

Missed duodenal injury and its management

M Fawzi Nasser, Muddaser M Sheikh, Sultan Abdallah Al-Amry, Essam El-Sayed, Yasser Al-Khalifa, Medhat Mostafa, Abdul Aziz Ayed Al-Shahrani, Bawa D. Dauda, Saeed Abdallah Al-Ghamdi, Saleem Abdul Sattar Khan

Abstract:

Injury to duodenum and pancreas is rare because of their safe retroperitoneal anatomical position. The injury to duodenum and pancreas initially present little symptoms therefore both pre and intra-operative detection of injury can be difficult. Also majority of the Pancreatico-duodenal injuries although are very rare but have a significant morbidity and mortality. Both Duodenum and pancreas have safe retro-peritoneal location, therefore sign and symptoms patients are subtle therefore difficult to diagnose also these patients have multiple associated injuries and are hemodynamically unstable which can be a cause of early mortality in these cases.

We present case report of 23 years old male who presented to a peripheral Hospital with a history of gunshot abdomen with wound of entry in epigastrium and wound of exit on right site of abdomen posteriorly, he underwent laparotomy at peripheral hospital, the findings documented at laparotomy was 8 cms tear in right lobe of liver, two tears were found in transverse colon which were repaired and proximal colon was brought out as loop colostomy. Two drains were placed in morrisons pouch and pelvis. Patient was referred to King Abdullah Hospital Bisha as patient was discharging copious biliary fluid in both drains. The Patient was resuscitated and underwent CT abdomen with Gastrografin oral contrast which was suggestive of Duodenal tear at the second and 3rd part of Duodenum which was repaired in 2 layers with Nasogastric tube placed, tube gastrostomy and feeding Jejunostomy performed. Patient had an uneventful recovery. Oral fluid started on 6th post-operative day. And tube gastrostomy was removed on 10th post-operative day.

Conclusion: Duodenal injuries are rare due to safe anatomical position of Duodenum. The clinician should have high index of suspicion when ever he is dealing with road traffic accident, seat belt injuries and gunshot abdomen to diagnose such injury, so that timely treatment can be offered to patient to avoid morbidity and mortality.

Keywords: Duodenal trauma, seat belt injury, gun shot abdomen, primary repair of duodenum, pyloric exclusion, tube duodenostomy, whipple's procedure

Introduction:

Due to the retro-peritoneal location of duodenum and Pancreas, sign and symptoms of pancreatic and duodenal trauma are subtle making diagnosis more difficult and can be easily missed.¹ The literature suggest that penetrating trauma carries worse outcomes when compared with blunt trauma. The patients who have gunshot injury to pancreas and duodenum shows worse prognosis than those who have

stab wound abdomen. In countries with high incidence of civilian violence, majority of pancreatoduodenal injuries are due to penetrating trauma, 70-80% being due to gunshot injuries.² Such injuries are rarely isolated and major vessels, stomach and Liver are commonly associated³ duodeno-pancreatic injuries may be related to flexion/distraction fracture of L1, L2 vertebra (Chance Fracture).⁴

Blunt Trauma to epigastrium due to box-

Received:
13th May 2016

Accepted:
22nd Novemembr 2016

King Abdallah Hospital,
KSA, Bisha
MF Nasser
MM Sheikh
SA Al-Amry
E El-Sayed
Y Al-Khalifa
M Mostafa
AAA Al-Shahrani
BD Dauda
SA Al-Ghamdi
SAS Khan

Correspondence:
Dr M Fawzi Nasser
Email: fawzy1953@hotmail.com
cell: 00966-501905633



Fig.1: CT abdomen with contrast showing contrast in stomach

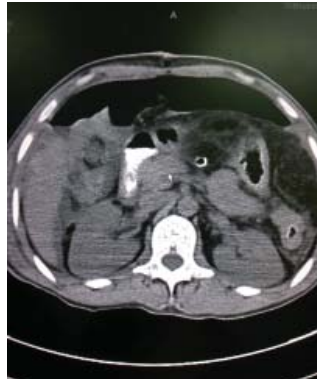


Fig.2: CT abdomen with showing contrast in the duodenum.



Fig.3: CT abdomen with contrast leaking in the peritoneal cavity

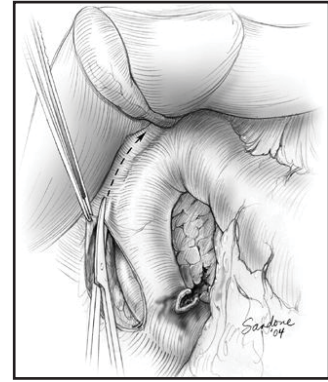


Fig.4: Re-exploration of abdomen carried out which showed about 2 litre of biliary fluid in peritoneal cavity. Whole gut was oedematus. The duodenum was mobilized by doing KOCHERS MANEUVER

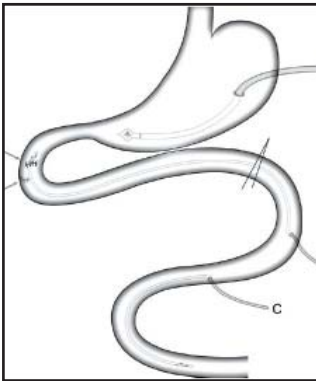


Fig.5: Triple tube decompression



Fig.6: Contrast Enema before closure of colostomy

ing, steering wheel, not uncommonly leads to pancreatoduodenal injuries as the organs get crushed against dorsolumbar spine. Deceleration may produce a tear at the junction of mobile and fixed part of the Dudenum. Clinical findings on examination suggesting gastro-intestinal perforation, finding consistent with peritonitis or positive DPL warrants early explorative laparotomy.

The investigation plain x-ray abdomen can show retro peritoneal air, free intra-peritoneal air in biliary tree. A focused abdominal ultrasound for trauma is useful in detecting intra-peritoneal fluid. Computerized tomograph is the most reliable method to detect retroperitoneal perforation of duodenum specially when performed with gastro-graain oral contrast

Endoscopic retrograde cholangio pancreatography is very useful in detecting injuries to main pancreatic duct.

CASE REPORT:

We present a case report of 23 years old male patient referred from peripheral hospital after one day of Laparotomy for gun shot injury abdomen with following information on referral form. Wound of entry at epigastrium and exit on right side of abdomen posteriorly. Laparotomy was performed at the peripheral hospital and findings were 10cm long tear right lobe of liver which was stitched. Two tears in transverse colon and mesocolon few cm apart which were repaired and after mobilising colon proximal colon brought out as loop colostomy. Two drains were placed one at site of liver repair and other in pelvis.

Patient received in resuscitation room, King Abdallah Hospital, Bisha, dehydrated, tacheopnic, tachecardiac pulse 136/min, BP 90/60 mm of Hg, O2 saturation 86% room air. Abdominal distention with tenderness present all over abdomen. Colostomy loop viable at right upper

abdomen. Both abdominal and pelvic drain were draining biliary fluid.

Resuscitation started. Fluid and electrolyte imbalance corrected, blood and FFPs arranged. The CT abdomen with gastrografin oral contrast carried out which showed contrast present in the 1st part of the duodenum, not going beyond duodenum and there was leaking of the contrast in the peritoneal cavity as shown in the CT abdomen as shown in Fig.1, Fig.2, and Fig.3.

Laparotomy carried out at King Abdallah hospital Bisha. There was 5cm tear at junction of 2nd and 3rd part of duodenum along with grade(1) injury to adjacent pancreas. After mobilizing the duodenum primary closure done in two layers.

Decompression tube placed inside duodenum by performing tube Gastrostomy. Nasogastric tube placed in the stomach and feeding jejunostomy was performed as shown in the diagrammatic representation Fig.4. Colostomy loop found over stretched. Segment of damaged transverse colon resected out. Distal end is closed and left inside, proximal end brought out as terminal colostomy. Abdominal cavity washed with copious amount of normal saline. Two drains placed and wound closed.

Post-operatively patient had a smooth recovery and oral liquids started at 6th post-operative day. Tube gastrostomy clamped at 4th post op day and removed at 10th post-operative day. After three months reversal of colostomy carried out after seeing the patency of distal large bowel as shown in Fig.5 and patient sent home in good general condition.

Discussion:

Pancreato-duodenal injuries are one of the most difficult challenge for a trauma surgeon. These injuries are not very common as pancreas and duodenum are retro-peritoneal structure. The abdominal injuries like solid organ injuries or hollow viscus are usually without much of problem, as the symptoms becomes obvious in the early stage as sign of peritonitis becomes obvious. In pancreato-duodenal injuries the symp-

toms are masked as there are no symptoms. Therefore these injuries can be missed. To diagnose such injuries clinician, should take a careful history, do thorough clinical examination and do the necessary investigation, CT scan abdomen with oral contrast is a very useful investigation, and has high sensitivity, and specificity to detect duodenal injuries, In blunt pancreatic injury its sensitivity is not very good and the extent of the pancreatic injury is often not evident on an initial tomography scan.⁵

Now-a-days most surgeons prefer to avoid complex reconstructive procedure and advocate necessary debridement and adequate drainage. Primary repair or resection and primary anastomosis in a single layer is preferred treatment. More complex procedure such as duodenal diverticulization or pyloric exclusion are considered for severe duodenal injuries.

Duodenal diverticulization was first described by Berne et al⁶ in 1968 for severe combined injury to Pancreas and Duodenum or severe injury of duodenum alone. The operation consists of suture closure of duodenal injury gastric antrectomy and end to side gastrojejunostomy, tube duodenostomy and generous drainage in the repair area. The same authors later described their experience with this procedure in 50 cases,⁷ reported 7(14%) patients developing duodenal fistula. With an overall mortality of 16%. A subsequent report from same institution, duodenal diverticulization was only used in 12 out of 105 patients.⁸

A superior variant of excluding the duodenal suture line and diverting gastric contents is Pyloric Exclusion, in which pyloric ring is identified and grasped from gastrotomy, the pyloric ring is than closed with non-absorbable polypropylene. A simultaneous gastrojejunostomy is than performed, Alternatively a stapled line may be placed just distal to pylorus. The first large series regarding pyloric exclusion was reported by Vaughan et al,⁹ from Ben Tob Hospital. In 1983 a 12 year experience from the same institution showed that, 122 patients out of 313 patients of duodenal injuries underwent pyloric exclusion

with a fistula rate of 5.5%.¹⁰ Jenson et al from South Africa have reported the outcome of a liberal use of pyloric exclusion procedure without vagotomy in all complex duodenal injuries.¹¹

Recently 2 large retrospective trial showed atrend towards greater complications rate and hospital stay in the pyloric exclusion group and have concluded that pyloric exclusion in patients with severe duodenal injuries confers no survival or outcome benefits.^{12,13}

Small bowel serosal patching of duodenal defect or variation on the theme in the form of gastric or jejuna pedicle mucosal grafts have little appeal and do not appear to have wide acceptance.¹⁴ However duodenojejunosomy with Roux-en-Y reconstruction appears to be the safest option in the duodenal injuries with defects defying primary suture or anastomosis.¹⁵

Conclusion:

Duodenal injure is one of the challenging problems to the general surgeon. Many cases of duodenal injury may be missed by clinical examination and even at laprotomy.

Management of duodenal injury varies from conservative management reaching up till pancreaticoduodenectomy. Management of the duodenal injury depend on grade of the duodenal injury and time passed after the trauma. A surgeon should have high index of suspicious to diagnose duodenal injury specially in the blunt epigastric trauma, seat belt injuries and gun shot injury.

Conflict of interest: None

Funding Source: None

Role and contribution of Authors:

Dr M Fawzi Nasser, Chairman of Surgery at KAH, conceived the idea and reviewed the initial writeup, conclusion and discussion.

Dr Muddaser M Sheikh, collected the data and references and wrote the initial writeup

Dr Sultan Abdallah Al-Amry, Assistant Professor and Consultant Surgeon, Bisha University, KAH, helped in collecting the references, discussion and conclusion writing.

Dr Essam El-Sayed, Consultant Surgeon, helped in collecting the data and helped in the case report writing

Dr Yasser Al-Khalifa, Consultant Surgeon, collected the references and critically review the discussion

Dr Medhat Mostafa, Consultant Surgeon, helped in collecting the references and review the discussion and conclusion writing

Dr Abdul Aziz Ayed Al-Shahrani, Resident Surgery, collected the data and references and helped in case report writing.

Dr Bawa D. Dauda, Consultant Surgeon, collected the data and review the discussion and conclusion

Dr Saeed Abdallah Al-Ghamdi, Consultant General and Vascular Surgeon, critically review the article and made the final correction

Dr Saleem Abdul Sattar Khan, Consultant Surgeon, critically review the article.

References:

1. Nilson E Norrby S et al Pancreatic Trauma in a defined population. *Acta Chir Scand* 1986;152:647-6512-Lopez PP Bejamin R et al. Recent Trends in the management of Pancreatodudenal injuries. *Am Surg.* 2005;71:87-852 (PubMed)
2. Lopez PP Bejamin R et al. Recent Trends in the management of Pancreatodudenal injuries. *Am Surg.* 2005;71:87-852 (PubMed)
3. Young Pr,Jr,Meredith JW et al. Pancreatic injuries resulting from pentratng trauma; A multi institution review.*Am Surg* 1998; 64:838-843.
4. Mulpuri K,Reilly Cwet al, The spectrum of abdominal injuries associated with Chance Fracture in Pediatric Patioents, *Eu J Pediatr Surg* 2007;17: 322-327
5. Van DW, Klakhoy A et al .Initial Resection of Potentially viable tissue is not optimal treatment of Grade11-1V pancreatic injury *World J Surg* 2009;33:221-227.
6. Berne CJ Donovan AJ Hagan WE et al Combined Duodeno pancreatin trauma:the role of end to side gastrojejunostomy. *Arch Surg.* 1968;96712-722.
7. BerneCJ ,Donovan AJ WhiteEJ et al,'Duodenal' Diver-ticulization' for duodenal and pancreatic injury*Am J Surg* 1974;127:503=507.
8. Shorr RM.Greaney GC et al, Injuries of the duodenum *Am J*

- Surg 1987;154:93-98.
9. Vaughan GD, Frazier OH et al. The Use of Pyloric Exclusion in the management of severe Duodenal injuries. *Am J Surg* 1977;134:785-790.
 10. Martin TD, Feliciano DV, et al, Severe Duodenal injuries Treatment with pyloric exclusion and gastrojejunostomy *Arch Surg* 1983 :118:631-635.
 11. Jansen M, Toit DF et al Duodenal injuries:surgical treatment adapted to circumstances, *Injury*:2002;33:611-615.
 12. Seamon MJ, Pieri PG et al A ten year retrospective review: Does Pyloric exclusion improve clinical outcome after penetrating and combined pancreoduodenal injuries? *J Trauma* 2007;62:829-833.
 13. Dubose JJ, Inaba K et al Pyloric exclusion in the treatment of severe Duodenal injuries:results from the national trauma Data Bank *Am J Surg* 2008;74:925-929.
 14. Ivatury PR, Nassoura ZE et al, Complex duodenal injuries. *Surg Clin North Am* 1996:76,797-812.
 15. Weigelt JA Duodenal injuries *Surg Clin North Am* 1990:70:529-539.