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A rare case of D2 perforation in blunt injury abdomen

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Abstract

A 47-year-old female brought by attenders to casualty with alleged history of accidental injury, struck against iron rail in bus 1 day before sustained injury in abdomen. Presented with complaints of abdominal pain, vomiting for 2 days. Previous history of duodenal ulcer - Gastric outlet Obstruction & undergone bilateral truncal vagotomy with posterior Gastrojejunostomy 1 year before. She was dehydrated, hemodynamically unstable bp not recordable, pulse feeble, with upper midline healed laparotomy scar in abdomen and tenderness in upper abdomen, diffuse swelling progressively increasing in size noted in epigastric region, guarding present. Patient was resuscitated. Supine Xray abdomen showed dilated bowel loops. CT abdomen showed pneumoperitoneum, free fluid in pelvis, no solid organ injury. Patient was taken for emergency laprotomy. Intraoperatively Omental adhesions to previous scar and about 300ml of turbid fluid noted, Status postoperative posterior Gastrojejunostomy. Colon-free from injuries. Diffuse saponification noted in omentum. Bile staining present. D2 perforation of size 2×2cm noted in anterolateral aspect. Pyloric exclusion, primary closure of duodenal injury and Tube duodenostomy done. Ryles tube passed through distal limb of GJ for feeding purposes postoperatively.

Keywords: blunt injury abdomen, duodenal injury, gastrojejunostomy, pneumoperitoneum, diffuse saponification, D2 perforation, pyloric exclusion, tube duodenostomy

Introduction

Blunt injury abdomen usually results from a motor vehicle collision, assaults, accidental falls. Most commonly injured organs are spleen, liver, small bowel 98% duodenal injuries associated with other solid organ injuries. This is a rare case of isolated duodenal injury.

Case Report

A 47-year-old female brought by attenders to a casualty with an alleged history of accidental injury in the abdomen, struck against the iron rail in bus 1 day before with c/o abdominal pain, vomiting for past 2 days. The patient had a previous h/o duodenal ulcer with Gastric Outlet Obstruction for which bilateral truncal vagotomy with posterior Gastrojejunostomy was done 1 year before. On Examination, patient was conscious, dehydrated, hemodynamically unstable. BP not recordable, pulse feeble.

Resuscitated with iv fluids, crystalloids, blood products & inotropic support started. Per abdomen- upper midline healed laparotomy scar present, diffuse tenderness present. Upper abdomen diffuses swelling progressively increasing in size noted, guarding present, no rigidity, BS absent.

Blood investigations showed leukopenia, RFT was normal, serum amylase elevated.

Hemoglobin- 10.1gm% Total Count -1900 Differential Count 55/40/5 Platelet 1.79 lakh, Serum Amylase was 1250 IU/ml.

After stabilization, the patient shifted for imaging. Xray abdomen supine showed dilated bowel loops. CT abdomen showed pneumoperitoneum, free fluid in the pelvis, no solid organ injury. The patient was taken for emergency laparotomy.

Intraoperative findings

- Omental adhesions to the previous scar noted, about 300ml of turbid fluid drained,
- Bowel walk has done from Duodenojejunal flexure to ileocaecal junction, Status postoperative posterior Gastrojejunostomy.
- Colon was free from injuries.

- Diffuse saponification was noted in the omentum. Bile staining present.
- Mobilization of the right colon up to the hepatic flexure followed by Kocher maneuver. Duodenum mobilized, D2 perforation of size 2 *2 cm noted.
- Solid organs- Liver, Spleen, Pelvic organs normal

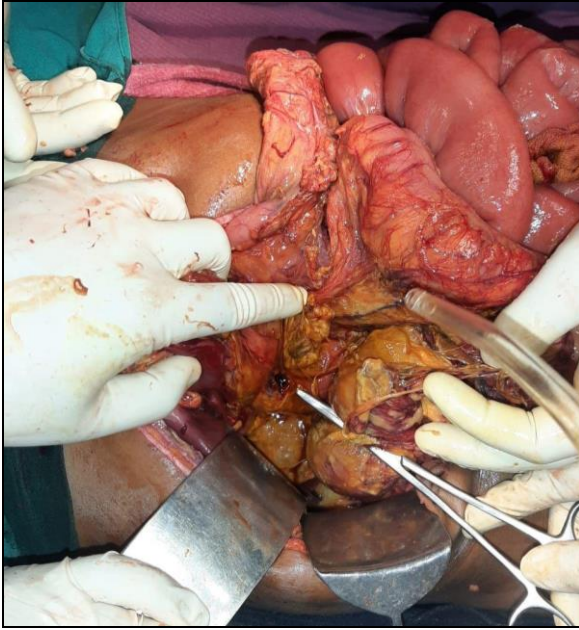


Fig 1: Duodenal Perforation



Fig 2: Diffuse saponification of the omentum

Procedure

Pyloric exclusion is done, and primary closure of duodenal injury done with 3'0 polyglactin (Vicryl)

- Tube duodenostomy done through a separate incision.
- Ryles tube passed through the distal limb of Gastrojejunostomy.
- Pyloric exclusion- In order to prevent gastric contents reaching the duodenum - Staple from the outside or oversew the pyloric outlet through a gastric incision. In this case, stapler applied.

Ryles tube passed through distal limb to jejunal which would have helped in feeding obviating the need of Feeding Jejunostomy for feeds.

The patient was monitored in ICU, treated with higher antibiotics. The patient's general condition improved. The patient was discharged. On regular follow-up duodenostomy tube removed after 6 weeks after clamping and checked for bile leak and CECT abdomen.

Discussion

Blunt injury may result in crushing, shearing, or burst injuries of the duodenum. Crush injuries occur with a direct force applied to the abdominal wall, transferred to the duodenum which is pushed posteriorly against the spinal column. Shear injuries occur when the mobile and nonfixed portions of the organ accelerate and decelerate forward and backward respectively.

Burst injury occurs when force is applied to gas and fluid-filled duodenum against a closed pylorus and acutely flexed duodenojejunal angle.

CECT findings suggestive of duodenal injury are Extravasation of oral contrast from duodenum with a retroperitoneal hematoma, Extraluminal gas/fluid around the duodenum, Focal bowel wall thickening, Interruption of the progress of the bowel contrast medium. Intra-op findings that require exploration are Crepitus along the duodenal sweep, bile staining of paraduodenal or adjacent tissues, documented bile leak, right-sided retroperitoneal, or periduodenal hematoma ^[1].

Important steps for duodenal injury management include - Early diagnosis, Control of haemorrhage, Control of bacterial contamination.

If there is duodenal hematoma it might be grade 1 or 2 depending on whether it involves one portion or more than one portion. Grade 1 if there is partial thickness laceration and no perforation. Grade 2 if there is a disruption of <50% of the circumference. Grade 3 includes disruption 50-75% of D2, 50-100% of circumference of D1, D3, D4. Grade 4 is the disruption >75% of D2 or involving Ampulla, distal CBD. Grade 5 is a massive disruption of duodenopancreatic complex, devascularisation of the duodenum ^[2]

Grade I injuries are primarily closed with interrupted nonabsorbable Lembert-style sutures. Grade II injuries can be closed transversely to avoid narrowing of the lumen, Two-layer closure, and secure a viable patch of omentum, or the serosal side of jejunum across the repaired defect. Grade III and IV management include - Pyloric Exclusion with Tube duodenostomy, Gastrojejunostomy, and feeding jejunostomy.

Debride the edges of the wound and primary two-layer closure with concomitant pyloric exclusion. If it is not feasible, if the anastomosis is under tension or the injured duodenum requires resection,

- injury proximal to ampulla-perform antrectomy plus GJ and stump closure
- Injury distal to ampulla-Roux-en-Y duodenojejunostomy to the proximal end of duodenal injury with oversewing of the distal duodenum
- Three-tube technique: gastrostomy, retrograde duodenostomy, and feeding jejunostomy ^[3, 4].

Grade V management includes Whipples procedure for trauma. It is performed as a staged procedure. Control of hemorrhage, resection debridement in the initial laparotomy, stapler.

resection of the duodenal sweep and pancreatic head, ligation of the common bile duct at pancreatic head. The patient is resuscitated in the ICU. Gastrointestinal reconstruction with

pancreatic remnant anastomosis and choledochojejunal anastomosis can be done later [5, 6].

Jejunal serosal patch - coined by Kobbold and Thall. This is to prevent severe narrowing which may occur due to primary closure.

Jejunal mucosal patch - This patch can be constructed with the proximal segment of the jejunum, which can be carried up in a retrocolic location on its vascular pedicle. The antimesenteric border of the jejunum can then be split longitudinally and anastomosed using a double-layer technique to the duodenum to close the defect.

Pedicle grafts of the stomach, also known as gastric island flaps, are based on gastroepiploic vessels. These are obtained from the body of the stomach at the greater curvature rather than the antrum because exposure to alkaline secretions of antral tissue will stimulate secretion of hydrochloric acid. Open pedicle grafts of the ileum to repair duodenal defects have also been tried.

Intramural Hematoma is identified as a "coiled spring" appearance in UGI series.

Follow-up UGI with Gastrograffin should be obtained every 7 days if the obstruction persists clinically.

- Treated with nasogastric suction and IV alimentation.
- Treatment of an intramural hematoma found at early laparotomy is controversial – either to open serosa, evacuate the haematoma without violating the mucosa, and repair the wall of bowel carefully. However, controversially others believe that operation will increase the incidence of perforation and to leave the hematoma intact is better and planning nasogastric decompression postoperatively.

Studies show that patients with intramural hematoma or complete duodenal perforation without pancreatic injury did well with simple closure or evacuation of the hematoma.

Patients with duodenal perforation and minor pancreatic injury did best after primary closure and pancreatic drainage if the operation was performed within 24 hours.

Patients with combined duodenal and major pancreatic disruption did best after a bypass procedure when the main pancreatic ductal system was intact, whereas when the main pancreatic duct was disrupted, pancreaticoduodenectomy is the best procedure.

Bad prognostic factors in duodenal injury- If it is associated with vascular injury, pancreatic injury, common bile duct injury, blunt injury, or missile injury. If >75% of the wall is involved or Injury in the first, second portion of the duodenum. If >24 hours since the injury, has a poor prognosis [7].

Conclusion

Findings at times can be subtle, but a low threshold for exploration high index of suspicion must be maintained since delayed duodenal injuries are associated with high mortality.

In a damage control setting, the use of a duodenostomy tube or resection leaving the gastrointestinal tract in discontinuity is highly effective for temporarily controlling contamination [1].

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