disease	1.12	0.52	0.029	0.09 to 2.15
Surgical Intervention (Laparotomy)	-0.56	0.28	0.048	-1.11 to -0.01
SOFA Score (Severity)	0.35	0.08	0.001	0.19 to 0.51
Length of Hospital Stay (Days)	0.09	0.02	0.001	0.05 to 0.14

Discussion

This study provides a detailed analysis of patients with abdominal sepsis, focusing on demographics, comorbidities, surgical interventions, antibiotic therapy, treatment outcomes, complications, and mortality.

In this study, the mean age of the patients was **52.4 ± 14.6 years**, reflecting a wide range of patients from younger adults to the elderly. This is consistent with studies by **Gupta & Kaushik (2006)**, where they noted that abdominal sepsis often affects patients across various age groups, though older adults tend to experience worse outcomes due to age-related physiological decline.[5] The **male predominance (60%)** is also in line with findings from **Mishra et al. (2014)**, who reported a higher incidence of sepsis in males.[6] Regarding comorbidities, **hypertension (34.17%)** and **diabetes mellitus (26.67%)** were the most common, mirroring the results from **Sawyer et al. (2015)**, who found a significant association between comorbidities like diabetes and poor outcomes in abdominal infections.[8]**Chronic liver disease (15.83%)**, another common comorbidity in this study, was associated with a higher risk of mortality, as seen in **Mazeh et al. (2012)**, which highlighted the adverse effects of liver disease on patient outcomes in abdominal infections.[8]

The **severity of sepsis** in this cohort showed that **45.83%** of patients had **mild sepsis**, **35.83%** had **moderate sepsis**, and **18.33%** had **severe sepsis**, aligning with findings from **De Pascale et al. (2022)**, who emphasized the importance of early recognition and severity scoring, such as the **SOFA score**, to predict patient outcomes.[9]

The most frequent surgical intervention in this study was **laparotomy with peritoneal lavage (81.67%)**, which is a standard procedure in the management of generalized peritonitis and abdominal sepsis, as reported in **Coccolini et al. (2023)**. The study also highlighted the use of less common procedures such as **drainage of abscesses (10%)**, **bowel perforation repair (6.67%)**, and **resection of necrotic bowel tissue (8.33%)**, which are essential for managing more localized infections.[10] These findings are similar to those in **Regimbeau et al. (2014)**, who noted that the type of surgical intervention plays a significant role in the patient's recovery, with more extensive interventions being linked to longer recovery times and higher complication rates.[11]

In line with standard practice, the study utilized **piperacillin-tazobactam (62.50%)** and **meropenem (37.50%)** as first-line broad-spectrum antibiotics, which are recommended for covering a wide range of Gram-negative and anaerobic bacteria in abdominal sepsis. The use of **vancomycin (50%)** and **clindamycin (37.50%)** for Gram-positive coverage is also consistent with the findings of **Blot et al. (2012)**, who discussed the importance of empiric therapy in managing intra-abdominal infections.[12] The universal use of **metronidazole (100%)** for anaerobic coverage is essential in cases of peritonitis, as emphasized in **Montravers et al. (2015)**, who reported the importance of covering anaerobic pathogens in prolonged peritonitis cases.[13]

The **mortality rate** in this study was **18.33%**, which is consistent with **Sawyer et al. (2015)**, who found a mortality rate of approximately 20% in their cohort of patients with intra-abdominal infections. The **median length of hospital stay** was **14 days**, which is reflective of the severity of the condition, as patients with abdominal sepsis typically require prolonged hospitalization.8 The **wound infections (14.17%)** and **secondary infections (8.33%)** observed in this study are common complications in abdominal sepsis and are reported in other studies such as **Lamme et al. (2006)**, who identified wound infection as a

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significant complication after abdominal surgery.[14] The need for **re-laparotomy for source control (11.67%)** indicates the complexity of sepsis management, aligning with findings from **De Waele et al. (2022)**, who highlighted the critical importance of early and effective source control to reduce complications and improve survival.[15]

The mortality rate varied depending on the type of surgical intervention. **Drainage of abscesses and collections** had the highest mortality rate (25.00%), while **laparotomy with peritoneal lavage** had a lower mortality rate (16.33%). These findings are supported by **van de Groep et al. (2019)**, who found that source control procedures, such as drainage, are associated with higher mortality when compared to more aggressive interventions like laparotomy.[16] The lower mortality in **bowel perforation repair (12.50%)** reflects the effectiveness of this intervention in more localized infections, as suggested by **Coccolini et al. (2023)**, who reported better outcomes with early identification and treatment of bowel perforations.[10]

The **multiple regression analysis** identified several predictors of mortality in abdominal sepsis. **Age**, **male gender**, **diabetes mellitus**, **chronic liver disease**, and the **severity of sepsis (SOFA score)** were significant factors influencing mortality. These findings are consistent with studies by **Mazeh et al. (2012)**, who found that older patients, those with diabetes, and those with higher SOFA scores were at higher risk of mortality.8 Additionally, **De Pascale et al. (2022)** highlighted that poor timing and failure of source control are significant risk factors for mortality, which aligns with the findings in this study that showed **laparotomy** was protective, reducing mortality by **56%** ($p = 0.048$).[9] The study also demonstrated the importance of **hospital stay** duration as a predictor of mortality, with each additional day in the hospital increasing the likelihood of death by **9%** ($p = 0.001$), which is consistent with **Reemst et al. (1996)**, who observed that prolonged hospitalization is a marker of more severe or complicated sepsis.[17]

Conclusion

In conclusion, the management of abdominal sepsis remains a complex challenge that requires a multifaceted approach, combining timely surgical intervention for source control and appropriate adjunctive antibiotic therapy. The findings of this study emphasize the importance of early recognition and treatment, with surgical procedures like laparotomy and drainage playing a pivotal role in improving patient outcomes. Additionally, empiric broad-spectrum antibiotics, tailored based on culture results, are essential in managing infection effectively. Despite advances in treatment, careful monitoring and individualized care are crucial in minimizing complications and improving survival rates in patients with abdominal sepsis.

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