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Case Report

A case of traumatic isolated duodenal perforation due to blunt abdominal trauma

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ABSTRACT

Isolated duodenal injury following blunt abdominal trauma is a rare clinical entity and is often unnoticed leading to delay in management thereby increasing morbidity and mortality. We report a case of isolated duodenal perforation following blunt abdominal trauma and highlight the challenges and decision-making dilemmas associated with its management. The present patient had two perforations, one on the anterior and the other on the posterior wall of the duodenum. Complete duodenal mobilization during laparotomy and a decision of performing pyloric exclusion aided momentously in the management.

Keywords: Duodenal injury, Blunt trauma, Management

INTRODUCTION

Duodenal injuries occur in 12% of all the abdominal trauma patients. However, it is less common in blunt abdominal trauma, occurring in about 0.1% cases. The presence of close proximity of other organs makes isolated duodenal injury a rarity. The overall associated mortality has been reported as 14.8%.[1]

The anatomical location of the duodenum makes diagnosis and treatment of isolated duodenal injury difficult. Due to its rarity and subtle clinical features, the diagnosis and management is often delayed. We describe a patient with isolated duodenal injury and highlight some problems and principles in its management.

CASE REPORT

In A 19-year-old male sustained blunt trauma to the upper abdomen after road traffic accident. Primary care was given at another facility and then transferred to our hospital.

On admission his pulse rate was 110/min and blood pressure was 110/70 mmHg. Patient had mild tenderness over the epigastrium. Haemoglobin was 14 g/dl total leukocyte count was 15,000/mm3 (reference range 4000–11,000/mm3). Serum amylase was 88 U/l (reference range: less than 95 U/l). Erect chest radiograph was normal. In erect abdominal radiograph retroperitoneal air was seen dissecting around the right kidney. (Figure 1)

Focussed assessment with sonography in trauma (FAST) scan revealed no abnormality. Contrast-enhanced computed tomography (CT) scan of abdomen with intravenous and oral contrast media revealed full thickness perforations in the anterior and posterior wall of the second part of the duodenum with extravasation of orally administered contrast and moderate pneumo-retroperitoneum. (Figure 2)

In view of duodenal perforation with pneumo-retroperitoneum the patient was taken up for emergency exploratory laparotomy. Intraoperatively contusions, biliary staining, and crepitus was seen over the hepatic

flexure of the colon and paraduodenal area. Dissection was difficult due to highly oedematous tissue therefore dissection was started from virgin plane of ascending colon. Complete Kocherization of the duodenum was done. Two perforations were noted in the second part of the duodenum just above the ampulla, on anterior and posterior wall each, involving more than 75% of the circumference (AAST grade IV). (Figure 3,4)

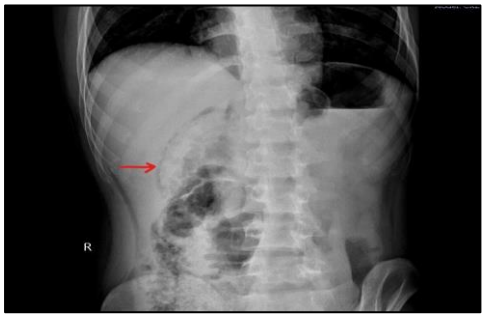

Figure 1: Erect chest radiograph with red arrow showing peri-renal and retroperitoneal air.

Figure 2: Contrast enhanced CT axial section showing defects in the anterior and posterior walls of duodenum (red arrows) suggestive of perforation with significant right perinephric air.

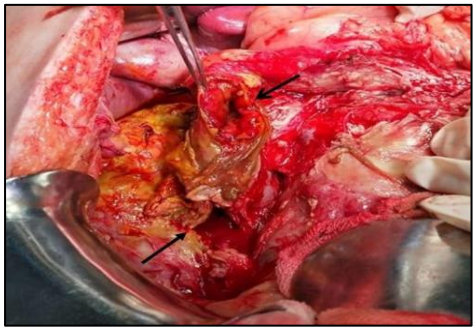

Figure 3: Perforations on anterior walls of the duodenum.

Duodenorrhaphy was done in single layer with 3-0 PDS sutures (Figure 5). Duodenal switch was undertaken to exclude the injured segment by dividing the pylorus with linear cutter stapler. (Figure 6) Retrocolic isoperistaltic loop gastrojejunostomy was done and side to side Brauns jejuno-jejunostomy performed to prevent afferent loop syndrome. Duodenostomy tube was placed from the first part of duodenum for biliary diversion. (Figure 7,8)

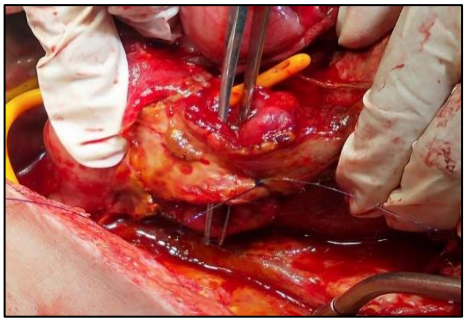

Figure 4: Perforations on posterior walls of the duodenum.

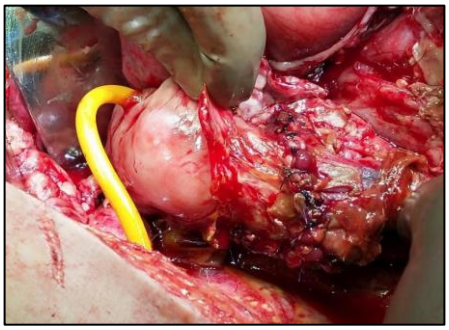

Figure 5: Sutured duodenal perforations with duodenostomy tube in situ.

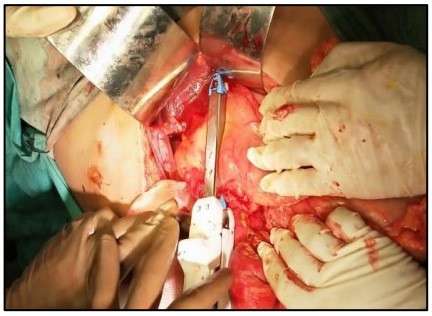

Figure 6: Pyloric division done by linear cutter stapler.

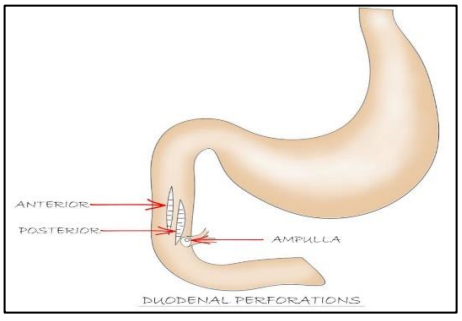

Figure 7: Preoperative pictures of duodenal perforation.

Post-operative period was uneventful. CT abdomen with oral contrast on the the tenth post-operative day confirmed no active leak from any anastomotic site. Duodenostomy tube was removed on the fourteenth post-operative day. Patient was discharged twenty-five days after surgery.

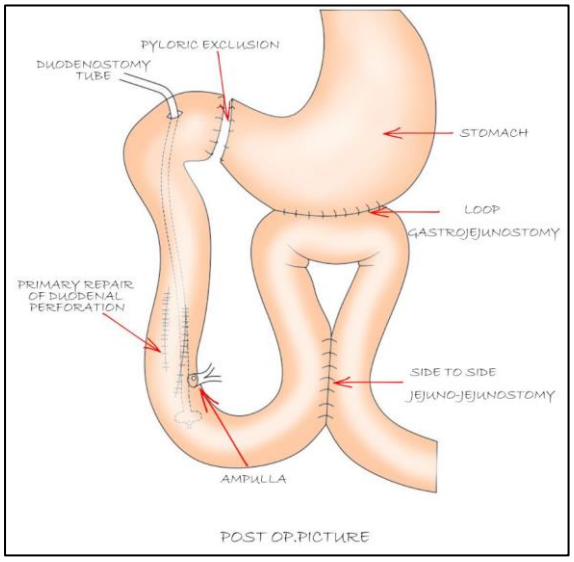

Figure 8: Postoperative pictures of duodenal perforation.

DISCUSSION

Perforation of the duodenum caused by blunt trauma to the abdomen is due to either direct trauma to the abdomen or an automobile lap belt deceleration injury. In duodenal injuries, mural hematoma, laceration, or complete transection of the duodenum is encountered, attributable to the following mechanisms: tearing during deceleration, crushing between the abdominal wall and the spine, and blowout.

Diagnosing duodenal injury after blunt abdominal trauma requires very high index of suspicion and hence is often delayed or missed during the secondary trauma survey, resulting in increased morbidity and mortality.

We have described a patient with AAST grade IV duodenal perforation following blunt abdominal trauma.[2] Patient had atypical abdominal signs with delayed presentation in hospital. Despite of the high index of suspicion Computed Tomography was the cornerstone of the diagnosis.

Penetrating duodenal injuries are often first diagnosed at laparotomy. Duodenal injuries following blunt abdominal trauma are frequently associated with other organ injuries. But in this case, it was isolated duodenal injury. Blunt duodenal injuries are more challenging to identify. Physical examination findings can be insufficient because of the retroperitoneal location. Even full thickness duodenal perforations may not demonstrate typical peritoneal signs as in this case. The most favourable tool for diagnosis is abdominal CT.[3] Occasionally, CT scan may also be negative when performed early or may suggest subtle findings like small amount of unexplained fluid or unusual bowel morphology due to paraduodenal hematoma.[4-6] Hence low threshold for exploration must be maintained because of potential false negative CT results.

The approach for management of duodenal injuries depends upon the site of the injury and amount of tissue destruction. Small perforations especially those involving the first part of the duodenum can be repaired primarily with single layer monofilament sutures maintaining largest possible residual lumen. Complete Kocherization of the duodenum is strongly recommended for adequate exposure to rule out multiple injuries and tension free repair.[7]

Challenges arise when there is substantial loss of the duodenal tissue and injuries of the second part of the duodenum as it is tethered to the pancreas by its blood supply and the ducts of Wirsung and Santorini. Therefore, defects in the second part of the duodenum can be "patched" with Roux-en-Y Duodenojejunostomy.[8] However operative modalities should be individualised as per the requirements.

In this patient perforation with severely lacerated walls of the duodenum was just proximal to the ampulla. Hence mere primary repair of the rent would have resulted in leak of bile and enteric contents. This troublesome complication was prevented by performing Pyloric Exclusion and creating Gastro-jejunostomy. Tube duodenostomy for biliary drainage aided further in protecting the repair. Braun jejunojejunostomy was done in an effort to prevent afferent loop syndrome and delayed gastric emptying.

CONCLUSION

Duodenum is high pressure zone of the alimentary tract. Isolated duodenal injury is uncommon following blunt abdominal trauma and can pose diagnostic and therapeutic challenge. Meticulous clinical evaluation with high index of suspicion even during exploration and appropriate use of imaging techniques leads to the diagnosis. The treatment should be individualised depending upon the site, size of injury and amount of tissue loss.

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