

Isolated Gastric Perforation following Blunt Trauma Abdomen not to be Missed: A Case Series



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Submission: 26-01-2024

Revision: 16-02-2024

Publication: 01-04-2024

ABSTRACT

Abdominal trauma is a commonly encountered emergency which may be because of roadside accidents, assaults, or falls from height. Blunt injury to the abdomen is far more common than penetrating injury. Gastric perforation commonly occurs following penetrating abdominal trauma. However, gastric rupture is an uncommon entity following blunt trauma abdomen (BTA). Here, we are presenting three cases of isolated gastric perforation after BTA, two were due to a roadside accident, and one was a result of a fall from height. History suggests of a full stomach is usually found in traumatic gastric rupture. This condition usually presents with insignificant clinical or radiological signs. Isolated gastric rupture due to trauma is rare as it is usually associated with other injuries such as splenic and liver injuries. Early suspicion plays an important role in diagnosing this entity which carries higher morbidity and mortality if not managed timely. As isolated gastric perforation because of trauma leads to high morbidity and mortality, hence thorough lavage of the peritoneal cavity followed by double-layer closure after adequate debridement will reduce chances of intraperitoneal contamination thus improving outcome. Presentation after the last meal, the severity of gastric rupture, and other associated injuries play an important role in the prognosis of the patient.

Key words: Gastric rupture; Blunt trauma; Pneumoperitoneum

INTRODUCTION

Blunt trauma abdomen (BTA) is one of the common surgical emergencies which can lead to high morbidity and mortality in all age groups. It is more common than penetrating abdominal trauma. It commonly occurs due to road traffic accidents, less commonly because of falls from height, assault, etc. Blunt abdominal trauma-related gastric perforations are rare in adults with an incidence of 0.02–1.7%, usually associated with other intraabdominal and extra-abdominal injuries with isolated gastric rupture being uncommon.¹ Morbidity and mortality are directly related to other associated injuries, delay in diagnosis, development of sepsis, and recent meal intake.

BTA affects commonly solid organs such as the liver, spleen, and kidney along with hollow viscus. Injuries of colon-rectum are also not uncommon with an incidence that varies between 4% and 15%.^{2,3} However, by contrast, gastric perforations following BTA have an incidence of between 0.02% and 1.7%. A multicenter retrospective analysis of blunt gastric injuries from four trauma centers in Brazil over 14 years yielded only 33 cases of gastric perforation.¹ This rare condition is usually diagnosed at laparotomy because usual diagnostic tests fail to diagnose this condition preoperatively. Hereby, we are reporting three cases with isolated gastric perforations due to blunt abdominal trauma.

Access this article online

Website:

<http://nepjol.info/index.php/AJMS>

DOI: 10.3126/ajms.v15i4.62264

E-ISSN: 2091-0576

P-ISSN: 2467-9100

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CASE REPORTS

Case 1

A 20-year-old male came into the emergency department with a history of road-side accident by falling from a bike. He had degloving injury of the bilateral gluteal region and lower limbs and was found to have fractures of the pelvis and right fibula after clinic radiological evaluation. Debridement for degloving injury along with splintage was done for orthopedic injuries. After 2 days, he developed features of peritonitis in post-operative period. Patient underwent exploratory laparotomy and perforation of 4 × 4 cm size was identified at the fundus of the stomach. About 2 L of seropurulent fluid was drained from the peritoneal cavity. The rest of the abdomen was found to be normal. The fundus perforation was closed in two layers after freshening the edges and the abdomen was closed after thorough peritoneal lavage. Later patient developed septicemia and despite best efforts, the patient expired on the 3rd post-operative day.

Case 2

A 50-year-old male came to the accident and emergency department with an alleged history of road accidents when he was returning home from a marriage where he had a recent meal. On receiving patient was conscious and was complaining of pain abdomen. On examination, his pulse was 110/min, BP was 96/74, and RR was 24/min. He was investigated thoroughly. His Hb was 13 gm%, TLC – 11000, USG was suggestive of free fluid in the abdomen and the rest of the solid viscera were normal. X-ray abdomen sitting showed air under the right dome of the diaphragm. Patient underwent exploratory laparotomy. A big rent of 18 cm was found in the anterior wall of the stomach (Figure 1). There were a lot of undigested food particles in the peritoneal cavity and around 2 L of foul-smelling dark-colored fluid with an alcoholic smell were present. Rest of the peritoneal

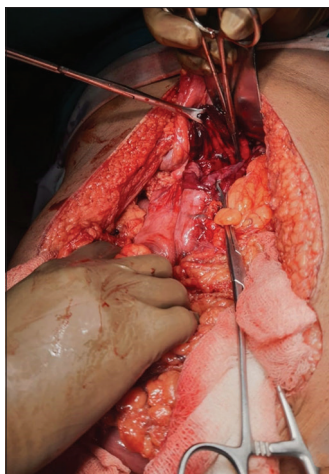


Figure 1: Big rent at the greater curvature of the stomach

cavity was normal. Patient underwent primary closure of the rent in double layers. Postoperatively, patient was shifted to ICU. Patient developed septicemia and expired on the 10th post-operative day.

Case 3

A 20-year-old male came to the accident and emergency department with an alleged history of fall from height. Patient was fully conscious, complaining of pain abdomen and vitals were stable. On per abdomen examination, the abdomen was slightly distended and guarding was present. On investigations, Hb was 12.2 gm%, TLC – 12000, LFT/RFT within normal limits. USG was suggestive of free fluid in the pelvis and sub-hepatic region. Solid viscera were normal. Contrast-enhanced computed tomography (CT) showed pneumoperitoneum and free fluid in the peritoneal cavity. Patient underwent exploratory laparotomy. Intraoperatively, the patient had a perforation of size 1.5 × 1.5 cm present on the body along the greater curvature of the stomach. 100 cc of hemorrhagic fluid and a small jejunal mesenteric tear was also present. Patient underwent primary closure of perforation in double layer followed by omentopexy. Postoperatively, the hospital stay of the patient was uneventful, and was discharged on the 8th post-operative day in satisfactory condition.

DISCUSSION

Roadside accidents are the most common cause of gastric rupture as a result of BTA in around 75% of the cases. There can be other mechanisms also such as assaults, falls, or cardiopulmonary resuscitation (Heimlich maneuver). Out of three patients, two had a history of roadside accidents and one had fallen from height. Consumption of a heavy meal before the injury is commonly seen in these cases because a distended stomach is less pliable and is more predisposed to rupture from blunt force.⁴ One of our patients had a history of heavy meals which has led to a large perforation.

The thoracic cage, mobility of the stomach, and gastric wall thickness are the various protective mechanisms that are the causes of the rarity of this condition.⁵ However, there are three mechanisms that may attribute to gastric perforations as a result of BTA. External compression leading to intense rise of intra-abdominal pressure, rapid deceleration resulting in shear forces, and crushing of intra-abdominal contents between the anterior abdominal wall and the vertebral column may be the contributory mechanisms. The common sites of gastric perforation are the anterior wall (40%), greater curvature (23%), lesser curvature (15%), and posterior wall (15%). In one of our patients, the rupture was found at the fundus of the

stomach which is rarely seen. Such perforations are usually solitary as was there in our patients.⁶

Other intra- and extra-abdominal injuries are usually associated with gastric perforation due to BTA; isolated blunt gastric ruptures are uncommon. Splenic injury is the most common associated injury, followed by thoracic injury.^{5,6} Two of our patients had no such injuries whereas one had limb injuries.

Traumatic stomach perforation carries the highest risk of mortality among all hollow viscus injuries.⁷ Studies reveal that time to operative intervention is proportional to morbidity and mortality of the patient.^{5,6,8} The usual complication encountered is septicemia in nature with the reported incidence of intra-abdominal abscesses being up to 24% with a mortality rate of <66%.^{8,9} Complications are more in patients with loaded stomachs as higher gastric pH predisposes to a greater bacterial load leading to predisposition of contamination and infective complications. The physical examination may not be suggestive of peritonitis when the patient is intoxicated or has associated injuries, early laparotomy will lead to a better prognosis.¹⁰

Usually, these patients present with shock and abdominal tenderness³ but in all our cases signs and symptoms of an acute abdomen appeared late. Hence, it is sometimes difficult to diagnose gastric injury preoperatively. Around 50% to 66% of cases of gastric rupture cases develop can be detected by upright chest X-ray as most trauma chest films are done supine.¹ In the hemodynamically stable patient, the investigation of choice is a CT scan as it is accurate in detecting associated bowel, vascular, or solid organ injury.⁴ Diagnostic peritoneal lavage, serum amylase can also be an adjunct in the diagnosis where CT is not available.^{11,12}

Ultrasonography has value in hemodynamically unstable patients in identifying intra-abdominal fluid which strongly suggests free blood and an indication for laparotomy.⁹ Strong clinical vigilance is very mandatory as a negative CT scan can miss a bowel perforation in 13% of cases.¹³

The surgical management of gastric injury is determined by the grade, extent, and location of the injury as well as by the presence of associated injuries. At laparotomy, it is mandatory to exclude a separate gastric laceration (for example, along the posterior gastric wall). Grades 1–3 gastric injuries (the majority of gastric injuries) are amenable to primary repair with adequate debridement but it will not be feasible in patients in Grades 4 and 5 gastric injuries. Grade 4 and 5 gastric injuries are not common and they are usually associated with other organ

and major vascular injuries hence affected patients expire before reaching the hospital. Sub-total or rarely total gastrectomy may have to be done depending on the location of the injury and the extent of devascularization. The restoration of gastrointestinal continuity which includes a gastroduodenostomy, gastrojejunostomy, or a Roux-en-Y reconstruction will be done depending on the presence of associated injuries (to the duodenum, bile duct, and pancreas).¹⁴ Ryle's tube aspiration and peritoneal lavage with plenty of saline are mandatory after the injury is repaired.

Most complications occur due to intraperitoneal contamination of food particles from a distended abdomen. Out of three patients, two expired due to septicemia because of a distended abdomen and late diagnosis. The high morbidity and mortality in our cases was a delay in diagnosis and development of complications as was seen in other studies.⁸ High index of suspicion by primary care physicians in cases of BTA can reduce morbidity and mortality in these patients.

CONCLUSION

We report three cases of gastric perforation following blunt abdominal trauma which was associated with high mortality due to delayed diagnosis and septicemia because of intraperitoneal contamination. Grade of the injury, timing of presentation, presence of loaded stomach, and other concomitant injuries are important prognostic factors. Hence, a high index of suspicion, early diagnosis, adequate debridement and repair, and treating any complications aggressively are the keys to survival in patients with gastric rupture from blunt abdominal trauma.

ACKNOWLEDGMENT

Dr Ishwar Singh, Incharge Dhanvantari Apex Trauma Centre, PGIMS, Rohtak.

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Authors' Contributions:

SV, PG, ARB - Managed the patient, collected data, and wrote the manuscript; **SKY** - Helped in surgery and contributed in writing of manuscript; **AV, DK, SG**- Contributed in writing of the manuscript.

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Source of Support: Nil, **Conflicts of Interest:** None declared.