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Clinical Evaluation and Management Outcomes in Acute Peritonitis: A Prospective Study

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ABSTRACT

Background: Acute peritonitis is a life-threatening abdominal emergency normally resulting from hollow viscus perforation. Despite advances in surgical and critical care, it continues to present a significant burden in developing countries due to delayed presentation and limited access to timely intervention.

Methods: This prospective study, conducted in a general surgery department from February 2024 to January 2025, included 110 patients over age 12 with peritonitis due to hollow viscus perforation. Patients underwent detailed evaluation, surgical intervention, and follow-up. A total of 110 patients aged above 12 years with intraoperatively confirmed hollow viscus perforation were included. Data were collected on clinical features, investigations, surgical procedures, complications, and outcomes. Descriptive statistics were used for analysis.

Results: Of the 110 patients, 91 (82.7%) were male and 19 (17.3%) were female. The most affected age group was >50 years (36.3%). Duodenal ulcer perforation was the most common cause (48.18%), followed by ileal and appendicular perforations. The main symptom was diffuse abdominal pain (61.82%), with guarding and rigidity being the most common clinical signs (94.55%). Pneumoperitoneum was present in 75.45% of X-rays. Omental patch repair was the most frequently performed procedure (63.64%). Postoperative complications occurred in 60% of patients, with lower respiratory tract infection (22.73%) and wound infection (12.73%) being most common. Mortality was 8.18%.

Conclusion: The study has concluded that most patients with hollow viscus perforation were over 50 years old, and the most common cause was duodenal ulcer perforation, especially among males.

Key-words: Acute peritonitis; Hollow viscus perforation; Duodenal ulcer; Emergency laparotomy; Postoperative complications; Surgical outcomes; Abdominal sepsis; Omental patch repair; Pneumoperitoneum

INTRODUCTION

Acute peritonitis is a life-threatening inflammatory condition of the peritoneal cavity, frequently resulting from gastrointestinal perforations, infections, or trauma. It remains an important cause of illness and death, all-inclusive, predominantly in developing countries where delayed presentation and limited healthcare resources exacerbate consequences.

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The clinical presentation of acute peritonitis characteristically includes abdominal pain, tenderness, guarding, rigidity, fever, and signs of systemic infection. Rapidly reducing the high illness and death connected to diagnosis and management is critical to this condition [1]. The identification of free air or fluid suggestive of the diagnosis of peritonitis is mainly clinical, supported by imaging modalities such as abdominal radiography and ultrasonography to perforation. Laboratory support in measuring investigations, including the strictness of the condition, leukocyte counts and inflammatory markers. Grading systems like the Acute Physiology, the Mannheim Peritonitis Index and Continuing Health Evaluation II have been utilized to predict patient outcomes and guide management decisions [2,3].

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Management of acute peritonitis involves rapid resuscitation, broad-spectrum antibiotics, and timely surgical involvement to control the source of infection. Surgical procedures such as omental patch repair, appendicectomy, or resection and anastomosis. Recent developments have introduced methods like decisions that differ depending on the fundamental causes and may include direct peritoneal resuscitation and abdominal negative-pressure therapy to improve outcomes in severe cases [4].

Despite these developments, depending on factors such as the range from 10% to 35%, the prediction of acute peritonitis remains guarded, with death rates. This study intends to measure the clinical presentation, management methods, and results of patients with acute peritonitis in our institution, patients' age, comorbidities, and timeliness of involvement, contributing to the current body of knowledge and possibly guiding upcoming therapeutic methods [5].

Clinically, patients with acute peritonitis may present with diffuse abdominal pain, guarding, rigidity, abdominal distension, fever, vomiting, tachycardia, and signs of hypovolemia. Physical examination results such as destruction of liver dullness, absent bowel sounds, and guarding are classic symptoms, but not always present, especially in elderly or immunocompromised patients. The diagnosis is supported by radiographic evidence, such as pneumoperitoneum on upright abdominal or chest X-rays. Modern imaging modalities, particularly ultrasonography and computed tomography, have improved diagnostic accuracy and localization of perforation sites. However, in many rural and emergency settings, reliance on clinical suspicion and basic imaging persists [6].

Despite developments in delay in presentation, and the nature of the perforation anaesthesia, antibiotics, and surgical procedures, the death from generalized peritonitis remains high, ranging between 10% and 40%, depending on the patient's baseline health. Standard operating management includes emergency laparotomy, peritoneal lavage, repair or resection of the pierced bowel, and postoperative intensive care support. Frequently performed procedures include omental patch repair, simple closure, appendicectomy, and bowel resection with or without anastomosis or diversion. Postoperative problems such as wound infections, lower respiratory tract infections, intra-abdominal abscesses, fistula formation, and sepsis are predominant and significantly affect regaining and hospital stay [7]. This study aims to evaluate the clinical presentation, surgical management, postoperative complications, and short-term outcomes in patients diagnosed with acute peritonitis secondary to hollow viscus perforation.

MATERIALS AND METHODS

Research Design- This hospital-based prospective observational study was conducted in the Department of General Surgery in our hospital from February 2024 to January 2025. The aim was to evaluate the clinical presentation, diagnostic method, surgical management, and short-term consequences in patients diagnosed with peritonitis due to hollow viscus perforation. A total of 110 patients above 12 years of age with clinical and radiological evidence of peritonitis and intraoperative confirmation of hollow viscus perforation were included, following written informed consent and institutional ethical clearance. Patients with traumatic perforation, obstructed or strangulated hernias, or those unwilling to consent were excluded. Data were collected using a pre-structured proforma including history, physical examination, laboratory tests, and radiological imaging like chest X-ray and abdominal ultrasonography. All patients underwent exploratory laparotomy, and the surgical procedure—omental patch repair, resection and anastomosis, ileostomy, or appendectomy—was based on intraoperative findings. Postoperative care included intravenous fluids, antibiotics, analgesics, anti-ulcer agents, nutrition, and wound care. Patients were monitored regularly and followed up on the 10th postoperative day and at one month in the outpatient department.

Inclusion Criteria

- ✓ Patients with clinical suspicion and radiological support for peritonitis due to hollow viscus perforation, later confirmed intra-operatively.
- ✓ Age above 12 years.

Exclusion Criteria

- ✓ Patients with hollow viscus perforation secondary to trauma.
- ✓ Perforation due to an obstructed or strangulated hernia.

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Outcome Analysis- The outcome analysis in this study was conducted by systematically tracking each patient from the time of admission, through surgery, and during the postoperative period, both in the hospital and after discharge. All patients who underwent surgical management for hollow viscus perforation were observed for key outcomes, including postoperative complications, mortality, and overall recovery. A pre-structured proforma was used to collect detailed data on each patient's clinical progress, complications such as infections or fistulas, and outcomes, such as discharge or death. Follow-up assessments were carried out on the 10th postoperative day and at one month in the outpatient department to monitor for delayed complications or recovery issues. The collected outcome data were carefully entered into Microsoft Excel and analyzed using SPSS version 27. Descriptive statistics such as frequencies and percentages were used to summarize the rates of various complications, successful discharges, and mortality, providing a clear picture of patient outcomes following surgical treatment for hollow viscus perforation.

Statistical Analysis- All collected data were entered and analyzed using Microsoft Excel and SPSS 27, respectively. Descriptive statistics, including frequency, percentages, tables, and graphs, were used to present demographic data, clinical profiles, operative findings, postoperative complications, and outcomes. $p<0.05$ was considered to be significant.

RESULTS

Out of the 110 patients included in the study, a significant majority were male (91 cases, 82.7%), while females accounted for 19 cases (17.3%). The age distribution revealed that the highest number of cases occurred in patients aged over 50 years (40 cases, 36.3%), followed by the 21–30 years age group (29 cases, 26.4%). The 31–40 years age group was the least affected, with only 8 cases (7.3%). These findings suggest that acute peritonitis secondary to hollow viscus perforation is more prevalent in males and predominantly affects older adults (Table 1).

Table 1: Demographic Distribution of Patients with Peritonitis Secondary to Hollow Viscus Perforation (N = 110)

Variable	Category	No. of Cases	Percentage (%)
Sex	Male	91	82.7
	Female	19	17.3
Age Group (Years)	12–20	16	14.5
	21–30	29	26.4
	31–40	8	7.3
	41–50	17	15.5
	>50	40	36.3
	Total	110	100

Among the 96 patients, duodenal ulcer perforation was the most common cause overall (48.18%) and was predominantly seen in males (64.56% of males). In contrast, ileal perforation was the most frequent in females (52.94%). Appendicular perforation was more common in females (23.53%) compared to males (12.66%). Jejunal and stomach ulcer perforations were relatively rare across both sexes (Table 2).

Table 2: Distribution of Type of Hollow Viscus Perforation According to Sex

Type of Perforation	Male Count (% within sex)	Female Count (% within sex)	Total Count (%)
Duodenal ulcer perforation (DU)	51 (64.56%)	2 (11.76%)	53 (48.18%)
Appendicular perforation (AP)	10 (12.66%)	4 (23.53%)	14 (12.73%)
Jejunal perforation (JP)	2 (2.53%)	1 (5.90%)	3 (2.73%)
Ileal perforation (IP)	11 (13.92%)	9 (52.94%)	20 (18.18%)
Stomach ulcer perforation (SU)	3 (3.80%)	1 (5.90%)	4 (3.64%)
Total	79 (100%)	17 (100%)	96 (100%)

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In this study of 110 patients with hollow viscus perforation, the duodenum was the most involved anatomical site, seen in 55.45% of cases, followed by the ileum (20.91%) and appendix (14.55%). Less frequent sites included the stomach (4.55%), jejunum (3.64%), and sigmoid colon (0.90%).

Regarding clinical symptoms, diffuse abdominal pain was the predominant complaint (61.82%), followed by epigastric pain (21.82%) and right iliac fossa pain (12.73%). A minority presented with pain in both the right iliac fossa and right lumbar region (1.82%) or the right hypochondrium (1.82%). This distribution of pain correlates broadly with the anatomical sites of perforation observed (Table 3).

Table 3: Anatomical Site of Perforation and Site of Abdominal Pain in Patients with Hollow Viscus Perforation (N = 110)

Parameter	Category	Frequency	Percentage (%)
Anatomical Site of Perforation	Stomach	5	4.55
	Duodenum	61	55.45
	Jejunum	4	3.64
	Ileum	23	20.91
	Appendix	16	14.55
	Sigmoid colon	1	0.90
	Total	110	100
Site of Abdominal Pain	Diffuse	68	61.82
	Epigastric (E)	24	21.82
	Right iliac fossa (RIF)	14	12.73
	RIF and right lumbar (RL)	2	1.82
	Right hypochondrium (RH)	2	1.82
	Total	110	99.99

Among the 110 patients studied, vomiting was the most reported symptom, occurring in 83.64% of cases. Fever was present in 58.18% of patients, while a history of pain was noted in 36.36% of cases (Table 4).

Table 4: Distribution of Symptoms Among Patients with Hollow Viscus Perforation

Symptom	Frequency	Percent (%)
Vomiting	92	83.64
Fever	64	58.18
History of pain	40	36.36

Guarding and rigidity were the most frequent clinical signs, observed in 94.55% of patients, followed by obliterated liver dullness in 76.36%. Dehydration was noted in 68.18%, while abdominal distension and free fluid were each present in about 61% of cases. Bowel sounds were reduced or altered in 46.36% of patients, reflecting the severity of intra-abdominal pathology (Table 5).

Table 5: Distribution of Clinical Signs in Patients with Hollow Viscus Perforation

Sign	Frequency	Percent (%)
Abdominal distension (DA)	67	60.91
Dehydration (DEHY)	75	68.18
Guarding and rigidity (G & R)	104	94.55
Obliterated liver dullness (OLD)	84	76.36
Free fluid (FF)	67	60.91
Bowel sounds (BS)	51	46.36

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Pneumoperitoneum was detected on abdominal X-ray in 75.45% of the patients, confirming the presence of free intra-abdominal air typically associated with hollow viscus perforation. The remaining 24.55% of patients did not show pneumoperitoneum, possibly due to sealed or small perforations (Table 6).

Table 6: Distribution of Pneumoperitoneum on Abdominal X-ray in Patients with Hollow Viscus Perforation

Pneumoperitoneum	Frequency	Percent (%)
Present	83	75.45
Absent	27	24.55
Total	110	100

The most frequently performed surgery was Omental Patch Repair, accounting for 63.64% of the cases. Appendicectomy and Simple Closure were the next common procedures, representing 14.55% and 11.82% respectively. More complex surgeries like Resection & Anastomosis and Loop Ileostomy were performed in a smaller proportion of patients (Table 7).

Table 7: Distribution of Type of Operation Performed

Type of Operation	Frequency	Percent (%)
Omental Patch Repair	70	63.64
Appendicectomy	16	14.55
Simple Closure	13	11.82
Resection and Anastomosis	7	6.36
Loop Ileostomy	4	3.64
Total	110	100

Postoperative complications were observed in 60% of the patients. The most frequent was Lower Respiratory Tract Infection (LRTI), seen in 22.73%. Wound infection was also common, either alone (12.73%) or with other complications. Only 40% of patients had an uneventful postoperative course without any complications. Multisystem complications and critical outcomes like ARDS and septicemia were relatively rare but clinically significant (Table 8).

Table 8: Distribution of Postoperative Complications

Postoperative Complication	Frequency	Percent (%)
Absent	44	40
Intra-Abdominal Abscess	2	1.82
Lower Respiratory Tract Infection, Wound Infection	11	10
Wound Infection	14	12.73
Wound Infection, Fistula	2	1.82
Lower Respiratory Tract Infection	25	22.73
IAA, LRTI, WI	5	4.55
Fistula	2	1.82
Acute Respiratory Distress Syndrome	2	1.82
Septicaemia, LRTI	3	2.73
Total	110	100

Out of 110 patients who underwent surgical intervention for hollow viscus perforation, 101 patients (91.82%) were successfully discharged after treatment. Unfortunately, 9 patients (8.18%) succumbed postoperatively, indicating a mortality rate of 8.18% (Table 9).

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Table 9: Distribution of Patient Outcomes

Outcome	Frequency	Percentage (%)
Discharged	101	91.82
Expired	9	8.18
Total	110	100

DISCUSSION

The present study examines the critical aspects of clinical evaluation and management outcomes in patients with acute peritonitis. Our results document existing literature, emphasizing the importance of initial diagnosis and quick operating involvement in improving patient results. Most of the patients presented with diffuse abdominal pain, vomiting, and fever, consistent with the clinical features reported in previous studies [7].

Duodenal ulcer perforation emerged as the most common aetiology, followed by appendicular and ileal perforations. This distribution is even with results from other perspective studies conducted in similar conditions. Surgical management mainly involves difficult omental patch repair, appendicectomy, and simple closure, reflecting standard practices in the treatment of gastrointestinal perforations [8].

Postoperative problems were observed in an important proportion of patients, with lower respiratory tract infections and wound infections being the most prevalent. These problems emphasizing the need for vigilant postoperative care are consistent with those reported in other studies. The complete death rate in our study was 8.18%, which is lower than the rates reported in some studies, but still the severity of acute peritonitis [9].

Scoring systems for patient results and guiding management decisions, like the APACHE II and MPI, proved valuable in predicting. Patients with higher scores were more likely to experience difficulties and death, emphasizing the utility of these apparatuses in clinical practice. Innovative methods, such as severe cases of peritonitis, although additional investigation is needed to establish their DPR and NPT have shown promise in improving results in efficacy and pertinence in numerous clinical situations [10].

Postoperative difficulties were observed in a significant proportion of patients in our study, with lower respiratory tract infections and wound infections. These problems reflect the systemic inflammatory problem connected with peritonitis and the physiological stress of major abdominal surgery [11]. Wound infections, seen in over 12% of patients, not only prolonged hospital stays but also increased the need for secondary interventions such as wound debridement and antibiotic escalation. Similarly, LRTI, observed in approximately 23%, was often associated with fundamental factors like progressive age, prolonged immobilization, or aspiration during anaesthesia. The importance of initial mobilization, respiratory physiotherapy, and vigilant intraoperative and postoperative airway management to reduce pulmonary complications [12].

In a few cases, problems like intra-abdominal abscesses and fistulas developed, frequently in patients who had delayed presentations or experienced resection and anastomosis for totally contaminated peritoneal cavities. Such patients require close monitoring for signs of sepsis and may benefit from adjunct interventions such as image-guided drainage or reoperation [13]. The increasingly problematic nature of these difficulties emphasizes the necessity of a multidisciplinary postoperative care method that includes surgical, critical care, infectious disease, and nursing teams. These results are consistent with other studies, depending on patient risk factors and institutional protocol, shown in tertiary centres, which report difficulty rates between 20% and 50% [14].

Acute peritonitis remains a significant surgical emergency requiring quick diagnosis and management. Initial vigilant postoperative care is paramount to operating involvement, appropriate antibiotic therapy, and improving patient outcomes. The utilization of scoring systems can assist in risk stratification and guide therapeutic decisions. Supplementary studies are necessary to explore the efficacy of developing methods and to develop standardized protocols for the management of acute peritonitis [15].

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CONCLUSIONS

The study has concluded that most patients with hollow viscus perforation were over 50 years old, and the most common cause was duodenal ulcer perforation, especially among males. The main symptoms included diffuse abdominal pain and vomiting; while guarding and rigidity were the most frequent clinical signs. Omental Patch Repair was the most common surgery performed. Postoperative complications were seen in 60% of patients, mainly lower respiratory tract infection and wound infection, and the overall mortality rate was 8.18%. Despite the high rate of complications, most patients (91.82%) were successfully discharged after treatment. The novelty of this study lies in its comprehensive, hospital-based prospective analysis of hollow viscus perforation cases over one year, focusing on detailed clinical profiles, diagnostic approaches, surgical management, and short-term outcomes in an Indian population. By systematically evaluating both intraoperative findings and postoperative complications with consistent follow-up, the study provides valuable, up-to-date insights into the patterns and management outcomes of hollow viscus perforation in a real-world setting.

CONTRIBUTION OF AUTHORS

Research concept- Krushna Chandra Jena, Jyoti Sankar Kar

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Critical review- Bidyapati Acharya

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