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ETIOLOGY, MANAGEMENT, AND OUTCOMES OF TRAUMATIC GASTROINTESTINAL PERFORATION IN A TERTIARY CARE CENTER

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ABSTRACT

Background: This study aimed to evaluate the causes, anatomical distribution, and management strategies for traumatic gastrointestinal perforations.

Methods: A prospective study was conducted in the Department of General Surgery at a tertiary care center. A total of 100 patients presenting with traumatic gastrointestinal injuries were enrolled.

Results: The majority of patients (52%) were aged 21–40 years, with a male predominance. Blunt abdominal trauma accounted for 66% of cases, with road traffic accidents (48%) and falls (38%) being the most common causes. The jejunum was the most frequently injured site (58%). Surgical management included primary closure in 66% of patients, resection with anastomosis in 14%, and ostomy in 20%.

Conclusions: Blunt abdominal trauma, particularly from road traffic accidents, is the leading cause of gastrointestinal perforation, with the jejunum most commonly affected. Early diagnosis and timely surgical intervention are crucial to reducing morbidity and mortality.

Keywords: Blunt abdominal trauma, Penetrating abdominal trauma, Gastrointestinal injury.

INTRODUCTION:

Abdominal trauma represents a significant clinical challenge in the management of injured patients. Trauma is recognized as the leading cause of mortality in individuals under 40 years of age and remains the third most common cause of death across all age groups[1]. The high societal burden of traumatic abdominal injury therefore justifies particular attention to prevention, rapid diagnosis, and timely intervention[2]. Abdomen is the third most frequently affected anatomical region in trauma. Anatomically and clinically, abdomen is one of the most frequently affected regions in multisystem trauma, containing multiple vital solid and hollow organs whose injuries may rapidly determine outcome[3,4]. Abdominal injuries are traditionally classified into blunt and penetrating categories, with bowel injuries reported in association with both mechanisms[5]. Blunt abdominal trauma continues to be a major contributor to trauma-related mortality, largely attributable to the difficulty in establishing an early diagnosis due to its often subtle clinical manifestations[6]. In contrast, penetrating abdominal trauma is generally more straightforward to identify on clinical evaluation[7].

Epidemiologically, road traffic accidents constitute the predominant cause of blunt abdominal trauma worldwide, followed by falls. The mortality associated with blunt abdominal trauma exceeds that of

penetrating injuries, primarily due to delayed recognition and limited access to prompt diagnostic modalities and optimal early management[8]. Blunt abdominal trauma may produce solid-organ lacerations, mesenteric tears, or hollow-viscus injuries. Of note, hollow-viscus injuries (small-bowel and mesenteric) represent a small proportion of blunt-injured patients but carry a substantial risk of delayed diagnosis and increased morbidity and mortality when missed. Deceleration and shearing forces classically injure bowel at transition points between fixed and mobile segments — for example, the proximal jejunum near the ligament of Treitz and the distal ileum near the ileocecal junction — and CT patterns such as "bucket handle" mesenteric injuries are well described[9].

Penetrating abdominal trauma, on the other hand, is most frequently attributed to firearms, knives, or sharp objects such as broken glass. Firearm-related injuries account for approximately 80% of such cases, whereas stab wounds constitute the remaining 20%[10]. Among penetrating injuries, the colon and small intestine are the most commonly involved organs, and their injury is strongly associated with higher rates of postoperative complications[11].

AIMS AND OBJECTIVES:

1. To identify the causes and anatomical distribution of traumatic gastrointestinal perforations.
2. To evaluate the various management approaches and their outcomes in traumatic gastrointestinal perforations.

METHODS:

The study was done in the Department of General Surgery in Government Medical College Rajouri. Due informed consent was taken from the patients enrolled in the study. Patient details were taken according to the established proforma. The data was tabulated and results were expressed using statistical package for the social sciences (SPSS) software.

DESIGN:

It was a Prospective observational single center hospital-based study conducted at Govt. Medical College Rajouri

DURATION

The duration of the study was from August 2021 to July 2022.

INCLUSION CRITERIA

All the patients presenting with traumatic gastrointestinal injuries were included in the study.

EXCLUSION CRITERIA

Patients with abdominal trauma but without gastrointestinal perforation, as well as severely injured patients who did not survive resuscitative measures, were excluded from the study.

The study sample comprised patients admitted to the hospital with a history of trauma and suspected gastrointestinal injury. These patients, presenting with symptoms such as sudden-onset abdominal pain, fever, vomiting, and abdominal distension, underwent thorough clinical examination, including assessment of pulse, blood pressure, abdominal tenderness, guarding, rigidity, and other signs of peritonitis. Following initial assessment and resuscitation, patients underwent appropriate hematological and radiological investigations. Hemodynamically stable patients without clinical signs of peritonitis were evaluated using contrast-enhanced computed tomography (CECT) of the abdomen, whereas patients who were vitally unstable or exhibited signs of peritonitis on examination were taken for laparotomy.

RESULTS:

In our study, a total of 100 patients with traumatic gastrointestinal perforation were included. Out of 100 patients, 86 were males and 14 were females. Maximum patients (52%) were found in the age group of 21-40 years of age **(Table 1).**

Table 1. Age distribution of patients with Traumatic Gut perforation					
S. No.	**Age (yrs)**	**Male**	**Female**	**Total**	**%age**
1	<20	22	06	28	28
2	20-30	21	01	22	22
3	30-40	28	02	30	30
4	40-50	07	03	10	10
5	50-60	04	02	06	06
6	>60	04	-	04	04
Total		**86**	**14**	**100**	**100%**

In our study, RTA was the most common mode of trauma with total of 48% patients followed by fall with 38% patients **(Table 2).**

Table 2. Distribution of patients according to mode of trauma.				
Mode of Injury	**Male**	**Female**	**Total**	**%age**
Gunshot	10	0	10	10
Fall	30	08	38	38
RTA	42	04	48	48
Assault	04	02	06	06
Total	**86**	**14**	**100**	**100%**

In our study, 66 patients sustained blunt trauma, while 34 experienced penetrating injuries. Among those with blunt trauma, 56 were male and 10 were female. In the penetrating trauma group, 30 were male and 4 were female. Traumatic perforation was most frequently observed in the jejunum, affecting 58% of patients, and it was also the predominant site of perforation in blunt trauma cases. In contrast, among patients with penetrating injuries, the colon was the most commonly affected site, with perforations observed in 14% patients **(Table 3).**

Table 3. Distribution of patients according to site of perforation				
Site of perforation	**Blunt**	**Penetrating**	**Total**	**%age**
Gastric	0	10	10	10
Jejunum	52	06	58	58
Ileum	10	04	14	14
colon	04	14	18	18
Total	**66**	**34**	**100**	**100%**

In most of the patients, primary repair of the perforations was done accounting for 66% of the patients. Resection anastomosis was done in 14% of the patients while 20% of the patients underwent primary repair with stoma **(Table 4).**

Table 4. Distribution according to surgical intervention					
S. No.	**Surgical intervention**	**Blunt**	**Penetrating**	**Total**	**%age**
1	Primary repair	50	16	66	66
2	Resection anastomosis	06	08	14	14
3	Primary repair with stoma	10	10	20	20
Total		**66**	**34**	**100**	**100%**

In our study, 94% of the patients were discharged after management while 06% of the patients expired.

DISCUSSION:

Our study of 100 patients with traumatic gastrointestinal perforation provides valuable insights into the demographic profile, etiological factors, anatomical distribution, surgical management, and outcomes of such injuries. The findings are compared with existing literature to contextualize our results.

The male predominance (86%) observed in our study aligns with global trends, where males are more frequently affected by traumatic gastrointestinal perforations. This is consistent with findings from a study by Mirzamohammadi S et al, which reported a higher prevalence of traumatic bowel perforation in males (87.5%)[11].

The age group of 21–40 years being the most affected in our study is also in agreement with other studies, which have identified this age range as the most common for traumatic gastrointestinal injuries[12].

Regarding the mode of trauma, our study found that road traffic accidents (RTAs) (48%) and falls (38%) were the leading causes. This distribution is comparable to other study by Naqvi R et al, where RTAs are a significant contributor to traumatic gastrointestinal injuries[13].

In our study, the jejunum was the most commonly affected site (58%) in blunt trauma cases, while the colon was the most affected site (41%) in penetrating trauma cases. These findings are consistent with study by Naqvi R et al, which have reported a higher incidence of jejunal perforations in blunt trauma and colonic perforations in penetrating trauma[13].

Primary repair was the most common surgical intervention (66%) in our study, followed by primary repair with stoma (20%) and resection anastomosis (14%). These results are in line with other studies, which have reported that primary repair is a safe and effective method for managing traumatic colonic injuries[14].

Our study reported a mortality rate of 6%, with 94% of patients being discharged after management. This is comparable to other studies, which have reported mortality rates ranging from 2.5% to 8% for traumatic gastrointestinal perforations[15].

CONCLUSION:

Traumatic gastrointestinal injuries, arising from blunt or penetrating abdominal trauma, have shown an increasing incidence, largely attributable to road traffic accidents. These injuries predominantly affect adult males and most commonly involve the small intestine, particularly the jejunum. Primary closure remains the standard surgical approach in most cases. Early recognition and timely surgical intervention are critical, as prompt management is associated with favorable recovery, whereas delays in diagnosis and treatment are strongly correlated with increased morbidity and mortality.

Our study provides valuable data on the demographics, etiology, anatomical distribution, surgical management, and outcomes of traumatic gastrointestinal perforations. The findings are consistent with existing literature, highlighting the importance of early diagnosis and appropriate surgical intervention in improving patient outcomes.

Further studies with larger sample sizes and multicenter involvement are recommended to validate these findings and develop standardized protocols for the management of traumatic gastrointestinal perforations.

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