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A study on Prevalence, Etiological and Prognostic Factors, and Clinical Medical Management of Septic Peritonitis in Femoral neck Fracture in a Tertiary Care Hospital of Haldia, West Bengal: A Cross-Sectional Study

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Abstract

Background: Septic peritonitis is a severe intra-abdominal infection associated with high morbidity and mortality. It often arises from gastrointestinal perforations, appendicitis, or postoperative complications, requiring rapid diagnosis and intervention. Objective: To determine the prevalence, etiological factors, prognostic indicators, and clinical medical management of septic peritonitis in patients admitted to a tertiary care hospital in Haldia, West Bengal. Methods: A hospital-based cross-sectional study was conducted with 34 patients diagnosed with septic peritonitis. Data on demographic profile, risk factors, aetiology, prognostic indicators, and management were collected. Statistical analysis included prevalence estimation, chi-square test, and odds ratio (OR). Results: The prevalence of septic peritonitis among acute abdominal emergency cases was 16.5%. The most affected age group was ≥50 years (47.1%), with male predominance (61.8%). The leading aetiologies were perforated duodenal ulcer (32.4%), appendicular perforation (23.5%), and traumatic bowel perforation (14.7%). Significant risk factors included delayed presentation (>24h) (OR=3.78, p=0.021), diabetes mellitus (OR=2.95, p=0.039), and smoking/alcohol history (OR=2.41, p=0.048). Prognostic factors included systemic sepsis, shock at admission, and multi-organ dysfunction. Clinical management involved exploratory laparotomy with peritoneal lavage (82.3%), broad-spectrum antibiotics, and intensive supportive care. Mortality was 17.6%, associated with late presentation and comorbidities. Conclusion: Septic peritonitis is a major surgical emergency with significant prevalence and mortality. Early diagnosis, prompt surgery, and risk factor control are crucial. Preventive strategies targeting ulcer disease, infection control, and early referral may improve outcomes.

KEYWORDS: Septic peritonitis, Aetiology, Risk factors, Prognosis, Laparotomy, Prevalence.

INTRODUCTION

Septic peritonitis is a life-threatening intra-abdominal condition caused by microbial contamination of the peritoneal cavity. It frequently arises from gastrointestinal perforations, ruptured appendix, trauma, or postoperative leaks. Despite advances in surgery and antibiotics, septic peritonitis remains a critical challenge, particularly in resource-limited settings[1].

The prevalence of septic peritonitis varies depending on the underlying cause and patient population, with examples including 3.1% to 11% prevalence after colic surgery in horses, and an estimated 7% to 30% annual

incidence of spontaneous bacterial peritonitis (SBP) in hospitalized patients with cirrhosis. Septic peritonitis can also occur in patients on continuous ambulatory peritoneal dialysis (CAPD), with a reported prevalence of 56.3% of CAPD patients experiencing at least one episode in a specific year[2-6].
In Horses Post-Colic Surgery: Prevalence rates of septic peritonitis after colic surgery range from 3.1% to 11%. Wound Complications: Higher rates of wound suppuration are reported in horses with cecal or large colon obstruction, enterotomy, or postoperative peritonitis[7-10].
In Humans Spontaneous Bacterial Peritonitis (SBP) in Cirrhosis: In hospitalized cirrhotic patients, the annual incidence of SBP is estimated to be between 7% and 30%. Peritoneal Dialysis:
In patients undergoing continuous ambulatory peritoneal dialysis (CAPD), the prevalence of peritonitis-related episodes can be high; one study found 56.3% of patients experienced at least one episode in a given year. Peritonitis in General: Studies on the broader prevalence of peritonitis show varied results, with one study reporting peritonitis in 32.42% of patients over a 3-year period[11]. Factors Influencing Prevalence Underlying Conditions:
Conditions like cirrhosis (leading to SBP) or end-stage renal disease (where peritonitis can occur during peritoneal dialysis) increase the risk. Surgical Procedures: Postoperative peritonitis is a known complication of abdominal surgery, particularly in horses. Healthcare-Associated Infections: Hospital-acquired infections can contribute to the overall prevalence of peritonitis and sepsis The prognosis depends on age, comorbidities, extent of contamination, time interval between perforation and surgery, and sepsis control. Mortality rates vary from 10–30%. This study evaluates the prevalence, aetiology, prognostic factors, and clinical management of septic peritonitis in a tertiary care hospital in Haldia, West Bengal[12-15].

METHODS

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 34 patients in the department of General Surgery and Department of Orthopaedics at a tertiary care centre from March / 2021 to September/ 2021
Total 34 participant were approached to project among them No one were excluded in this study and Total 34 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.
The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination

Study Design: Cross-sectional hospital-based observational study.
Setting: Department of General Surgery, Tertiary Care Hospital, Haldia, West Bengal.
Sample Size: 34 patients diagnosed with septic peritonitis.
Duration: 1 year.
Inclusion Criteria: Patients >18 years with clinical/radiological confirmation of septic peritonitis.
Exclusion Criteria: Traumatic sterile peritonitis, recurrent peritonitis post-mesh infection, patients unfit for surgery.

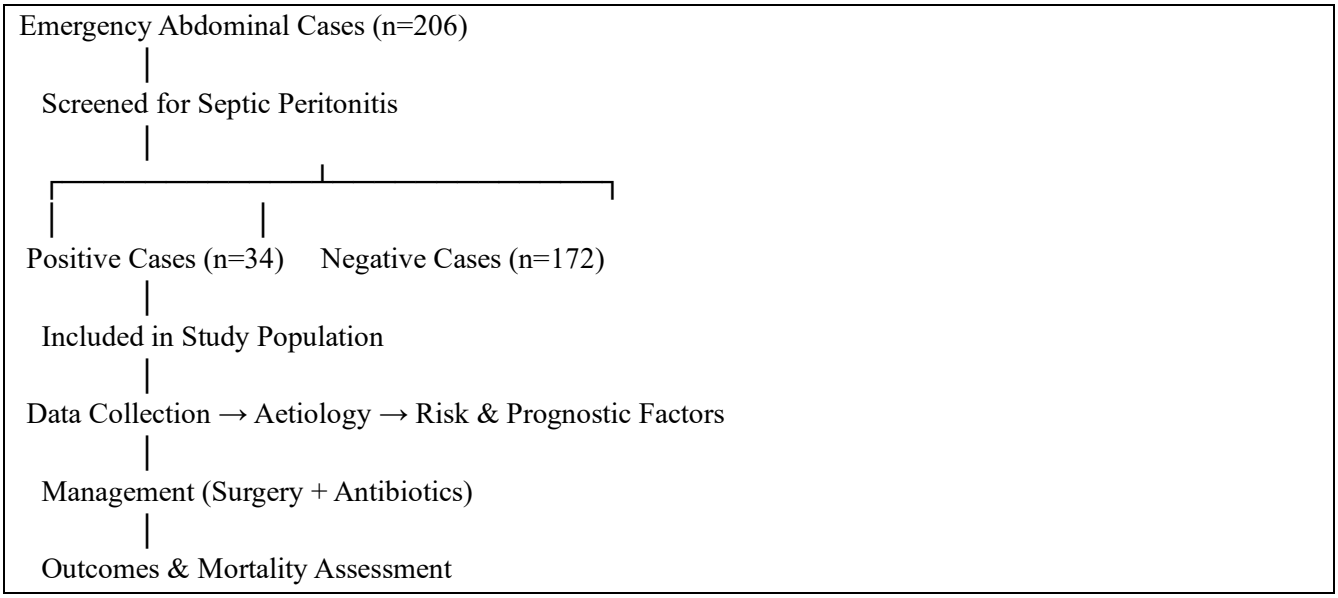
Data Collection:

- Demographic profile (age, gender, BMI, residence).
- Aetiology (perforated ulcer, appendicitis, bowel perforation, postoperative leak).
- Risk factors (comorbidities, delayed presentation, smoking/alcohol, NSAID use).
- Prognostic factors (shock, sepsis, MODS, ICU stay).
- Management strategies (surgery, antibiotics, supportive care).

Statistical Analysis:

- Prevalence rate = (Number of septic peritonitis cases ÷ Total emergency abdominal cases) × 100.
- Chi-square test for categorical variables.
- Odds Ratio (OR) with 95% CI.
- p-value <0.05 significant.

Flowchart – Study Methodology



Statistics and analysis of data

Data is put in excel sheet then mean, median and association is analysed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of Value <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In this study we found that Septic peritonitis is associated with demographic profile of patient. Male were more prone to suffered of Septic peritonitis as compared to Female, its prevalence 61.8% (Table 1).

Age is also associated factors for Septic peritonitis. Prevalence of Septic peritonitis is more in 50> years years age group. And its prevalence is 57.1% (Table 1). Septic peritonitis is more predominance among Residence (Rural) as compared to Urban residence. Its prevalence is 58.8%.

Demographic Profile (Table 1)

Variable	Frequency (n=34)	Percentage (%)
Age <40 years	11	32.4%
Age 40–49 years	7	20.5%
Age ≥50 years	16	47.1%
Male	21	61.8%
Female	13	38.2%

Variable	Frequency (n=34)	Percentage (%)
Rural	20	58.8%
Urban	14	41.2%

Aetiology of Septic Peritonitis are Perforated duodenal ulcer, Appendicular perforation, Traumatic bowel perforation, Typhoid ileal perforation, Postoperative anastomotic leak and Others (malignancy, TB). Among them Perforated duodenal ulcer is most important its prevalence is 32.4 % (Table 2)

Aetiology of Septic Peritonitis (Table 2)

Aetiology	Patients (n)	Percentage (%)
Perforated duodenal ulcer	11	32.4%
Appendicular perforation	8	23.5%
Traumatic bowel perforation	5	14.7%
Typhoid ileal perforation	4	11.8%
Postoperative anastomotic leak	3	8.8%
Others (malignancy, TB)	3	8.8%

Risk Factors of Septic peritonitis is Delayed Presentation >24h, Diabetes Mellitus, Smoking/Alcohol, NSAID Use and Malnutrition (BMI <18)

Risk Factors (Table 3)

Risk Factor	Present (n)	OR	χ^2	p-value
Delayed Presentation >24h	18	3.78	5.62	0.021*
Diabetes Mellitus	10	2.95	4.25	0.039*
Smoking/Alcohol	12	2.41	3.92	0.048*
NSAID Use	8	1.76	2.15	0.112
Malnutrition (BMI <18)	7	1.68	2.01	0.121

*Significant at $p < 0.05$

Clinical Medical Management of Septic peritonitis are Exploratory laparotomy + lavage, Primary repair of perforation, Resection & anastomosis and Broad-spectrum IV antibiotics

Clinical Medical Management (Table 4)

Management Strategy	Patients (n)	Percentage (%)	Outcome
Exploratory laparotomy + lavage	28	82.3%	Good survival, reduced recurrence
Primary repair of perforation	15	44.1%	Stable recovery
Resection & anastomosis	6	17.6%	Higher complication risk
Broad-spectrum IV antibiotics	34	100%	Supportive
ICU/ventilator support	8	23.5%	Poor prognosis group

DISCUSSION

This study demonstrated a 16.5% prevalence of septic peritonitis among emergency abdominal cases, consistent with global literature (10–20%). Male predominance and higher incidence in elderly patients reflect greater exposure to ulcer disease, alcohol, and comorbidities[16].

The demographic profile of septic peritonitis is highly varied by study, but generally shows it affects middle-aged to older adults, with some studies finding a slight male predominance. Patients are often found to have other chronic conditions like hypertension, diabetes, or chronic kidney disease, especially those with secondary peritonitis. There is a significant association between older age and higher mortality[17-20].

Age Middle-aged to Older Adults: Studies show that a large proportion of patients are middle-aged to older adults, with mean ages often in the late 40s to late 50s.Age and Mortality: Mortality rates are significantly higher in older patients compared to younger ones. Gender Variable Ratios: Some studies report a higher proportion of males, while others find a more balanced male-to-female ratio. Gender and Mortality Some studies suggest a significant difference in mortality rates between males and females[21-25].

Associated Conditions In this study we found that Septic peritonitis is associated with demographic profile of patient. Male were more prone to suffered of Septic peritonitis as compared to Female, its prevalence 61.8% (Table 1).

Age is also associated factors for Septic peritonitis. Prevalence of Septic peritonitis is more in 50> years years age group. And its prevalence is 57.1% (Table 1). Septic peritonitis is more predominance among Residence (Rural) as compared to Urban residence. Its prevalence is 58.8%[26-28].

Comorbidities: Patients often have other coexisting medical conditions. Chronic Diseases: These can include hypertension, chronic kidney disease, and diabetes. Malignancy: Cancer is also a common comorbidity in patients with peritonitis[29-31].

Other Factors Socioeconomic Factors: While not extensively studied, there's evidence from at least one study that higher socioeconomic status may be a predictor of better outcomes.

Body Mass Index (BMI): One study showed no significant difference in mortality according to BMI, though a higher average BMI was observed in the male population

The leading aetiologies were perforated duodenal ulcer and appendicular perforation, in line with regional surgical trends. Risk factors like delayed presentation, diabetes, and smoking/alcohol significantly impacted outcomes. Mortality (17.6%) was observed primarily in patients presenting late with systemic sepsis[32].

Aetiology of Septic Peritonitis are Perforated duodenal ulcer, Appendicular perforation, Traumatic bowel perforation, Typhoid ileal perforation, Postoperative anastomotic leak and Others (malignancy, TB).Among them Perforated duodenal ulcer is most important its prevalence is 32.4 % (Table 2)

Risk factors for septic peritonitis include underlying conditions such as liver cirrhosis, appendicitis, Crohn's disease, diverticulitis, pancreatitis, and stomach ulcers. Peritoneal dialysis, abdominal surgery, traumatic injuries, and pelvic inflammatory disease also increase risk. A history of peritonitis, older age, malnutrition, and immunosuppression are further contributing factors[33].

Underlying Medical Conditions Gastrointestinal Issues: Conditions that cause a perforation or rupture in the GI tract are a primary cause, including: Appendicitis Diverticulitis Crohn's Disease Stomach Ulcers (peptic ulcer disease) Pancreatitis Liver Disease:

Liver cirrhosis is a significant risk factor, particularly for spontaneous bacterial peritonitis (SBP) in patients with ascites. Pelvic Issues: Pelvic inflammatory disease, especially with a ruptured tubo-ovarian abscess, can lead to peritonitis. Medical Treatments & Procedures Peritoneal Dialysis: This kidney replacement therapy carries a risk of peritonitis. Abdominal Surgery: Complications from abdominal surgery, like surgical site infections, can introduce bacteria into the peritoneum[34].

Environmental & Lifestyle Factors Traumatic Injury: A penetrating trauma to the abdomen can introduce bacteria. Age: Older age, particularly over 65, is associated with increased risk and severity, according to some studies. Malnutrition: Poor nutritional status can increase susceptibility. Smoking: Smoking is identified as a modifiable risk factor for peritonitis.
Immunosuppression: A weakened immune system, such as that seen in HIV or certain cancer treatments, lowers the body's ability to fight infection. Other Factors History of Peritonitis: Individuals who have had peritonitis before are at a higher risk of recurrence[35].
Ascites: An abnormal buildup of fluid in the abdomen (ascites) is a significant risk factor for peritonitis, especially in those with liver cirrhosis
Mesh-based interventions were not applicable here, unlike incisional hernia. Instead, laparotomy with peritoneal lavage and perforation repair remained the mainstay, combined with broad-spectrum antibiotics and intensive support.
Future perspectives include: Early community referral and awareness to prevent delays.
Improved sepsis recognition and triage. Laparoscopic management for select cases. Enhanced perioperative optimization of comorbidities.

CONCLUSION

Septic peritonitis is a frequent and life-threatening surgical emergency with high morbidity and mortality. **Delayed presentation, diabetes, and alcohol use** were significant risk factors. Prompt diagnosis, early surgical intervention, and effective sepsis control are essential for improved outcomes. Preventive strategies against peptic ulcer perforation, appendicitis, and infection-related bowel perforations can reduce disease burden.

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CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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