Original Research Article

Duodenal injuries in blunt trauma abdomen: a retrospective analysis

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ABSTRACT

Background: Blunt trauma to abdomen very rarely produces isolated duodenal injuries and are to the tune of 3-5%. They are associated with high morbidity and mortality because of the diagnostic delay and missed diagnosis. The aim of this study is to discuss the mode of presentation, investigations and treatment options of isolated duodenal injuries in blunt trauma abdomen.

Methods: Retrospective analysis of patients with blunt trauma abdomen who presented to surgical department at government medical college, Kozhikode, Kerala was done. Those who sustained isolated duodenal injuries from January 2010 to 2016 January were included in this study. Complex biliopancreatic, bowel and vascular injuries were excluded.

Results: For the single D2 injury, primary closure in 2 layers with 2-0 vicryl and 3-0 braided black silk was done with an omental wrap. The D3 and D4 injuries, limited resection of the unhealthy perforated segment including D3 and D4 were done followed by an end to end duodeno jejunostomy and duodenal exclusion by anterior gastrojejunostomy. Leak test was performed, feeding jejunostomy was done.

Conclusions: Isolated duodenal injuries due to blunt trauma abdomen are very rare and should be suspected in patients presenting with upper abdominal pain and vomiting after trauma. CECT abdomen helps to detect it. The time interval between the onset and definitive intervention greatly influences the morbidity and mortality in these injuries.

Keywords: Blunt trauma, Duodenum, Duodenojejunostomy, Perforation

INTRODUCTION

Duodenum is the first part of small bowel situated retroperitoneally connecting stomach to the duodenojejunal flexure.¹ Blunt trauma to abdomen very rarely produces isolated duodenal injuries. These injuries are to the tune of 3-5%.² They are associated with high morbidity and mortality because of the diagnostic delay in few and missed diagnosis in many.³ Factors leading to overlooking of these injuries are low index of clinical suspicion, delay in development of signs and symptoms and patients delay in presenting to the hospital. With large amount of food and digestive juices that traverse the duodenum, most dreaded complication is duodenal fistula and peritonitis.⁴

The aim of this study is to discuss the mode of presentation, investigations and treatment options of isolated duodenal injuries in blunt trauma abdomen.

METHODS

Retrospective analysis of patients with blunt trauma abdomen who presented to surgical department at, government medical college, Kozhikode Kerala was done. Those who sustained isolated duodenal injuries from January 2010 to 2016 January were included in this study. Duodenal injuries associated with complex biliopancreatic, bowel and vascular injuries were excluded.

Our group included five patients, out of which 4 were males and one female, all within an age group of 14 to 57 years.

One patient had a history of heavy weight falling over the anterior abdominal wall, while the rest of the lot sustained road traffic accident, like fall from two wheeler, bicycle handle hitting the abdominal wall. All sustained superficial anterior abdominal all injuries like contusion and abrasion at the site of impact. There was no penetrating injuries to anterior abdominal wall. All of them presented with complaints of abdominal pain and vomiting in all cases, along with fever and features of peritonitis in the fifth case. All these were admitted to the emergency department and resuscitated, all trauma panel X-rays, contrast ct abdomen, haematology investigations were done except in one with shock and peritonitis. In a case which presented to us 36hrs after the incident done followed by exploratory laparotomy, FAST was done. In all other cases, CECT abdomen showed presence of free fluid, bowel wall edema, hematoma, retroperitoneal air near kidney and duodenum.

Table 1: Incidence, procedure for isolated duodenal injuries.

Site of duodenal injury	Incidence	Procedure	Mortality	Complications
D1	0	0	0	0
D2	03	Primary closure	Nil	Nil
D3	01	Duodenojejunostomy	Nil	Wound infection
D4	01	Duodenojejunostomy	Nil	Nil

For the solitary D2 injury, after exploration of abdomen and confirming the injuries, the wound edges were freshened, a primary closure in 2 layers with 2-0 vicryl and 3-0 braided black silk was done with an omental wrap. A thorough peritoneal lavage was given. Flank drain was put after performing a leak test. Patient was shifted to ICU and oral feeds were started on 6th post op day.

The D3 and D4 injuries were multiple perforations of 1×1, 1.5×1 and 0.5×0.5 cm size involving the anterior and lateral margins of duodenum with doubtful viability of the intervening duodenal tissue. So a limited resection of the unhealthy perforated segment including D3 and D4 were done followed by an end to end duodeno jejunostomy (DJ) done. Leak test was performed, feeding jejunostomy (FJ) was done. After a thorough peritoneal lavage, flank drain was kept. Feeds were started after 8 days. Mean operating time was two and a half hours and average blood loss was less than 400 ml. All cases were reviewed in OPD after 2weeks of discharge from hospital and there after every 3 months for next 1 year. One patient who underwent DJ had wound infection, no cases of duodenal leak or intra-abdominal collection, wound dehiscence were reported. One case of post op adhesive intestinal obstruction and a collection in subcutaneous plane with no intraperitoneal extension occurred in two patient who underwent DJ, both of which was conservatively managed.

RESULTS

On exploration of the abdomen revealed free fluid in peritoneal cavity, yellowish green staining of the retroperitoneum and tissues, retroperitoneal haematoma near duodenum and pancreas, mesocolon and abdominal wall. In the delayed presented case, revealed bile staining near DJ flexure and retroperitoneal air near the duodenum with crepitus and bile leak on kocherisation.⁵

There were no injuries to first part of duodenum (D1), 3 cases had solitary injury in the second part of duodenal (D2), and one case each in the third and fourth part of duodenum (D3 and D4). D3 and D4 injuries were perforations involving anterior and posterior duodenal wall.

There were no associated pancreatic or vascular injuries. Exact site of injury was diagnosed on explorative laparotomy.

DISCUSSION

Isolated duodenal injuries are very rare due to deep and relatively well-protected anatomical site of the duodenum. Management of duodenal injuries are always challenging. Surgeon's sole aim is to repair the injuries at the earliest and to avoid a leak or fistula which may be catastrophic. A delay in diagnosing and prompt intervention drastically increase the mortality in these type of injuries to the tune of 15-45%.⁶ Literature shows that the earlier options for a duodenal injury was triple tube stoma, i.e., one gastrostomy and two jejunostomy tubes were put.⁷ One was for feeding and the other two were put across the suture lines. Bern and Donovan suggested duodenal exclusion after the repair.⁸ This was met by vagotomy, antrectomy, tube duodenostomy and T tube biliary drainage. Pyloric exclusion was performed by Vaughn.⁹ Snyder classified duodenal injuries as mild or severe.¹⁰ Severe types of duodenal injuries were due to missile injuries, damaging more than 75% of the circumference of duodenal wall, with involvement of D1 and D2. The repair was done after 24 hrs of onset and he suggested complex procedures for them.

Factors like shock, hypotension, hypoalbuminemia, bowel edema, delayed diagnosis and intervention were all predictors of complications, morbidity and mortality. Asensio et al showed that overall duodenal fistula rate was 66%.¹¹ Study by Pandey et al showed that second

part of duodenum was mostly affected and majority of the injuries were treated with primary closure, Roux-en-Y duodenojejunostomy.¹² Crippa et al reported a case of D3 laceration which was missed in the initial period and surgery was mainly done for associated fracture of lower extremity bones. Later on a primary closure of the wound and quadruple tube decompression settled the issue.¹³

In our analysis all but one case had a mean hospital stay of 2 weeks and was discharged after suture removal. All these cases except one presented to us within 24 hours of onset of injury and were operated on the same day itself. Primary closure of the duodenal injuries in D2 was done after exploratory laparotomy. Decompression with a Ryles tube was done in all cases. One case of D3, D4 injury presented 36 hours after the injury with features of peritonitis. This was due to the diagnostic delay, which resulted in bowel wall edema, contamination and saponification of omental fat and sepsis. Here after exploration, resection of D3 and D4 was done with end to end DJ. Decompression with Ryles tube, gastrojejunostomy and FJ was done in this case. After the procedure, there was a minimal bile leak in the flank drain on the 5th post op day. He was nil per oral for 8 days and was given 20% human albumin infusion for 3 days and the leak settled after 4 days. The mean hospital stay was 24 days. This patient presented to the emergency department one week after discharge with fever and pain near the laparotomy wound. CECT abdomen showed 3.5×2 cm collection in subcutaneous plane with no intra peritoneal extension. Collection was let out and managed with conservative measures.

CONCLUSION

Isolated duodenal injuries due to blunt trauma abdomen are very rare. Duodenal injuries should suspected in patients presenting with upper abdominal pain and vomiting after trauma and should be subjected to contrast CT scan to detect it. Major duodenal injuries are invariably associated with complex biliopancreatic injuries which may require staged reconstructions. Duodenal injuries may be solitary or multiple and the time interval between the onset and definitive intervention greatly influences the morbidity and mortality. Hand sewn end to end duodenojejunostomy in 4 layers is a safe procedure in experienced hands. Duodenal exclusion procedures like gastro jejunostomy, and feeding jejunostomy is a must if the repair is done 24 hours after the onset of injury.

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