

TRAUMATIC GASTRIC RUPTURE FOLLOWING BLUNT TRAUMA ABDOMEN: A Case Series

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Background: Gastric rupture following blunt injury abdomen is a rare presentation with a reported incidence of 0.02-1.7% in current literature. History of recent meal has been implicated in traumatic gastric rupture. Commonly traumatic gastric rupture is associated with other injuries like splenic injury and fractures. Prompt diagnosis and early intervention reduces mortality and morbidity. Primary two layered closure can be done for a better surgical outcome. We report 2 cases of blunt injury abdomen with gastric rupture, one with road traffic accident and other being from a fall from a height, which were managed successfully without any post operative morbidity and mortality.

Keywords: Gastric rupture, Blunt trauma abdomen.

INTRODUCTION

Blunt abdominal trauma is a leading cause of morbidity and mortality among all age groups. Blunt trauma to the abdomen commonly occurs due to motor vehicle accidents. The incidence of hollow viscus injuries following blunt abdominal trauma varies from 4 to 15%.¹ Blunt gastric injuries are even rarer occurring in only 0.02-1.7% patients with blunt abdominal trauma.¹ Other causes are fall from a height, seat-belt injuries, and even vigorous resuscitation.² Blunt abdominal trauma occurs more commonly in childhood. Following the head and extremities, the abdomen is the third most commonly injured anatomic region. Blunt gastric injuries are uncommon in isolation, being associated with other intra and extra abdominal injuries as a rule.¹ Hollow viscus injuries after blunt trauma, though uncommon, can have serious consequences if the diagnosis is missed or delayed. Mortality increases parallel with time to operative intervention (<8hrs -2%; 8-16hrs-9%; 16 to 25hrs-17%; >24hrs-31%) as did the complication rate.³ We present two cases of traumatic gastric rupture, which were diagnosed and managed in time with a satisfactory result.

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Case Presentation:

Case 1

A 25 year male patient presented to the emergency department following road traffic accident while travelling on a two wheeler as a pillion rider, with pain abdomen and pain and deformity of left leg. He had a recent meal before trauma. There was no history of loss of consciousness or vomiting.

On examination the patient was conscious and coherent. Pulse was 105/min, regular and good volume. Blood pressure was 100/60 mm of Hg. Temperature was 98.6⁰ F. Respiratory rate was 22/min. There was tenderness and guarding of upper abdomen. Plain X- ray abdomen showed gas under diaphragm. CECT abdomen showed massive pneumoperitoneum with hemoperitoneum (Fig.1). X-ray left leg showed lower 1/3rd fracture of both bones. Hematological and biochemical parameters were within normal limit.

The patient was resuscitated. He was taken up for exploratory laparotomy as an emergency case. Exploratory laparotomy revealed 5 cms long, full thickness gastric rupture on the anterior surface of the body of the stomach, 2cms above the pylorus (Fig.2). There were associated intra abdominal injuries in form of mesenteric and omental tear. Primary two layer closure was performed for gastric rupture (Fig.3). Mesentery and omental tear were repaired. A thorough peritoneal lavage was done. Post operative recovery was uneventful. On 10th post operative day, he was referred to the orthopedic surgeon for the management of the fractures. On follow up 2 months after surgery, he was found to be asymptomatic.



Figure 1
CECT abdomen showing hemo-pneumo peritoneum



Figure 2
Gastric rupture over anterior wall



Figure 3
After primary closure of the gastric rupture.

Case 2

A 35 year male patient, presented to the emergency department, after a fall from a height (second floor of a house), with pain abdomen along

with pain and deformity of both upper limbs. He had a recent meal before trauma. There was no history of loss of consciousness or vomiting.

On examination he was conscious, coherent and well oriented. Pulse was 95/min, regular and good volume. Blood pressure was 90/60 mm of Hg. Temperature was 99⁰ F. Respiratory rate was 30/min. There was tenderness with guarding over epigastrium and left hypochondrium. Chest x- ray showed air under the diaphragm (Fig.4). X-ray both arms showed fracture distal 1/3 of both bones. Hematological and biochemical parameters were within normal limit.

The patient was resuscitated and was taken up for emergency exploratory laparotomy. On laparotomy, 7 cm long full thickness tear of the stomach wall was noted on the anterior surface close to the greater curvature on the body of the stomach (Fig.5). No other intra abdominal injury was noted. The gastric rupture was repaired with a primary two layer closure technique (Fig.6). Thorough peritoneal toileting was done before closure.

Post operative period was uneventful. On 10th post operative day, he was referred to the orthopedic surgeon for the management of the fractures. On follow up 2 months after surgery, he was found to be asymptomatic.



Figure 4
X-Ray Chest showing gas under diaphragm.



Figure 5
Gastric rupture



Figure 6
After primary closure

DISCUSSION

Traumatic gastric rupture following blunt injury abdomen is a rare presentation and we think of horses before zebras. So this entity might go unnoticed in the initial presentation. Gastric rupture usually occurs in combination with either intra or extra abdominal injuries which makes it even more difficult to get to the diagnosis. Stomach being relatively mobile with strong walls⁴ and being protected by rib cage usually escapes injury in blunt trauma setting, however if the stomach is distended by food, liquid or gas it is more likely to get injured than when it is empty.

In blunt trauma three different mechanisms causing injury to gastrointestinal organs are described.⁵ Firstly, it is the crush injury that occurs when an organ is compressed violently against the spine. Second is the burst injury, which occurs when rapid compressive forces are applied to a filled and distended hollow viscous, without direct mechanical compression. History of recent meal has been suggested to cause gastric rupture and in our series both the patients had a history of recent meal. Third is the shear injury, caused by rapid acceleration-deceleration of an organ at one point of fixation. Gastric rupture has been reported in literature following *Heimlich maneuver*, following bag and mask ventilation, cardiopulmonary resuscitation.

Experimental studies show that rise in intraluminal pressure can cause a sequential rupture of the wall of the stomach - firstly the seromuscular coat, then the mucosa, and finally the submucosa.⁶

Partial rupture of the stomach wall can occur and it may progress to full thickness rupture at a later stage.⁷ The anterior gastric wall is the most common site of rupture, followed by the greater curvature, the lesser curvature and the posterior wall.^{7,8}

Gastric rupture is well known for its association with injuries of adjacent organs like liver, pancreas and spleen.⁹ Associated solid-organ injury, lung injury and pneumo or hemothorax have

been reported in 83% to 93% of cases. Gastric rupture is often associated with injury to the extremities.^{9,10} In our series, both patients had fractures of extremities.

Gastric perforation following blunt abdominal trauma requires prompt diagnosis.¹¹ Free intraperitoneal air on plain abdomen and chest x-ray films is seen only in 16-66% of the cases.^{12,13} Computer Tomography (CT) may be also helpful in establishing an early diagnosis, thereby decreasing the period of peritoneal contamination, sepsis and shock and is more useful for visualization of intra-abdominal free air.^{9,11} It can also reveal associated solid-organ injuries. The CT findings which are suggestive of gastric rupture are free sub diaphragmatic air, visualization of an "outlined" falciform ligament, and intraperitoneal nasogastric tube location.¹¹

The majority of complications related to gastric rupture is septic in nature (10), and relate directly to massive intraperitoneal contamination.¹⁴ The most common complication is intra abdominal abscess formation but gastric fistulae may also occur.¹⁵

Injuries to the stomach are associated with the highest mortality of all hollow viscus injuries.¹⁶ The repair of the gastric rupture with two-layer technique and the air test to ensure any missing perforations is recommended as stomach has high vascularity and relatively less bacterial load.⁷ Both our patients had undergone primary two layer repair and had a good recovery and were asymptomatic at 8 weeks follow up.

CONCLUSION

Gastric rupture is a rare presentation following blunt injury abdomen. History of recent meal has been implicated in traumatic gastric rupture. Commonly traumatic gastric rupture is associated with other injuries like splenic injury and fractures. Prompt diagnosis and early intervention reduces mortality and morbidity. Hollow viscus injuries after blunt trauma, though uncommon, can have serious consequences if the diagnosis is missed or delayed. Mortality increases parallel with time to operative intervention as did the complication rate.

REFERENCES

1. Brusca V, Coimbra R, Rasslan S, et al. Blunt gastric injury. A multicentre experience. *Injury*. 2001;32:761-764.
2. Chiranjiv SG, Prabhdeep NS, Satpal S, et al. Isolated posterior wall gastric rupture in blunt trauma to abdomen. *IndJ Gastroenterology*. 2005; 24:183.
3. Jordan A Weinberg, Timothy C Fabian, Injuries to the stomach, small bowel, colon and rectum. *Trauma and thermal injury*. 2005;7; 1-8.

4. Deshpande AD, Sivapragasam S. Isolated posterior gastric injury due to blunt abdominal trauma. *Emerg Med J.* 2003;20:566.
5. Steven S, Pearl RH. Abdominal trauma. In: Grosfeld JL, O'Neal SA Jr, Fonkalsrud EW, Coran AG, editors. *Pediatric Surgery.* 6th ed. 2006. pp. 295–316.
6. Silbergleit A, Berkas EM. Neonatal gastric rupture. *Minn Med* 1966;49: 65-68.
7. Nanji AS, Mock C. Gastric rupture resulting from blunt abdominal trauma and requiring gastric resection. *J of Trauma.* 1999;47:410–412.
8. Ishikawa K, Ueda Y, Sonoda K, et al. Multiple Gastric Ruptures Caused by Blunt Abdominal Trauma: Report of a Case. *Surg Today.* 2002;32:1000–1003.
9. Shinkawa H, Yasuhara H, Naka S, et al. Characteristic features of abdominal organ injuries associated with gastric rupture in blunt abdominal trauma. *Am J of Surgery.* 2004;187:394–397.
10. Brunsting AL, Morton HJ. Gastric rupture from blunt abdominal trauma. *J Trauma.* 1987;27:887–891.
11. Tu RK, Starshak RJ, Brown B. CT diagnosis of gastric rupture following blunt abdominal trauma in a child. *Pediatr Radiol.* 1992;22:146–147.
12. Courcy AP, Soderstrom C, Brotman S. Gastric rupture from blunt trauma. A plea for minimal diagnostics and early surgery. *Am Surg.* 1984;50:424.
13. Siemens AR, Fulton LR. Gastric rupture as a result of blunt trauma. *Am Surgeon.* 1981;43:229–233.
14. Mushtaq SM, Aslam MN. Isolated double gastric rupture as a result of blunt abdominal trauma. *Ann Saudi Med.* 2005;25:351–352.
15. Ishikawa K., Ueda Y., Sonoda K., Yamamoto A., Hisadome T. Multiple gastric ruptures caused by blunt abdominal trauma: report of a case. *Surgery Today.* 2002;32(11):1000–1003.
16. Watts D D, Fakhry S M. Incidence of hollow viscus injury in blunt trauma: an analysis of 275,557 trauma admission from the east multi-institutional trial. *J Trauma* 2003. 54289–294.294.
17. Lloyd R G, Delayed rupture of stomach after blunt abdominal trauma, *British Medical Journal* 1982, Vol 285; p176.

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