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## A study of traumatic small bowel injuries in our set up: A tertiary care study

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### Abstract

Small intestine is the third most commonly injured organ in blunt abdominal trauma (BAT) following liver and spleen. The aim of this study is to determine the incidence, age, sex, mode of injury, location, morbidity, mortality, complications and management associated with the traumatic small bowel injury.

**Keywords:** blunt abdomen trauma (BAT), laprotomy, exterozation, seromuscular

### Introduction

Blunt trauma abdomen being the leading cause of mortality and morbidity in every age group and small bowel injuries comprises the third most common injury in trauma abdomen. It is very challenging and tricky to diagnose the traumatic small bowel injury and it comprises 11% of total cases at the time of admission <sup>[1]</sup>. The diagnosis is notoriously difficult, especially in patients with multiple injuries, head trauma or impaired consciousness. The introduction of abdominal computerized tomography (CT) imaging as the primary diagnostic method in cases of blunt abdominal trauma and the acceptance of non-operative management for solid organ injury have increased the risk of missed small bowel injury <sup>[2]</sup>. The diagnosis of SBI is now more frequently made on the basis of clinical signs or an abnormal CT scan, than as an associated injury during a trauma laparotomy. As a result, delays in the diagnosis of SBI may occur and contribute significantly to morbidity and mortality <sup>[3]</sup>. Intestinal disruptions can be due to a variety of types of blunt trauma, with automobile being the most common aetiologic agent.

Ultrasound (US) has been described as a potentially useful diagnostic tool and is being used with increasing frequency <sup>[4]</sup>. In present scenario, much emphasis is given to CT scan findings associated with bowel and mesenteric injury due to blunt trauma.

### Methods

This study was carried in the postgraduate department of General surgery SKIMS Medical over a period of one year and included 310 cases of blunt trauma abdomen, out of which 44 cases had undergone laparotomy for intestinal and mesenteric injuries which accounted approximately 14.1% cases. All the operated cases were divided into major and minor injuries; major 1. Bowel perforation or transaction, 2. Mesenteric injury with compromised vascularity requiring resection, 3. Seromuscular injury of bowel not amending to resection. The pattern of injury was introspected with respect to age, sex, cause of injury, location of injury and associated injuries.

### Results

**Table 1:** Age and sex of patients with intestinal injuries

Age in years	Male	Female	% Age
10-20	1		2.27
21-30	7	1	18.18
31-40	19	3	50
41-50	7	2	20.4
51-60	3	1	9
Total	37	7	100

Out of 44 operated cases there were 37 males and 7 females with ratio of 5.2:1, mean age in

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which cases of blunt trauma abdomen with intestinal injuries was 34.8 years with 50% incidence and least was between 10 to 20 years of age.

**Table 2:** Cause of injury

Cause of injury	No of cases	% Age
Roar traffic trauma	24	54
Fall from height	9	20
Heavy object on abdomen	6	13.6
Trauma with blunt object	5	11.3

Out of 44 cases, road traffic accident was the most common mode of injury with 54% followed by other injuries of fall from height accounting 20% and least for trauma due to heavy objects 11.3%.

**Table 3:** Location of small intestine injuries

Location	Perforation	Serosal injury	total
deudonum	1		1
DJ junction	11	4	15
II junction	6	2	8
Terminal ileum	14	1	15
Diffuse	2	3	5
	34	10	

Out of 44 cases of small bowel injuries, 34 cases of small bowel perforations and 10 cases of serosal injuries were seen. Small bowel injuries in 15 cases of each were seen in DJ junction and terminal ileum respectively. Least involved part was deudonum.

### Associated injuries

**Table 4:** Colon of ascending tranverse and sigmoid

Colon	Ascending colon	Tranverse	Sigmoid
No. of injuries	1	3	3

Associated injuries of colon was examined and involved 1 in ascending colon, 3 in each tranverse and sigmoid colon.

Mesenteric injuries were seen in 8 cases and involved 3 in jejunal mesentry, 3 in ileal mesentry and 2 in sigmoid mesentry. Liver and splenic injury was seen 2 cases each which was managed conservatively.

Complication of anastomotic leak, intra-abdominal abcess and burst abdomen was seen in 3, 1, 1 cases respectively and all patients survived. In patients with leakage, exteroziation of bowel was done and in patients with abcess radiological drainage was done.

### Discussion

Mechanism of injury to the intra-abdominal structures during blunt trauma abdomen can be classified into two primary mechanisms 1. Compression forces 2. Deceleration forces [5]. Compression forces may result from direct blows or external compression against a fixed object (e.g. seat belt, spinal column). These forces may deform hollow organs and transiently increase intraluminal pressure, resulting in rupture. Deceleration forces cause stretching and linear shearing between relatively fixed and free objects. As bowel loops travel from their mesenteric attachments, thrombosis and mesenteric tears, with resultant splanchnic vessel injuries can result. Whatever the mechanism, early recognition of these lesions can be difficult.

It was Annan in 1837, who reported the first case of intestinal rupture secondary to blunt trauma in America [6]. It has been

observed in earlier studies that these injuries are seen in the younger age groups and usually occur due to road traffic accidents [7], which are comparable with present study.

In this study, intestinal injuries was seen in 14.1% patients with blunt abdominal trauma. This figure is consistent with the 5-15% reported in others studies, leading the intestine the 3<sup>rd</sup> most commonly injured abdominal organ in blunt trauma [8]. Most of the patients in this study presented with abdominal pain, tenderness and distension. However, the features were vague at initial examinations and became obvious only at repeated abdominal examinations. Delayed presentation or large leakage of bowel contents into the peritoneal cavity results in increased morbidity. This has also been reported in others studies.

In this study, it was observed that the proximal jejunum and distal ileum were more prone to perforation and injuries. This has also been observed in earlier reports [9]. Some studies have not supported this view. Dauterive *et al.* in a study of 60 patients, found that less than half of the perforations occurred in these zones. However, according to his study, mesenteric injuries do occur more frequently at these points. Similar results were noted in the present study. Colonic injuries occurred less frequently than small intestinal injuries. This has also been reported in others studies [10]. This is mainly due to its location and the lack of redundancy.

CT findings considered diagnostic for bowel injury are contrast extravasation and/or extraluminal air. CT diagnosis for small bowel perforation has a sensitivity of 92% and specificity of 94% [11]. The role of laparoscopy in blunt abdominal trauma is mainly diagnostic. In the recent years, there have been reports on therapeutics laparoscopy and repair of bowel perforations [12]. In hemodynamically stable patients with blunt abdominal trauma, laparoscopy safely and effectively identifies bowel injuries. Early recognition of these injuries and timely surgical treatment offers the exploratory laparotomy, drainage of septic peritoneal fluid and wound saline lavage are very important. Prophylactic antibiotics are required [13]. Simple closure is usually adequate for single perforation of the small intestine, but more extensive injuries such as multiple perforations and gangrene from mesenteric injuries usually require resection and anastomosis. Large bowel injuries particularly in the left colon may require creation of stomae best prognosis [14].

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