



# An In-Depth Examination of Acute Peritonitis Patient Evaluation in a Clinical Study

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## KEYWORDS

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**Abstract: Background:** Peritonitis is a frequent surgical emergency, and effectively managing it continues to be a complex task, even as surgical techniques, antimicrobial therapies, and intensive care support have advanced significantly. The primary culprits behind peritonitis are typically perforations of hollow organs and cases of appendicitis. Our study was conducted with the objective of examining the leading cause of peritonitis resulting from perforations, identifying associated risk factors, assessing various clinical presentation patterns, exploring treatment strategies, scrutinizing postoperative complications. **Methods:** We conducted a study involving 100 patients aged 12 years and older who presented with peritonitis. These patients were closely monitored over a span ranging from 10 months to 2 years, with an average follow-up period of approximately 18 months. **Results:** The leading cause of peritonitis in our study was appendicular perforation, followed closely by peptic ulcer perforation. Perforation-induced peritonitis accounted for 28% of all emergency surgeries conducted, with a male-to- female ratio of 3:1. The majority of patients falling within the age group of 51 to 60 years. Patients who sought medical attention within 24 hours of perforation experienced a smoother recovery, while those presenting after this critical time frame encountered more significant postoperative complications. We also found that serum CRP (C-reactive protein) levels served as a valuable prognostic indicator. These levels remained elevated in cases with complications. Among the complications observed, wound infections were the most prevalent, occurring in 56% of cases. **Conclusion:** Indeed, early diagnosis and timely surgical intervention are pivotal factors in facilitating rapid recovery for patients with peritonitis. However, it's important to note that the ultimate outcome is influenced by various factors, including the patient's age, the extent of peritoneal contamination, and the presence of any concurrent medical conditions. This study underscores the significance of C-reactive protein (CRP) as a serum prognostic marker, shedding light on its potential to aid in predicting patient outcomes.

## I. INTRODUCTION

Peritonitis refers to the inflammation of the serous membrane that lines the abdominal cavity and envelops the visceral or- gans contained within it [1], [2]. This inflammation can man- ifest as either localized or generalized and is categorized into primary, secondary, and tertiary forms. Primary spontaneous peritonitis is an infrequent occurrence and is typically caused by a single type of microorganism, often pneumococci or haemophilus bacteria [3]. Secondary peritonitis arises as a consequence of the spread of infection originating from intra- abdominal organs or as a result of the leakage or spillage of contents from the gastrointestinal or genitourinary tracts. Additionally, secondary peritonitis can also occur due to exogenous contamination, further broadening its range of potential causes. Tertiary

peritonitis refers to the recurrence or reactivation of peritonitis, which occurs even after ade- quate treatment of the initial episode of secondary peritonitis. This form of peritonitis represents a persistent or recurrent inflammatory condition within the abdominal cavity, despite prior efforts to manage and resolve the secondary peritonitis that preceded it. The peritoneal cavity stands as the largest cavity within the human body, spanning an expansive sur- face area estimated to be approximately 1.0 to 1.7 square meters in relation to the total body surface area. In cases of inflammation affecting the parietal peritoneum, which is abundantly supplied with somatic nerves, individuals often experience intense and localized pain. This localized pain is a result of the inflammation's impact on the sensitive somatic nerve endings in the parietal peritoneum.



## METHODS

A clinical study focusing on generalized peritonitis was undertaken following approval from the institutional ethical committee. The study encompassed the examination of 100 cases affected by peritonitis. During the course of the study, we diligently monitored and recorded various parameters, including the recurrence of symptoms, the occurrence of wound infections, the development of incisional hernias, and the presence of postoperative intestinal obstructions, if any, in the study participants. In this clinical study, we established specific inclusion criteria to determine eligibility for participation. Our criteria encompassed all cases involving individuals diagnosed with peritonitis or perforation of a hollow viscus. To ensure a comprehensive representation of the population, we considered patients aged 12 years and above, encompassing both males and females. This inclusive approach allowed us to gather valuable insights and data from a diverse group of patients affected by peritonitis and hollow viscus perforation, contributing to the robustness and relevance of our study's findings. We also established exclusion criteria to refine the scope of our study. Patients below 12 years of age were excluded, as were those with immunodeficiency diseases, as their unique medical conditions could potentially confound the study results [4]. Additionally, individuals with peritonitis who were managed conservatively, without surgical intervention, were also excluded from our study. These exclusion criteria were applied to maintain the homogeneity of the study cohort and ensure that the findings were applicable to the specific population under investigation. During the course of our clinical study, we conducted a comprehensive range of medical assessments and laboratory tests on the participants to gather essential data for our research [5], [6]. These evaluations included measuring hemoglobin levels, assessing coagulation profiles, determining blood grouping and Rh typing, conducting total and differential white blood cell counts, measuring the erythrocyte sedimentation rate (ESR), screening for HIV and Hepatitis B surface antigen (HBsAg), analyzing blood urea and serum creatinine levels, and evaluating serum electrolyte levels. Furthermore, we closely monitored serum C-reactive protein (CRP) levels at multiple time points, including preoperatively and on days 2, 4, and 6 postoperatively, to gauge the inflammatory response and assess its implications. In cases where typhoid

perforation was suspected, we conducted the WIDAL test to confirm the diagnosis [7], [8]. These comprehensive evaluations and tests enabled us to gather a wealth of data for our study and gain a deeper understanding of the clinical profiles and outcomes of patients with peritonitis and hollow viscus perforations.

## II. RESULTS

In our hospital, perforation peritonitis accounted for a significant portion, constituting approximately 28% of all emergency surgical procedures conducted. This demonstrates the substantial prevalence of this condition within our patient population [9]. When analyzing the demographics of the patients affected by perforation peritonitis, we observed no-

Age in years	No. of cases
<20	12
21-30	10
31-40	8
41-50	32
51-60	20
61-70	15
>70	10

TABLE 1: Age incidence of perforation.

Sex	No. of cases	Percentage
Males	78	78
Females	22	22

TABLE 2: Sex incidence.

table patterns in age and gender distribution. As shown in Table 1 and Table 2, the male-to-female ratio among patients with perforation peritonitis was 3:1, highlighting a significant male predominance in this particular medical condition. These findings provide valuable insights into the epidemiology of perforation peritonitis within our hospital's patient population.

In our study, we identified a notable peak incidence of perforation peritonitis occurring within the age range of 41 to 50 years. This age group exhibited the highest frequency of cases, signifying a critical period of susceptibility to this condition. Additionally, we analyzed the time delay in patient presentation following the onset of symptoms, categorizing patients into specific time intervals [10]–[13]. Among the patients presenting within less than 24 hours from the onset of symptoms (13 patients), we observed a relatively low morbidity rate of 4%. For those presenting within 24-



36 hours (6 patients), the morbidity rate increased to 8%. A significant increase in morbidity was noted for patients presenting at 36-48 hours (26 patients), with a morbidity rate of 80%. Furthermore, patients presenting within 48-72 hours (5 patients) had the highest morbidity rate, reaching 100%. These findings underscore the critical impact of timely medical intervention in mitigating morbidity associated with perforation peritonitis.

### III. DISCUSSION

Khanna et al conducted a study involving 210 consecutive cases of perforation peritonitis. The research revealed that a majority of the cases, specifically 110 of them, were attributed to typhoid. Other contributing factors included duodenal ulcer (60 cases), appendicitis (7 cases), amoebiasis (7 cases), and tuberculosis (5 cases) [14], [15]. In the current study comprising 100 cases, the most common cause of peritonitis was found to be appendicular perforation, accounting for 44% of the cases. This finding aligns with the results reported by Noon et al and Akcay et al, who observed that 21% and 18% of their respective cases were attributed to appendicular perforation [16], [17]. In the current study, the second most prevalent cause of perforation peritonitis was peptic ulcer perforation, accounting for 38% of cases. Among these, gastric ulcer perforations constituted 10%, while duodenal ulcer perforations made up 28%. It's worth noting that the duodenal-to-gastric ulcer ratio in this study was 4.5:1, which differs from findings in other Indian studies, such as Jhobta et al's research, which reported a duodenal-to-gastric ulcer ratio of 7:1. [18]–[20] In the current study, other causes of perforation peritonitis were identified as follows: malignant perforation accounted for 12%, and perforation due to various other reasons constituted 14%. These other causes included ileal perforations of unknown origin (6%), perforations associated with jejunal diverticula (4%), and perforations related to sigmoid volvulus (2%)<sup>21</sup>. Additionally, gastric carcinoma presenting with perforation peritonitis was responsible for 6% of cases, while colonic cancer-related perforation was observed in 4% of patients. Interestingly, Yadav et al, in their study, reported a lower rate of 2.6% for malignant perforation cases. The evaluation of inflammatory markers, such as CRP (C-reactive protein) and Procalcitonin (PCT), as prognostic indicators has generated significant interest in the medical field. In a

study conducted by Reith and colleagues involving 250 patients with abdominal sepsis, they found that serum CRP and PCT levels outperformed TNF- $\alpha$ , IL-1, and IL-6 levels in predicting prognosis. Interestingly, in our study, we observed that serum CRP levels were notably elevated in patients upon admission. In patients who experienced an uncomplicated postoperative recovery, these CRP levels gradually decreased when measured on day 3, day 5, and day 8 [22]–[24]. However, in individuals who developed complications, the CRP levels remained persistently high. This underscores the potential utility of CRP as a valuable indicator for monitoring and predicting patient outcomes. In our study, we did not perform any definitive antiulcer surgery due to the presence of peritoneal soiling. This approach aligns with the findings of previous studies by Ugochukwu et al and Khalil et al, which also highlighted the challenges posed by peritoneal soiling in the context of antiulcer surgery. For patients with malignant perforation, we opted for either limited or definitive resection as appropriate. In one particular case of malignant gastric ulcer perforation, we performed a distal radical gastrectomy as the surgical intervention.

### IV. CONCLUSION

The pattern of generalized peritonitis resulting from hollow viscus perforation varies across different regions of the world. In developing countries, perforations in the proximal gastrointestinal tract are the most frequently observed, while in developed nations, perforations of the distal gastrointestinal tract, often related to trauma, are more common [25], [26]. In rural settings, such as the one in our study, appendicitis leading to peritonitis was more prevalent than ulcer perforation. This occurrence is attributed to delays in seeking medical attention, which lead to appendicitis progressing to perforation peritonitis. Importantly, our study emphasizes the significance of using serum prognostic markers like CRP to assess the prognosis of patients in such cases. It is crucial to underscore the importance of early recognition and timely surgical intervention to minimize both morbidity and mortality rates in cases of peritonitis, as highlighted by our findings.

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## AUTHORS CONTRIBUTION

All authors contributed equally.

## CONFLICT OF INTERESTS

Author declared that there is no conflict of interest.

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