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## Post traumatic jejunal perforation: A series of 3 cases and literature review

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### Abstract

**Background:** Isolated jejunal perforation caused by blunt abdominal trauma is uncommon and most often seen after motor vehicle accidents. We present 3 cases of “blowout” perforation of the jejunum who were admitted to Dhiraj hospital with intense abdominal pain following a blunt abdominal trauma.

**Conclusion:** Although diagnosis of traumatic jejunal perforation is challenging a high index of clinical suspicion with physical examinations and the available appropriate imaging modalities we can arrive at diagnosis.

**Keywords:** blunt, jejunum, perforation, trauma

### Introduction

Trauma causes significant morbidity and mortality with motor vehicle accidents causing most deaths [1]. Blunt Abdominal Trauma (BAT) can injure any abdominal organs. Isolated Jejunal Perforation following BAT is extremely rare [2]. Although, majority of intestinal perforations are caused by Motor Vehicle Accidents (MVA) it can also result from physical assault, fall from height or injury caused by bicycle handle bar.

Blunt abdominal trauma causing perforation of the gastrointestinal tract is relatively infrequent with incidence of hollow visceral injury being <1%–8.5% [3, 4]. Samuel Annan reported the first case of intestinal rupture secondary to blunt trauma [5]. Isolated Jejunal Perforation post blunt trauma is seen in less than 1% cases [2].

A sudden increase in intra-luminal pressure in a fluid or air-filled bowel loop causes perforations on the anti-mesenteric border. These perforations occur due to raised intraluminal pressure and not due to crushing hence, usually they are not surrounded by damaged tissue [6]. Delayed diagnosis of Isolated Jejunal Perforation has significant morbidity and mortality [7, 8].

Punctate or slit-like perforations often occurring on the antimesenteric border are probably the consequence of a sudden increase in intraluminal pressure in a fluid or air-filled loop. Robbs *et al.* [9] in 1980 reported five such lesions in Zulu tribesmen, most caused by a blow to the abdomen with a heavy, round-headed weapon. The small bowels of almost all victims were distended with large quantities of local beer. These perforations were not surrounded by damaged tissue and did not appear to result from a crushing-type injury [9, 10]. They are referred to as “blowout” perforations. The assessment of modern-day blunt intestinal injury reveals that the vast majority of intestinal perforations following blunt abdominal trauma are caused by motor vehicle accidents.

We present 3 cases of isolated jejunal perforation following blunt abdominal trauma.

### Case presentation

#### Case 1

A 24-year-old male was admitted to the casualty with intense abdominal pain caused by road traffic accident. Laceration were present over thigh were primarily sutured, multiple bruises over all limbs were noted on his physical examination. Palpation revealed abdominal tenderness and guarding, and auscultation was marked by the absence of bowel sounds. Vital signs were normal. Blood tests were within normal limits. The erect chest radiograph showed the presence of free air under the diaphragm.

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Decision was made for an exploratory laparotomy that revealed a small amount of bile-stained fluid and an isolated perforation of the jejunum on the 1 X 1 cm in length, 20 cm distal from the ligament of Treitz. Exploration of the rest of the peritoneal cavity was unremarkable. The ruptured jejunum was sutured primarily (Vicryl 3-0) in two layers. The patient had an uneventful postoperative course and on the 4th postoperative day soft diet was started and drain were removed on day 7 and discharged after suture removal on day 14.

### Case 2

An 18-year-old male was admitted to the casualty with abdominal pain, vomiting and not able to pass stool for 3 days. History revealed blunt abdominal trauma by bull horn. No other injury was found. Palpation revealed abdominal tenderness and guarding, and auscultation was marked by the absence of bowel sounds. Vital signs were normal. Blood tests were revealed Hemoglobin: 8 gm% and Sr. Creatinine 1.4. The erect chest radiograph showed the presence of free air under the diaphragm. Ultrasound was suggestive of free fluid and absent peristalsis. Decision was made for an exploratory laparotomy that revealed around 2 liters of bile-stained fluid and an isolated perforation of the jejunum on the 3 X 3 cm in length, 20 cm distal from the ligament of Treitz. Exploration of the rest of the peritoneal cavity was unremarkable. The ruptured jejunum was sutured primarily (PDS 3-0) in two layers. The patient was kept intubated postoperatively and started on antibiotics and cardiac support (Dopamine and Noradrenaline infusion). Patient expired on day 3 due to MODS. (Figure 1).

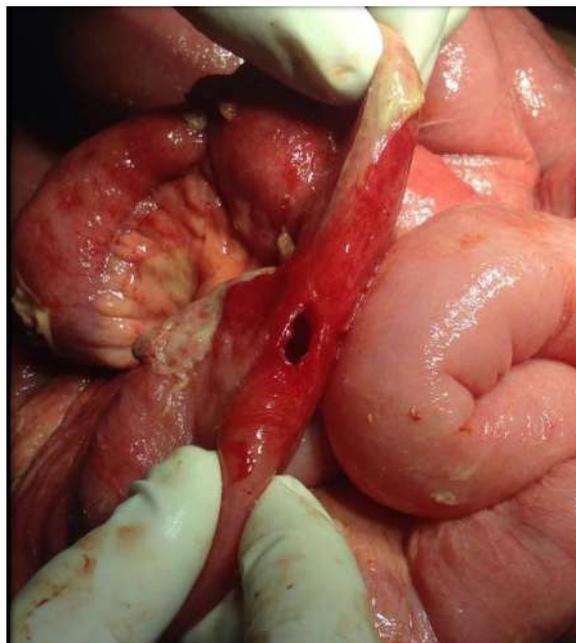


**Fig 1:** Patient expired on day 3 due to MODS

### Case 3

A 25-year-old male was admitted to the casualty with abdominal pain caused by road traffic accident. No other external injury was note. Palpation revealed mild abdominal tenderness and guarding, and sluggish bowel sounds. Vital signs were normal. Blood tests were within normal limits. The erect chest radiograph and abdominal standing was normal and didn't show any the presence of free air under the diaphragm. Ultra sound revealed free fluid in abdominal cavity. CECT abdomen pelvis revealed perforation in small bowel? Jejunal Perforation. Decision was made for an exploratory laparotomy that revealed a small amount of peritonal fluid and an isolated perforation of the jejunum on the 2 X 1 cm in length,

20 cm distal from the ligament of Treitz. Exploration of the rest of the peritoneal cavity was unremarkable. The ruptured jejunum was sutured primarily (PDS 3-0) in two layers. The patient had an uneventful postoperative course and on the 4th postoperative day soft diet was started and drain were removed on day 7 and discharged after suture removal on day 14. (Figure 2).



**Fig 2:** The patient had an uneventful postoperative course and on the 4th postoperative day soft diet was started and drain were removed on day 7 and discharged after suture removal on day 14

### Discussion

The abdomen is the third most commonly injured part of the body following trauma. Early recognition of small bowel injury is important in the prevention of morbidity [11-13]. Seventy-five percent of blunt abdominal traumas are caused by motor vehicle accidents [14]. Although small-bowel injury has been reported to be the third most common injury in blunt abdominal trauma, it occurs in less than 1% of blunt trauma patients [15, 16]. In the medical literature, 62 cases of small intestine perforations caused by physical assault were reported from 1970 to 1998 [16]. Hollow organ injury following a history of blunt abdominal trauma is a dilemma for emergency department physicians. The diagnosis of hollow viscus organ injury should be based upon the mechanism of injury, history and serial physical examinations.

Physical examination is not adequate on its own for the diagnosis, and it was reliable in only 30% of blunt trauma injuries [16]. According to Schenk *et al.*, [17] there are no reliable signs or symptoms, and free air under the diaphragm on erect chest plain radiographs is characteristically absent. Among 111 patients with small bowel perforations, abdominal tenderness was a common finding, but it was not specific for bowel perforation. Only 40% of the CT scans were diagnostic for bowel perforations; 50% of them showed suggestive signs and 10% were considered as negative. Persistence of abdominal signs indicated peritoneal lavage [18]. Apart from physical examination, there are three diagnostic tools for hollow viscus perforation: diagnostic peritoneal lavage (DPL), CT scanning, and focused abdominal sonography for trauma (FAST). The DPL is the most widely used method. According to Burney *et al.*, [19] peritoneal lavage has proven sensitive in the demonstration of hemoperitoneum, but is less reliable in the

early diagnosis of intestinal injuries. Powell *et al.* [20] noticed that the routine use of peritoneal lavage in stable trauma patients often leads to nontherapeutic laparotomies. The gold standard for assessment of blunt trauma diagnosis is CT scanning, with a sensitivity of 92%, specificity of 94%, positive predictive accuracy of 30%, negative predictive accuracy of 100%, and overall accuracy (validity) of 94% [21]. It is emphasized that CT scan might have the capacity to accurately diagnose blunt intestinal trauma, providing it is performed and interpreted with care. It has proved to be an excellent imaging modality for diagnosis and management of hemodynamically stable patients with abdominal injuries, contributing toward a significant reduction in morbidity and mortality in trauma victims [22]. Although the impact of operative delays on morbidity and mortality has been unclear, even relatively brief delays as little as eight hours result in morbidity and mortality directly attributable to a “missed” smallbowel injury [23]. Small bowel perforation has low mortality and complication rates if it is treated earlier than 24 hours after injury. The principle of “rushing to the operation suite” for a stable patient with blunt abdominal trauma without detailed systemic examination is not justified. Because delay in diagnosis does not seem to affect morbidity or mortality, dedication to observation and serial physical examinations will aid in the proper identification of elusive small-bowel and mesenteric injuries in blunt trauma [24]. In one study [25], mortality from operative blunt trauma was associated with admission blood pressure  $\leq 90$  mmHg, age  $\geq 24$  years and Injury Severity Score  $\geq 35$ . Morbidity was associated with age  $\geq 24$  years and delay in operative therapy  $\geq 24$  hours. Some authors [25] believe that mortality is associated with other serious concomitant injuries and that complications are associated with diagnostic delays.

### Conclusion

Although diagnosis of traumatic jejunal perforation is challenging a high index of clinical suspicion with physical examinations and the available appropriate imaging modalities we can arrive at diagnosis.

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