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Original Research Article

A Clinical Study on Outcome and Complications of Gastroduodenal Perforation Based on the Time of Presentation and Surgery

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Abstract

Background: Gastroduodenal perforation is a life-threatening surgical emergency associated with significant morbidity and mortality. The timing of presentation and surgical intervention plays a crucial role in determining patient outcomes.

Aim: To evaluate the outcomes and complications of gastroduodenal perforation based on the time of presentation and timing of surgery.

Methods: This prospective observational study was conducted over 12 months at a tertiary care center and included 50 patients aged >18 years with non-traumatic gastroduodenal perforation. Patients were analyzed based on time of presentation (<24 hours, 24–72 hours, >72 hours) and onset-to-surgery interval. Postoperative complications and mortality were assessed, and statistical analysis was performed to determine associations.

Results: The study population showed male predominance (88%) with most patients in the 31–60 years age group. Early presentation (<24 hours) was observed in 48% of patients, while 18% presented after 72 hours. Surgical site infection (52%) was the most common complication, followed by septic shock (32%), renal failure (28%), and respiratory complications (20%). Delayed presentation was significantly associated with increased morbidity, including higher rates of SSI (70% vs. 33%), respiratory complications (38% vs. 0%), septic shock (up to 88.89%), and renal failure. Mortality was 12% overall, with no deaths in early presenters and a markedly higher mortality (55.56%) in patients presenting after 72 hours ($p < 0.05$).

Conclusion: Delayed presentation in gastroduodenal perforation is strongly associated with increased morbidity and mortality. Early diagnosis and prompt surgical intervention are critical to improving clinical outcomes.

Keywords: Gastroduodenal Perforation; Delayed Presentation; Surgical Outcomes.

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Introduction

Gastroduodenal perforation is a life-threatening surgical emergency that continues to pose a significant burden on healthcare systems worldwide. It represents a critical complication of peptic ulcer disease and is associated with considerable morbidity and mortality despite advances in diagnostic modalities, antimicrobial therapy, and perioperative care.

The global incidence of perforated peptic ulcer ranges between 4 and 14 cases per 100,000 population annually, with higher prevalence reported in developing countries due to delayed presentation and limited access to healthcare facilities [1,2]. The etiology of gastroduodenal perforation is multifactorial, with Helicobacter pylori infection, chronic non-steroidal anti-inflammatory drug (NSAID) use, smoking, alcohol consumption, and physiological stress being the most commonly implicated factors [3,4]. In addition, comorbid conditions such as diabetes mellitus, cardiovascular disease, and renal impairment further influence disease severity and postoperative outcomes [5].

The pathophysiology involves spillage of gastric or duodenal contents into the peritoneal cavity, resulting in chemical peritonitis followed by bacterial contamination, systemic inflammatory response, and eventual progression to sepsis and

multi-organ dysfunction if untreated [6]. One of the most critical determinants of outcome in patients with gastroduodenal perforation is the time interval between symptom onset, presentation to healthcare facility, and surgical intervention. Early diagnosis and prompt surgical management are essential to achieve source control and limit peritoneal contamination [7]. Delayed presentation, often due to lack of awareness, socioeconomic factors, or delayed referral, is associated with increased risk of complications such as surgical site infection, septic shock, respiratory failure, acute kidney injury, and mortality [8,9].

Several scoring systems, including the Boey score and Mannheim Peritonitis Index, have emphasized the importance of delay in presentation as a key prognostic factor [10].

However, in real-world clinical settings, especially in resource-limited environments, patients frequently present late, leading to advanced peritonitis and poor outcomes. Understanding the relationship between timing of presentation and postoperative outcomes is therefore crucial for improving patient care and guiding public health strategies.

The present study aims to evaluate the outcomes and complications of gastroduodenal perforation with specific emphasis on the time of presentation and timing of surgical intervention. By analyzing the association between delay and morbidity as well as mortality, this study seeks to highlight the importance of early diagnosis and timely surgical management in improving clinical outcomes.

Aim and Objective: To study the demographic features and outcomes of gastroduodenal perforation based on the time of presentation and surgery.

Materials and Methods

This study was designed as a prospective observational study conducted over a period of 12 months. The study population comprised patients aged more than 18 years who were diagnosed with gastroduodenal perforation and admitted for surgical management. A total of 50 patients who fulfilled the eligibility criteria were included in the study.

Patients were included if they were above 18 years of age and had a confirmed diagnosis of non-traumatic gastric or duodenal perforation. Patients aged less than 18 years, those with hollow viscus perforations other than gastroduodenal origin, individuals with a history of previous abdominal surgeries, and patients who were not willing to undergo surgical intervention or comply with follow-up were excluded from the study.

Results:

A total of 50 patients diagnosed with gastric perforation were included in the study. The study population demonstrated a marked male predominance, with 44 patients (88%) being male and 6 (12%) female. The majority of patients belonged to the middle-aged group, with peak incidence observed between 41 and 50 years. Overall, 86% of patients were within the age group of 31–60 years, indicating that gastric perforation is more common in the middle-aged population.

Regarding the time of presentation, 24 patients (48%) presented within 24 hours of symptom onset, 17 patients (34%) presented between 24 and 72 hours, and 9 patients (18%) presented after 72 hours. This suggests that although nearly half of the patients sought early medical attention, a significant proportion presented late (Table 1). The interval between onset of symptoms and surgical intervention was less than 36 hours in 35 patients (70%), whereas 15 patients (30%) underwent surgery after 36 hours (Table 2). With respect to co-morbid conditions, diabetes mellitus was the most common, observed in 14 patients (28%), followed by hypertension in 10 patients (20%) and coronary artery disease in 4 patients (8%) (Table 3). Intraoperative findings revealed serobilious peritoneal contamination in 21 patients (42%), seropurulent contamination in 17 patients (34%), and purulent contamination in 12 patients (24%) (Table 4).

Table 1: Time of Presentation

Time Of Presentation	No. Of Patients	Percentage
< 24 Hours	24	48%
24 – 72 Hours	17	34%
>72 Hours	9	18%
Total	50	100%

Table 2: Onset of Symptoms to Surgery

Onset Of Symptoms To Surgery	No. Of Patients	Percentage
< 36 HOURS	35	70%
>36 HOURS	15	30%
TOTAL	50	100%

Table 3: Co-Morbidities

Co-Morbidities	No. Of Patients	Percentage
DM	14	28%
Hypertension	10	20%
CAD	4	8 %

Table 4: Intra Op Finding

Intra Op Finding	No. Of Patients	Percentage
Serobilious	21	42%
Seropurulent	17	34%
Purulent	12	24%

The most common postoperative complication was surgical site infection (SSI), occurring in 26 patients (52%). Among these, 4 patients (8%) developed burst abdomen. Respiratory complications were observed in 10 patients (20%), some of whom required postoperative ventilatory support. Septic shock occurred in 16 patients (32%), necessitating inotropic support. Acute renal failure was noted in 14 patients (28%). The overall mortality rate in the study was 12% (6 patients) (Table 5).

Analysis of morbidity in relation to time of presentation showed a significant increase in complications with delayed presentation. Among patients with SSI, 30% were presenting within 24 hours compared to 70% among those presenting after 24 hours (Chi-square = 6.846, p = 0.0326). Respiratory complications were absent in early presenters but occurred in 38% of patients presenting after 24 hours (Chi-square = 24.837, p = 0.000004).

Similarly, septic shock was not observed in patients presenting within 24 hours but occurred in 47% of patients presenting between 24–72 hours and 88.89% of those presenting after 72 hours (Chi-square = 26.457, p = 0.0000018). Acute renal failure was observed in 4% of early presenters, 30% of those presenting between 24–72 hours, and 88.89% of those presenting after 72 hours (Chi-square = 23.33, p = 0.00000859). Burst abdomen occurred exclusively in patients presenting after 72 hours, with an incidence of 44.44%, and was not observed in earlier presentations (Chi-square = 19.807, p = 0.00005) (Table 6).\

Table 5: Incidence of Morbidities and Mortality

Morbidities And Mortality	No. Of Patients	Percentage
SSI	26	52%
Respiratory Complication	10	20%
Septic Shock	16	32%
Renal Failure	14	28%
Burst Abdomen	4	8%
Death	6	12

Table 6: Incidence of Morbidities with Time of Presentation

Time Of Presentation	Ssi	Respiratory Complications	Septic Shock	Aki	Burst Abdomen
< 24 Hours	16%	0%	0%	2%	0%
24 – 72 Hours	22%	6%	16%	10%	0%
>72 Hours	14%	14%	16%	16%	8%
Total	52%	20%	32%	28%	8%

Mortality analysis revealed a strong association with delayed presentation.

No deaths occurred among patients presenting within 24 hours, whereas mortality was 5% in the 24–72 hour group and increased dramatically to 55.56% in patients presenting after 72 hours (Chi-square = 20.044, p = 0.000044) (Table 7). Overall, delayed presentation was significantly associated with increased morbidity and mortality, highlighting the importance of early diagnosis and timely surgical intervention in patients with gastric perforation.

Table 7: Comparison of Mortality with Time of Presentation

Time Of Presentation	Died	Survived	Total
< 24 Hours	0	24	24
24 – 72 Hours	1	16	17
>72 Hours	5	4	9
Total	6	44	50

Discussion

The present study demonstrates a strong association between delayed presentation and increased morbidity and mortality in patients with gastroduodenal perforation. The findings are consistent with existing literature and reinforce the critical importance of early diagnosis and timely surgical intervention.

The observed male predominance (88%) in this study aligns with previous reports, which have consistently shown higher incidence among males, likely due to increased exposure to risk factors such as smoking, alcohol consumption, and NSAID use [11,12]. The predominance of middle-aged patients (31–60 years) is also consistent with global trends, although some Western studies report a shift toward older age groups due to increased NSAID use and comorbidities [13].

Time of presentation emerged as a key determinant of outcome. Nearly half of the patients presented within 24 hours; however, a significant proportion presented after 24 hours, with 18% presenting after 72 hours. This delay is comparable to findings from other developing regions, where late presentation remains a major challenge [14]. Delayed presentation leads to progression from localized chemical peritonitis to generalized bacterial peritonitis, increasing the severity of systemic inflammatory response.

The high incidence of surgical site infection (52%) observed in this study is comparable to previously reported rates ranging from 30% to 60% [15]. The significantly higher incidence in patients presenting after 24 hours highlights the role of prolonged peritoneal contamination and bacterial load. Similar observations have been reported by Gupta et al., who demonstrated increased infection rates with delayed intervention [6].

Respiratory complications were observed exclusively in patients presenting after 24 hours, suggesting that systemic inflammatory response and sepsis contribute to pulmonary dysfunction. This is supported by previous studies indicating that delayed treatment increases the risk of acute respiratory distress syndrome and postoperative ventilatory requirements [16].

Septic shock showed a dramatic increase with delayed presentation, particularly in patients presenting after 72 hours. The incidence of 88.89% in this group underscores the severity of systemic infection and the importance of early source control. Søreide et al. have emphasized that delay in surgery is directly correlated with increased risk of sepsis and mortality [1].

Acute renal failure was also significantly associated with delayed presentation, reflecting the combined effects of hypovolemia, sepsis, and multi-organ dysfunction. Similar findings have been reported in studies evaluating outcomes in perforation peritonitis, where renal failure is a strong predictor of mortality [17]. Burst abdomen was observed exclusively in patients presenting after 72 hours, indicating severe infection, poor nutritional status, and impaired wound healing. This complication further increases morbidity and prolongs hospital stay.

The overall mortality rate of 12% in this study is comparable to reported rates ranging from 6% to 30% [18]. Notably, no mortality was observed in patients presenting within 24 hours, while mortality increased significantly in delayed presenters, reaching 55.56% in those presenting after 72 hours. This finding strongly supports the hypothesis that early intervention significantly improves survival outcomes.

The relationship between delay and adverse outcomes can be explained by the progression of peritoneal contamination, bacterial proliferation, endotoxemia, and systemic inflammatory response leading to organ dysfunction. Early surgical intervention limits this cascade and improves prognosis.

The findings of this study have important clinical implications. First, there is a need for increased public awareness regarding early symptoms of perforation and the importance of seeking prompt medical care. Second, strengthening referral systems and improving access to emergency surgical services can reduce delays. Third, early resuscitation, timely antibiotic administration, and prompt surgery remain the cornerstones of management.

This study also highlights the need for risk stratification and aggressive management in patients presenting late. Such patients may benefit from intensive monitoring, early organ support, and multidisciplinary care to reduce morbidity and mortality. Limitations of the study include the relatively small sample size and single-center design, which may limit generalizability. However, the findings are consistent with existing literature and provide valuable insights into the impact of delayed presentation. Future research should focus on multi-center studies with larger sample sizes and evaluation of interventions aimed at reducing delays in presentation and improving outcomes. In conclusion, the present study clearly demonstrates that delayed presentation in gastroduodenal perforation is associated with significantly increased morbidity and mortality. Early diagnosis and timely surgical intervention are critical for improving patient outcomes.

Conclusion:

Gastroduodenal perforation continues to be a significant surgical emergency with substantial morbidity and mortality, especially in developing regions.

This study demonstrated a clear male predominance and highest incidence among middle-aged individuals, reflecting patterns consistently reported in similar studies across India and other parts of the world. The most compelling and clinically relevant finding was the stark contrast in outcomes between early and delayed presenters. Patients who underwent surgery within 24 hours of symptom onset experienced significantly fewer complications, shorter hospital stays, and zero mortality, whereas delayed intervention was associated with a markedly higher rate of postoperative complications, including surgical site infections, respiratory failure, septic shock, acute renal failure, and death.

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