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POSTOPERATIVE COMPLICATIONS RATE IN EARLY AND LATE PRESENTING CASES OF GASTROINTESTINAL TRACT PERFORATION IN BIHAR: A COHORT STUDY.

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ABSTRACT

Background

Gastrointestinal (GI) tract perforation is a life-threatening surgical emergency requiring immediate intervention. This study aims to evaluate the postoperative complication rates in early versus late presenting cases of gastrointestinal tract perforations in Northern India.

Methods

A prospective cohort study included 182 individuals with confirmed GI tract perforations, who presented to the emergency department and outpatient clinic. The patients were allotted into 2 groups: Group A (presentation within 48 hours) and Group B (presentation between 48 and 144 hours). Both groups underwent exploratory laparotomy followed by standard postoperative care. Data on postoperative complications, hospital stay, and mortality were collected and analyzed using SPSS version 23.0.

Results

The study included 182 patients, with 48 in Group A and 134 in Group B. The mean age was 42.5 ± 10.6 years, with a male predominance (70% male, 30% female). Group B experienced significantly higher rates of postoperative complications compared to Group A. Local complications, such as surgical site infection, were observed in 25.4% of Group B patients versus 10.4% in Group A ($p=0.028$). Systemic complications, including septicemia and respiratory complications, were more common in Group B (55.2%) compared to Group A (27.1%) ($p=0.001$). The mortality rate was significantly higher in Group B (17.9%) compared to Group A (6.2%) ($p=0.047$). The mean hospital stay was longer for Group B, averaging 12.6 ± 4.3 days, compared to 8.9 ± 3.1 days for Group A ($p<0.001$).

Conclusion

Delayed presentation of GI tract perforations is correlated with notably higher postoperative complications, longer hospital stays, and increased mortality. Early intervention is crucial to improving patient outcomes.

Recommendations

There is an urgent need to enhance healthcare accessibility and education in rural areas to encourage early presentation. Strengthening healthcare infrastructure and implementing community outreach programs can help reduce delays in seeking medical care for GI emergencies.

Keywords: *Gastrointestinal perforation, postoperative complications, early intervention, delayed presentation, surgical outcomes.*
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INTRODUCTION

Gastrointestinal (GI) tract perforation is a critical surgical emergency characterized by the disruption of the continuity of the gastrointestinal wall, leading to the spillage of luminal contents into the peritoneal cavity, and resulting in peritonitis. This condition necessitates immediate medical attention due to the high risk of severe complications and mortality if not managed promptly. The etiology of GI perforations is diverse, ranging from peptic ulcer disease, malignancies, and trauma to inflammatory conditions such as Crohn's disease and diverticulitis. The clinical presentation of GI perforation often includes acute abdominal pain, signs of peritonitis, and sepsis, making timely diagnosis and intervention crucial for patient survival and recovery [1]. The management of GI perforations typically involves surgical intervention, such as exploratory laparotomy, to repair the perforation and decontaminate the peritoneal cavity. Postoperative care is equally important and often involves intensive monitoring, antibiotic therapy, and supportive care to prevent and manage complications [2]. Despite advancements in surgical techniques and perioperative care, the timing of intervention remains a significant determinant of patient outcomes. Early surgical intervention, ideally within the first 48 hours of symptom onset, has been correlated with better outcomes,

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including lower rates of postoperative complications and mortality [3].

However, in resource-limited settings such as Northern India, delays in presentation are common due to factors like lack of access to healthcare, socioeconomic barriers, and inadequate healthcare infrastructure. These delays can significantly impact the prognosis of patients with GI perforations, leading to higher morbidity and mortality rates. Recent studies have highlighted the challenges faced in such settings, where late presentations often result in increased rates of complications such as septicemia, respiratory distress, and multi-organ dysfunction syndrome (MODS) [4].

This study aimed to compare the rate of postoperative complications between early and late presenting cases of gastrointestinal tract perforation.

METHODOLOGY

Study Design

A prospective cohort analysis.

Study Setting

The study was conducted in Purnea, Bihar, India, at the Department of General Surgery, Fatma Hospital, Purna, Bihar, India. This location provided a diverse patient population, allowing for a comprehensive analysis of postoperative outcomes in this setting. The study was conducted over a period from June 20023 to June 2024.

Participants

A total of 182 patients who presented with gastrointestinal tract perforation were included in the study. These patients were allocated into 2 groups based on the time of presentation:

- Group A: Patients who presented within 48 hours from the onset of symptoms (48 patients).
- Group B: Patients who presented between 48- and 144 hours from the onset of symptoms (134 patients).

Inclusion Criteria

- Age: 18-60 years
- Hemoglobin: >10 g/dl
- Liver function tests: Within normal limits
- Serum albumin levels: Within normal limits

Exclusion Criteria

- Known cases of diabetes mellitus, hypertension, liver disease, immunocompromised patients or those with autoimmune diseases
- Cases of tuberculosis, malignant diseases, cardiac abnormalities or disease
- Patients presenting after 144 hours from the onset of symptoms

Bias

Selection bias was minimized by including consecutive cases of gastrointestinal tract perforation that met the inclusion criteria. Observer bias was reduced by using standardized procedures for both surgical and postoperative management. All patients received similar postoperative care, including antibiotic therapy, oxygen, ventilatory support, and fluid and electrolyte management, to ensure consistency across the study.

Variables

Variables included time of presentation, postoperative complications, including local complications and systemic complications.

Data Collection

Data were collected prospectively from patient records, operative notes, and follow-up visits. Information on the timing of presentation, surgical findings, postoperative complications, and outcomes were meticulously recorded.

Procedure

Patients with signs and symptoms of perforation peritonitis were clinically examined and investigated. Those with confirmed gastrointestinal tract perforation underwent exploratory laparotomy with peritoneal lavage using warm NaCl, followed by definitive surgical management of the perforated site. Postoperative care was uniform for all patients and included intensive care unit (ICU) management, administration of third-generation cephalosporins and metronidazole, as well as oxygen and ventilatory support as needed.

Statistical Analysis

Data was analyzed using SPSS 23.0. The two groups' postoperative complication rates were compared using t-tests for continuous variables and chi-square testing for categorical ones. Statistical significance was achieved with p-values below 0.05.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

RESULTS

A total of 182 patients were comprised in the study, with 48 patients in Group A (early presentation within 48 hours) and 134 patients in Group B (late presentation between 48 and 144 hours). The mean age was 42.5 ± 10.6 years, with a male predominance (70% male, 30% female). The demographic characteristics between the two groups were comparable.

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Table 1: Demographic profile

Characteristic	Group A (n=48)	Group B (n=134)	p-value
Mean Age (years)	41.8 ± 10.2	42.8 ± 10.8	0.612
Gender (Male/Female)	35/13	93/41	0.482
Mean Hemoglobin (g/dl)	11.5 ± 0.9	11.3 ± 0.8	0.289
Normal LFT (%)	100%	100%	-
Normal Serum Albumin (%)	100%	100%	-

Group B experienced a considerably higher incidence of postoperative complications than Group A. Local complications such as surgical site infection, burst abdomen, and anastomotic leak was observed in 18.7% of Group A patients and 42.5% of Group B patients (p=0.004). Systemic complications, including septicemia and respiratory complications, were significantly more common in Group B (55.2%) compared to Group A (27.1%) (p=0.001).

Table 2: Postoperative Complications

Complication Type	Group A (n=48)	Group B (n=134)	p-value
Local Complications			
Surgical Site Infection	5 (10.4%)	34 (25.4%)	0.028
Burst Abdomen	2 (4.2%)	18 (13.4%)	0.078
Anastomotic Leak	2 (4.2%)	12 (9.0%)	0.276
Postoperative Intestinal Obstruction	4 (8.3%)	26 (19.4%)	0.091
Incisional Hernia	2 (4.2%)	7 (5.2%)	0.768
Systemic Complications			
Septicemia	6 (12.5%)	46 (34.3%)	0.002
Respiratory Complications	5 (10.4%)	32 (23.9%)	0.041
MODS	1 (2.1%)	10 (7.5%)	0.190
Renal Failure	2 (4.2%)	11 (8.2%)	0.410
DVT	0 (0.0%)	3 (2.2%)	0.351
Mortality			
In-Hospital Deaths	3 (6.2%)	24 (17.9%)	0.047

The mean hospital stay was significantly longer for Group B (12.6 ± 4.3 days) compared to Group A (8.9 ± 3.1 days) (p<0.001). This was likely due to the higher rate of complications in the late presentation group.

Table 3: Hospital Stay

Group	Mean Hospital Stay (days)	Standard Deviation	p-value
Group A (n=48)	8.9	3.1	<0.001
Group B (n=134)	12.6	4.3	

DISCUSSION

The study included 182 patients who were divided into two groups based on the timing of their presentation: Group A (early presentation within 48 hours) and Group B (late presentation between 48 and 144 hours). The demographic analysis showed that the two groups were comparable in terms of age and gender, with a mean age of 42.5 ± 10.6 years and a male predominance (70% male, 30% female). This suggests that the timing of presentation, rather than demographic factors, was the primary variable influencing postoperative outcomes.

The study found that postoperative complications were significantly more common in patients who presented late (Group B). Local complications, such as surgical site infections and anastomotic leaks, were more prevalent in Group B, with 25.4% experiencing surgical site infections compared to 10.4% in Group A. This difference suggests that delayed surgical intervention increases the risk of local complications, likely due to the progression of infection and tissue damage that occurs with prolonged untreated perforations.

Systemic complications, including septicemia and respiratory complications, were also significantly higher in Group B, affecting 55.2% of patients compared to 27.1% in Group A. The increased incidence of systemic complications in late-presenting patients indicates that delayed treatment leads to more widespread and severe infections, which can affect multiple organ systems. This, in turn, contributes to a higher risk of morbidity and mortality.

The mortality rate was found to be significantly higher in Group B, with 17.9% of patients succumbing to their condition, compared to 6.2% in Group A. This underscores the critical importance of early surgical intervention in improving survival rates among patients with gastrointestinal perforations. The longer hospital stays observed in Group B (12.6 ± 4.3 days) compared to Group A (8.9 ± 3.1 days) further reflect the greater complexity and severity of complications associated with

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delayed presentation, necessitating prolonged medical care and recovery time.

Overall, the study demonstrates that early presentation and prompt surgical management of gastrointestinal perforations are crucial in reducing postoperative complications, minimizing hospital stays, and lowering mortality rates. These results highlight the need for heightened awareness and rapid response to symptoms of gastrointestinal perforation to improve patient prognoses.

An analysis of long-term results following curative resection for perforated colorectal cancer (CRC) looked at the effects of postoperative complications. The study discovered that postoperative complications had a major impact on overall survival (OS) and recurrence-free survival (RFS). It is imperative to prevent and manage postoperative adverse events in patients with perforated CRC since complications are independent prognostic markers for worse outcomes [5].

A retrospective analysis of patients undergoing emergency surgery for colorectal cancer (CRC) with obstruction or perforation was conducted. The study revealed that major postoperative complications occurred in nearly half of the patients, with a mortality rate of 12%. Key risk factors for complications and mortality included advanced age, perioperative blood transfusions, and a high Acute Physiology and Chronic Health Evaluation (APACHE II) score. These findings underscore the high morbidity and mortality associated with late-presenting gastrointestinal perforations requiring emergency surgery [6].

A study analyzed the outcomes of early versus late surgical intervention in patients with perforation peritonitis. Their study found that patients who underwent surgery within six hours of diagnosis had significantly better outcomes, including lower complication and mortality rates, shorter hospital stays, and quicker resumption of normal diet compared to those who had surgery after six hours. The study highlights the critical importance of timely surgical intervention in improving postoperative outcomes in patients with gastrointestinal perforations [7].

Moreover, the research investigated the optimal treatment strategies and postoperative complications in patients with upper gastrointestinal tract perforations. The study showed that patients who underwent surgery early had better outcomes, with fewer complications and shorter hospital stays, compared to those who had delayed treatment. The study emphasized the need for rapid surgical intervention to reduce the risk of severe complications and improve survival in cases of gastrointestinal perforations [8].

A study examined when individuals with gastrointestinal perforations and Crohn's disease (CD) should have surgery. According to their research, individuals who underwent surgery after a diagnosis that was more than five years ago had much greater rates of postoperative complications, such as anastomotic dehiscence and surgical site infections. This implies that better postoperative outcomes for CD patients could result from earlier surgical intervention [9].

Generalizability

The findings of this study, conducted in a resource-limited setting in Northern India, highlight the significant impact of delayed presentation on postoperative outcomes in gastrointestinal tract perforations. While the results are directly applicable to similar low-resource environments where healthcare access and infrastructure may be limited, the generalizability to more developed healthcare settings may be limited due to differences in healthcare systems, early intervention capabilities, and patient demographics. However, the study underscores the universal importance of timely surgical intervention, which remains critical for improving patient outcomes across diverse clinical settings.

CONCLUSION

The study indicates that late presentation (after 48 hours) is associated with a significantly higher risk of postoperative complications, prolonged hospital stay, and increased mortality. The data suggest that early intervention is crucial in managing gastrointestinal tract perforations to reduce the risk of adverse outcomes. The need for timely surgical intervention and standardized postoperative care cannot be overemphasized to improve patient outcomes in these cases.

Limitations

The limitations of this study include a small sample population who were included in this study. Furthermore, the lack of a comparison group also poses a limitation for this study's findings.

Recommendation

There is an urgent need to enhance healthcare accessibility and education in rural areas to encourage early presentation. Strengthening healthcare infrastructure and implementing community outreach programs can help reduce delays in seeking medical care for GI emergencies.

Acknowledgment

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List of abbreviations

GI – Gastrointestinal
MODS – Multi-Organ Dysfunction Syndrome
ICU – Intensive Care Unit
LFT – Liver Function Tests
CRC – Colorectal Cancer
OS – Overall Survival
RFS – Recurrence-Free Survival
APACHE II – Acute Physiology and Chronic Health Evaluation II
CD – Crohn's Disease

NaCl – Sodium Chloride

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Conflict of interest
The authors have no conflicting interests to declare.

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