

Traumatic Rupture of Duodenum: A Case Report

Rahman MA¹, Imam HM²

Abstract:

Isolated duodenal rupture after blunt abdominal trauma is infrequent, liable to be missed and is associated with high morbidity and significant mortality. Diagnostic delay is a part of clinical picture in most of these cases, considering its anatomical location & lack of peritoneal sign. Among different modalities, use of CT scan for diagnosis is widely appreciated. Majority of duodenal injury can be managed by simple repair of injured site. But delayed presentation, lack of optimal diagnostic approach & delayed surgical intervention have results in many post-operative complication & hamper the possible outcome. The case of young traumatized patient with isolated duodenal rupture is presented to highlight these issues.

Keywords: Rupture Duodenum, Blunt abdominal trauma, Delayed surgical treatment

Introduction:

Injuries, especially as a result of blunt trauma, now constitutes one of the major causes of death in our country. The frequency of trauma to the abdomen may be increasing in almost geometric proportion as the number & speed of highway vehicles, civil unrest & terrorist attack rises.

Abdominal Trauma is a common clinical entity occurring in an emergency surgical unit and Blunt abdominal injury causing hollow viscous rupture is a common squeal. According to East multi-institutional trial of trauma indicate that after blunt abdominal trauma the incidence of small bowel injury and small bowel perforation (SBP) 1.1% and 0.3%, respectively¹.

Case report:

This is a story of a 20 years old boy. He had a history of road traffic accident 3 days back where he encountered by tin at supra umbilical region on right side. He was treated by local physician. On next morning he developed increasing abdominal pain, vomiting, respiratory distress & his conditions were deteriorating. On examination (OE) his abdomen was very tender & rigid, Blood Pressure (BP) - 100/60 mm Hg, Respiratory rate (RR) - 24/min, Pulse rate (PR) - 110/min. X-ray abdomen in erect posture including both dome of diaphragm revealed free gas shadow under both dome of diaphragm. Then other necessary investigations for assessing fitness for anaesthesia were done & Patient was prepared for exploratory laparotomy.

Abdomen was opened by upper midline incision revealing peritoneal cavity (Fig. 1, 2) with huge bile mixed food material & blood mixed fluid. Then content was sucked & peritoneal toileting was done. On query, large perforation was found in the 2nd part of duodenum (Fig. 3) about 10 cm distal to Gastro-Duodenal (G-D) junction & there was no other injury. Primary repair was done & two drain tube were kept in situ.

On 5th post-operative day (POD) patient was allowed to take liquid diet & sips of water orally. At the mean time observing for drain collection, abdominal pain, fever, vomiting & any discharge from wound.

On 7th POD patient was allowed to semi solid diet. Finally the drain tubes were removed on 9th POD. The recovery was uneventful. The patient left hospital giving thanks to all.

Discussion:

Blunt abdominal trauma (BAT) may be from direct compression of the abdomen against a fixed object with resulting tears or subcapsular haematoma involving the solid organ associated viscera². Hollow organs (typically small intestine) may rupture due to compression against a fixed point, usually the vertebral column. This compression causes rapid increase in intraluminal pressure leading to perforation of bowel wall at the anti-mesenteric border, where bowel is usually weaker². Isolated duodenal injuries following a blunt abdominal trauma is uncommon. Complete transaction of duodenum is very rare presentation². The

¹Professor Md. Ataur Rahman, Department of Surgery, Eastern Medical College.

²Dr. HM Hasan Imam, Assistant Registrar, Department of Surgery, Eastern Medical College.

Address of Correspondence: Professor Md. Ataur Rahman, Professor & Head, Department of Surgery, Eastern Medical College, Comilla. Mobile: +8801711721098, Email: ataurr1954@yahoo.com

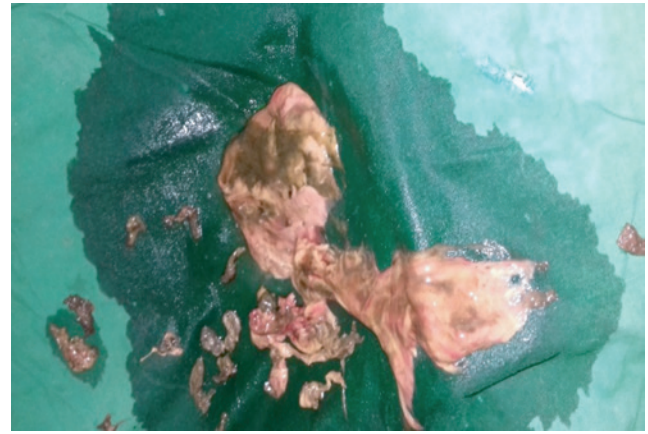


Figure 1, 2: Huge bile, blood & food mixed fluid & material revealed after opening the abdomen by upper midline incision

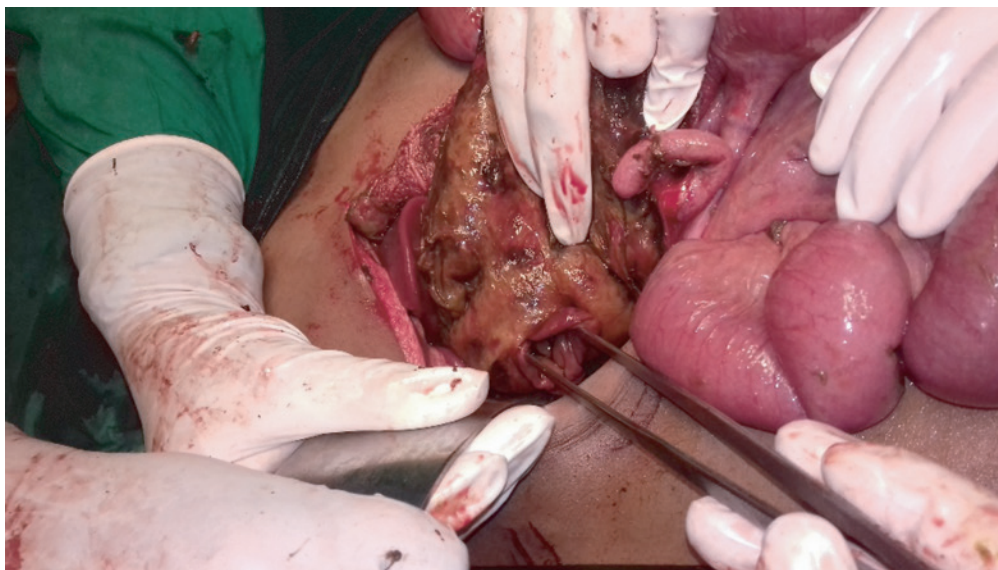


Figure 3: Large perforation found in the 2nd part of duodenum

most common cause of blunt abdominal trauma (BAT) is motor vehicle accident (MVA).

Patients with multiple lower rib fractures are notorious for having severe intra-abdominal injuries without significant abdominal pain. The severe pain from the rib fractures becomes a distracting injury for the less noticeable abdominal pain. As a result, the patient may have a poor outcome as abdominal injuries are not recognized.

Spontaneous perforation of an hollow viscus may be the result of a range of pathological processes, where diagnosis is relatively easy for surgeon. But isolated duodenal perforation after blunt abdominal trauma is still a diagnostic challenge to surgeon.

One third of our patient did not present to the hospital until after an average of three days with advanced peritonitis. Reasons put forward to explain such delay include: 1. Relatively less initial peritoneal irritation

induced by the nearly neutral intestinal content particularly those with perforation between the duodeno-jejunal flexure and the ileo-caecal junction; 2. In small gut perforations the mucosa may prolapse through the hole and partly seal it making early sign of misleading; 3. The entity of a delayed perforation caused by an evolving injury. These patient have an initial contused bowel wall at the time of trauma that ultimately gives way after a variable period with resultant peritonitis. For this reason, physical examination during the initial evaluation is reliable for an early diagnosis in only 30% of blunt trauma injuries, in those patients who exhibit clear peritoneal signs³.

Abdominal pain, the usual symptom indicating abdominal injury is not severe & therefore the patient did not seek hospital care soon after injury most probably due to the above reasons.

Initial approach to the blunt abdominal trauma (BAT) patient is done according to fundamental principles of

advanced trauma life support (ATLS) system, which compromise primary survey & resuscitation [ABCDE (Airway, Breathing, Circulation, Disability, Exposure) of trauma care, steps of resuscitation, re-evaluation of ABC, monitoring the vital sign, introduction of gastric tube or Foley's catheter] and secondary survey (careful abdominal examination & to identify all other injuries).

Several diagnostic modalities are being used for the identification of isolated bowel perforation. These are X-ray abdomen in erect posture including both dome of diaphragm, Serum amylase, WBC count, focused assessment with sonography for trauma (FAST), diagnostic peritoneal lavage (DPL), Abdominal CT. Free sub-diaphragmatic gas, a radiologic sign indicative of hollow viscus perforation easily detected in plain abdominal radiographs, could lead to an early diagnosis in only 7-8% of the cases^{4,5}. Elevated white blood cell (WBC) count and serum amylase levels could be suggestive of an intra-abdominal process and aid diagnosis in conjunction with history and physical findings. Although abnormal serum amylase can be noted in such cases, no clear cut-off value that could help differentiate patients with SBP could be determined⁴. Focused assessment with sonography for trauma (FAST) play an important roles to detect the free intra-peritoneal fluid and haemo-pericardium in the assessment of acutely traumatized patient, with the sensitivity of 91-100%⁶. Diagnostic peritoneal lavage (DPL) can identify Small bowel perforations (SBP) with great sensitivity (up to 100%) but relatively low specificity^{7,8}. CT has proved to be the gold-standard examination, contributing toward a significant reduction of morbidity and mortality in trauma victims^{9,10}. Postoperative complications like wound infection, would dehiscence, intra-abdominal abscess, acute respiratory distress syndrome and sepsis, all occur at two to three times higher incidence in patients who undergo surgical repair of Small bowel perforations with extended delay^{11,12}. The key individual in the development of a system of trauma care is the general surgeon.

Treatment:

Urgent hospitalization of patient preferably in ICU with initial resuscitation, side by side preparation of the patient for laparotomy. After laparotomy, thorough surgical toileting, identification of injury, repair, re-toileting then drain were given. Associated injury were also looked for & treated. Abdomen was closed in layer. A meticulous follow up of the patient is needed for good outcome.

Conclusion:

We present a case of successful repair of 3 days old traumatic duodenal perforation. Isolated duodenal perforation in blunt abdominal trauma victim is hard to diagnosis. Early diagnosis & appropriate operative management which are imperative to prevent morbidity in many cases. The rarity of duodenal perforation, the patient's good general condition following road traffic accident & treatment by local physician delayed the diagnosis. Cornerstone to successful management is combination of detailed history including the mechanism of injury, thorough clinical examination & Investigation under close supervision, surgical procedures to identify the perforation & repair.

References:

1. Watts DD, Fakhry SM. Incidence of hollow viscus injury in blunt trauma: an analysis from 275,557 trauma admissions from the East multi-institutional trial. *J Trauma* 2003; 54(2): 289-94.
2. AH Dauterive, L Flancaum, EF Cox. Blunt intestinal trauma. A modern-day review. *Ann Surg* 1985; 201(2): 198-203.
3. Guarino J, Hassett JM Jr, Luchette FA. Small bowel injuries: mechanisms, patterns, and outcome. *J Trauma* 1995; 39(6): 1076-80.
4. Fang JF, Chen RJ, Lin BC, Hsu YB, Kao JL, Kao YC, Chen MF. Small bowel perforation: is urgent surgery necessary? *J Trauma* 1999; 47(3): 515-20.
5. Mathonnet M, Peyrou P, Gainant A, Bouvier S, Cubertafond P. Role of laparoscopy in blunt perforations of the small bowel. *Surg Endosc* 2003; 17(4): 641-5.
6. Fakhry SM, Watts DD, Luchette FA; EAST Multi-Institutional Hollow Viscus Injury Research Group. Current diagnostic approaches lack sensitivity in the diagnosis of perforated blunt small bowel injury: analysis from 275,557 trauma admissions from the EAST multi-institutional HVI trial. *J Trauma* 2003; 54(2): 295-306.
7. Neugerbauer H, Wallenboeck E, Hungerfort M. Seventy cases of injuries of the small intestine caused by blunt abdominal trauma: a retrospective study from 1970 to 1994. *J Trauma* 1999; 46(1): 116-21.
8. Fabian TC, Mangiante EC, White TJ, Patterson CR, Boldreghini S, Britt LG. A prospective study of 91 patients undergoing both computed tomography and peritoneal lavage following blunt abdominal trauma. *J Trauma* 1986; 26(7): 602-8.

9. Gay SB, Siström CL. Computed tomographic evaluation of blunt abdominal trauma. *Radiol Clin North Am* 1992; 30(2): 367-88.

10. Fakhry SM, Brownstein M, Watts DD, Baker CC, Oller D. Relatively short diagnostic delays (<8 hours) produce morbidity and mortality in blunt small bowel injury: an analysis of time to operative intervention in 198 patients from a multicenter experience. *J Trauma* 2000; 48(3): 408-14.

11. Mirvis SE, Gens DR, Shanmuganathan K. Rupture of the bowel after blunt abdominal trauma: diagnosis with CT. *Am J Roentgenol* 1992; 159(6): 1217-21.

12. Ma OJ, Kefer MP, Stevison KF, Mateer JR. Operative versus nonoperative management of blunt abdominal trauma: role of ultrasound-measured intraperitoneal fluid levels. *Am J Emergency Med* 2001; 19(4): 284-6.