Case Report

Distal Pancreatectomy Secondary to a Blunt Trauma Following a Road Traffic Accident (RTA) - A Case Report

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Abstract

Background: Pancreas being a horizontally placed organ in the abdomen extends from concavity of the second part of duodenum to the hilus of spleen. Since it is largely retroperitoneal, there is only some degree of movement that makes it susceptible to blunt trauma. This rate of trauma is increasing and is more disastrous when it involves the ducts. **Case Report:** A 19-year-old male with no known comorbid presented to the emergency department after a road traffic accident involving a Motorcycle and truck, with him being run over by the truck. Abdomen was tense, tender to touch, guarding and rebound tenderness was positive. His baselines were all normal except Hb 11.7 g/dl, TLC 12.7 × 10^9, total bilirubin 8.8 mg/dl and alkaline phosphatase 348 IU/L. Ultrasound showed an iso-echoic area measuring 1.8 × 0.8 cm, seen adjacent to the right kidney, suggestive of sub capsular hematoma. Free fluid streak in Morrison's pouch and minimal peri-splenic free fluid was also noted. Furthermore, CT scan showed a retroperitoneal zone 1 hematoma behind the pancreas. We immediately prepared the patient for an exploratory laparotomy. According to the classification of pancreatic injury, our patient was classified as class 2. Post-operatively the patient did well with ultrasound and CT scan done 2 weeks after the procedure showing no collection around the pancreas and intact spleen. **Conclusion:** Distal pancreatectomy with splenic salvage, together with sufficient drainage of the retro peritoneum, adequate bowel rest and hyper alimentation is integral in the management of transection injury to the pancreas.

Keywords: Pancreas; Spleen; Pancreatectomy; Pancreatic injury; Trauma; Road traffic accident

Introduction

The pancreas extends transversely across the upper abdomen behind the stomach, with its head in the concavity of the duodenum and its tail lying in the zone of the hilus of the spleen. The pancreas is a reasonably fixed organ with some degree of superior and inferior movement. The fixation of the pancreas accounts for its liability to blunt trauma. [1] The prevalence of trauma to the abdomen (both blunt and penetrating) is increasing and significant consequences can emerge when the main pancreatic ducts or their major divisions are involved. [2] We report a successful case of distal pancreatectomy with splenic salvage, after a blunt trauma to the abdomen.

Case Report

19 year old male with no known comorbid presented to the emergency department of Civil Hospital, Karachi, Pakistan, after a road traffic accident (RTA) involving a Motorcycle and truck, with him being run over by the truck. The patient experienced blunt abdominal trauma and he lost his consciousness as he fell on the road. On examination, patient was in distress, his Glasgow Coma Scale (GCS) was 10/15 and vitals on arrival were blood pressure 110/70 (normal: 120/80), pulse 85 (normal: 70-100), respiratory rate 24 breaths/minutes (normal: 12-20 breaths/minute) and normal temperature 98.6 F (normal: 97- 99 F). Furthermore on primary survey, his airway was intact; breathing on auscultation showed bilateral equal air entry with normal vesicular breath sounds, circulation was intact, there was no deformity and upon examination of the extremities showed track marks on the anterior abdominal wall. Upon examination of the abdomen, it was tense, tender to touch, guarding and rebound tenderness was positive. However, gut sounds were audible and digital rectal examination was unremarkable.

Keeping in view the nature of the accident, we immediately ordered his baselines, Ultrasound Extended Fast, Computed Tomography (CT) scan of abdomen and chest X-ray. His baselines revealed Hemoglobin (Hb) 11.7 g/dl (normal: 14-18 g/dl), Hematocrit (Hct) 35.1% (normal: 38.8-50%), Total Leucocyte Count (TLC) 12.7 × 10^9 (normal: 4 × 10^{-9}/l), platelet 209 × 10^{-3} (normal: 150 × 10^{-3}-400 × 10^{-3}), bun 9 mg/dl (normal: 7-20 mg/dl), creatinine 0.9 mg/dl (normal: 0.6-1.2 mg/dl), sodium 138 meq/L (normal: 135-145 meq/L), potassium 4.3 meq/L (normal: 3.5-5 meq/L), chloride 101, meq/L (normal: 97-107 meq/L), total bilirubin 8.8 mg/dl (normal: 0.1-1.2 mg/dl), Serum glutamic pyruvic transaminase (SGPT) 38 units/l (normal: 7-56 units/l), alkaline phosphatase 348 IU/l (normal: 44-147 IU/l), and amylase 23 units/l (normal: 23-85 units/l). Focused assessment with sonography for trauma showed an iso echoic area measuring 1.8 × 0.8 cm, seen adjacent to the right kidney, suggestive of a subcapsular hematoma. Free fluid streak was also noted in Morrison's pouch. Minimal peri-splenic free fluid was also noted. Furthermore, CT scan showed a retroperitoneal zone 1 hematoma behind the pancreas. After the discovery of hematoma, we immediately prepared the patient for an exploratory laparotomy. The patient was kept Nil per oral (NPO), 4 fresh frozen plasma (FFP) and 4 Packed cell volume (PCV), and he was administered intravenous normal saline 0.9%, intravenous omeprazole 40 mg as well as

How to Cite this Article: Rajput A, et al. Distal Pancreatectomy Secondary to a Blunt Trauma Following a Road Traffic Accident (RTA)-A Case Report. Ann Med Health Sci Res. 2018;8:328-330

Table 1: Classification of severity of pancreatic injury.

Class I	Contusion, peripheral laceration, intact ductal system.
Class II	Distal laceration, transection, disruption; suspected ductal disruption; No duodenal injury.
Class III	Proximal laceration, transection disruption; suspected ductal injury; No duodenal injury.
Class IV	Severe combine pancreatico-duodenal disruption

intravenous paracetamol stat. The procedure started with a midline incision, with subcutaneous tissue, fascia, Linea alba and peritoneum opened. The findings unveiled a zone 1 expanding retroperitoneal hematoma (800 ml) with multiple clots that were retrieved. Moreover, bowel survey was done and lesser sac was opened, a transection of the pancreas at the level of the body and tail was noted. Hence distal pancreatectomy was done, along with ligation and division of the splenic artery without splenectomy, and two penrose drains were placed as well. Post-operatively, patient was kept NPO, nasogastric tube was placed, thromboembolism-deterrent (TED) stockings were applied and the specimen was sent for histopathology. Patient was hydrated well with normal saline 0.9% as well as with 5% dextrose saline appropriately, he was started on intravenous metronidazole 400 mg (three times a day), intravenous piperacillin - tazobactam 1 gram (3 times a day) and intravenous omeprazole 40 mg (2 times a day). The patient was shifted to intensive care unit (ICU) for one day, before being extubated and shifted back to ward. Postoperatively, patient was recovering well, with strict drain charting, monitoring of liver function tests, random glucose monitoring and vitals. Postoperative ultrasound and CT scan done 2 weeks after the procedure showed no collection around the pancreas, and the spleen was intact. Both the drains were removed 1 month after the procedure, his random and fasting blood glucose levels were within normal limits (excluding insulin deficiency) and his laboratory values on discharge were as follows: Hb 12.3 g/dl (normal: 14-18 g/dl), HCT 36.9% (normal: 38.8-50%), TLC 6×10^{-9}/l (normal: 4×10^{-9}/l), platelet 249×10^{-3} (normal: 150×10^{-3}-400×10^{-3}), Blood Urea Nitrogen (BUN) 7 mg/dl (normal: 7-20 mg/dl), creatinine 0.4 mg/dl (normal: 0.6-1.2 mg/dl), sodium 135 meq/L (normal: 135-145 meq/L), potassium 4.2 meq/L (normal: 3.5-5 meq/L), chloride 97 meq/L (97-107 meq/L), total bilirubin 2.23 mg/dl (normal: 0.1-1.2 mg/dl), SGPT 23 units/l (normal: 7-56 units/l), and alkaline phosphatase 207 IU/l (normal: 44-147 IU/l).

During the follow up, we had our patient undergo an MRCP scan. The findings were significant for a dilated Common bile duct, although clinically as well as in the lab parameters there are no abnormalities and the patient continues to live a healthy and normal lifestyle.

Discussion

Injury to the pancreas following blunt trauma occurs in nearly 2% of the patients, and a notable number of these are transections. Distal pancreatectomy was first suggested by Walton in 1923 and his proposition was based on the documented experience of Mayo's distal pancreatectomy for iatrogenic transection of the pancreas during splenectomy. Distal pancreatectomy for the blunt transection of the pancreas was first used famously by Hannon and Sprafka in 1955, which was fortified as a procedure of choice by Weitzman and Rothschild. [2,3] The mechanism of injury involves acute forcible compression of the pancreas against the vertebral column. Disturbance of the pancreatic tissue and the breakdown of the intra pancreatic duct system with liberation of the exocrine enzymes cause necrosis of tissue and retroperitoneal irritation with extravasation of plasma. Damage to the pancreatic vessels results in hemorrhage in to the peripancreatic retroperitoneum. [3]

The patient usually presents with minimal or no physical signs of injury. Slight abdominal tenderness is a common initial finding. Nevertheless, gradual development (over the period of six to eight hours) of involuntary guarding, rebound tenderness, and reduced bowel sounds should raise suspicion of pancreatic injury. The patient can have acute pancreatitis with signs of hypovolemia and toxicity. As a result of extravasation of plasma into the peri-pancreatic tissue, laboratory test usually shows hemo-concentration with an increase in hematocrit. Furthermore, serum and urine amylase is increased in 91% of the patients with blunt pancreatic trauma. Hence, serial amylase levels can be useful in diagnosing pancreatic blunt trauma. The plain radiographs usually provide no specific conclusions following pancreatic trauma.

There are several factors that determine the need for operative intervention. The presence of signs and symptoms of peritoneal irritation on initial assessment or within the immediate 24 hours of trauma warrants exploration of the abdomen. Added to that, elevated serum amylase can also be used as an exclusive indicator of pancreatic trauma. Intra-operatively, it is imperative to examine the entire pancreas, while also exploring all the retroperitoneal hematomas. Moreover, classification of the severity of the injury is necessary to devise a plan, in order to have a sufficient surgical repair. The classification [Table 1] consists of location of pancreatic injury, presence of ductal injury and duodenal injury. [3,4] Our patient also had a tense abdomen which was tender to touch, alongside guarding and rebound tenderness which developed within hours. However, our patient had normal hematocrit levels (35.1%) and in contrast to the literature, our patient's amylase level (23 units/l) was low and remained subsequently low throughout. Moreover, based on the classification, [3] our patient will amount to class 2 as he had a distal laceration along with suspected ductal involvement without any duodenal injury.

Common post-operative complications include fistula formation, pseudocyst formation, prolonged pancreatitis and sepsis. Drainage can be accomplished with either soft sump or Penrose drain administration, with the usage of both simultaneously has been associated with slender post-operative complications. In our setup, only the option of Penrose drain was available. Furthermore, there is always a concern for pancreatic insufficiency following distal pancreatectomy, however, literature unveils it to be rare. In a review of about 348 cases, only 6 developed insulin deficiency, which is accordant with Dragstedt's resection of 90% of a dog's pancreas without any deterioration of insulin production. [3,5] Nevertheless, our patient did not develop any complications and showed no signs of insulin deficiency post-operatively.

The conventional technique involves removal of the tail of the pancreas along with the spleen, which shares a common artery and vein. However, in recent years, it has been considered worthwhile to salvage the spleen, in the hopes of avoiding any postoperative sepsis and hematologic abnormalities. Literature shows salvage of spleen during distal pancreatectomy by carefully dividing the splenic artery and splenic vein beyond the tail of the pancreas, with the spleen feeding on short gastric as collateral vessels. [6] We hoped to conserve the spleen in a similar way in our patient. Moreover, hyper-alimentation and GI tract rest are also an essential part of postoperative management which has shown to reduce postoperative pancreatic juices, as well as preventing prolong postoperative pancreatitis. [3] The success in our patient with hyper-alimentation and GI tract rest further supports this point in the literature. [7,8]

Conclusion

Overall, as far as the damage to pancreas is concerned, high index of suspicion is important to avoid neglect of blunt pancreatic injury. Distal pancreatectomy has been considered a successful procedure in the setting of transection injuries to the pancreas. Furthermore, the importance of splenic salvage cannot be denied and should be done where feasible. This approach, together with sufficient drainage of the retroperitoneum, adequate bowel rest and hyper-alimentation is

essential in the management of transection injury to the pancreas, as can be seen in our case. To our knowledge, the literature involving distal pancreatectomy is quite slender, so we hope to add more in this regard.

Conflict of Interest

The authors disclose that they have no conflicts of interest.

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