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## Combined pancreatic and duodenal transection injury: A case report



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## ABSTRACT

**INTRODUCTION:** Combined pancreatic-duodenal injuries in blunt abdominal trauma are rare. These injuries are associated with high morbidity and mortality, and their emergent management is a challenge. **CASE PRESENTATION:** We report a case of combined complete pancreatic (through the neck) and duodenal (first part) transections in a 24-year-old male secondary to blunt abdominal trauma following a motor vehicle crash. The duodenal stumps were closed separately and a gastrojejunostomy performed for intestinal continuity. The transected head of pancreas main duct was suture ligated and parenchyma was over sewn and buttressed with omentum. The edge of the body and tail pancreatic segment was freshened and an end to side pancreatico-jejunostomy was fashioned. A drain was left in situ. Post operatively the patient developed a pancreatic fistula which resolved with conservative management. After ten months of follow up the patient was well and showed no signs and symptoms of pancreatic insufficiency.

**DISCUSSION:** Lengthy, complex procedures in pancreatic injuries have been associated with poor outcomes. Distal pancreatectomy or Whipple's procedure for trauma are viable options for complete pancreatic transections. But when there is concern that the residual proximal pancreatic tissue is inadequate to provide endocrine or exocrine function, preservation of the pancreatic tissue distal to the injury becomes an option.

**CONCLUSION:** Combined pancreatic and duodenal injuries are rare and often fatal. Early identification, resuscitation and surgical intervention is warranted. Because of the large number of possible combinations of injuries to the pancreas and duodenum, no one form of therapy is appropriate for all patients.

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## 1. Introduction

This work has been reported in line with the Surgical Case Report Guidelines (SCARE) criteria [1]. Pancreatic and duodenal injuries are both uncommon and difficult to diagnose [2]. Traumatic pancreatic and duodenal injuries are reported to make up 2%–5% of all blunt abdominal trauma [3,4]. The morbidity and mortality rates of pancreaticoduodenal injuries still remain high, with reported mortalities of up to 25% in patients with duodenal trauma and up to 30% in patients with pancreatic injuries [4,5]. The rarity of such injuries, the complex anatomy and the common association with concomitant multi-organ injury, which may obscure the subtlety of imaging patterns of duodenal and pancreatic injury poses a unique challenge [5]. Lengthy, complex procedures in these cases have been associated with poor outcomes [2]. Studies have supported a trend towards the simplification of emergent management with the concept of damage control surgery gaining increased acceptance [2].

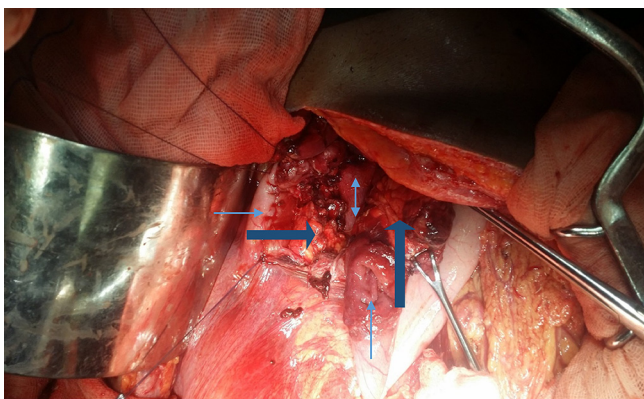
Here, we report a referral case to a Central teaching hospital of a complex traumatic pancreaticoduodenal injury successfully treated by gastrojejunostomy, pancreatojejunostomy and closure of the duodenal stumps separately. We emphasize on the need for imminent surgery in such an acute setting and describe one possible surgical option in view of the wide variability regarding the management of such injuries.

## 2. Case presentation

A 24-year-old male patient was brought into Parirenyatwa Hospital Emergency Rooms with severe abdominal pain eight hours after being involved in a motor vehicle crash. The patient did not have any contributory family, psychosocial or drug history. On admission he was fully conscious but anxious, saturating at 96% on oxygen per face mask. He was tachycardic (pulse 140bpm) and hypotensive (BP 89/56). His abdomen was distended with generalized tenderness and guarding. No other external injuries were noted. A full blood count showed a white cell count of  $3,65/\text{mm}^3$ , hemoglobin 13.5 g/dl and a platelet count of  $250 \times 10^6$ . A chest x-ray was unremarkable. Extended Focused Abdominal Sonography (eFAST) for trauma demonstrated free fluid in the abdomen.

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**Fig. 1.** Intra-operative picture demonstrating complete transection of the pancreatic body (bold arrows) and duodenum (small arrows). Distal duodenum stump has been closed. Superior mesenteric vein is visible between the transected pancreatic segments (double arrow).

After initial fluid resuscitation he was taken for an emergency laparotomy. His abdomen was full of a mixture of blood and gastric contents. He had a complete transection of both the pancreas (through the neck) and the first part of the duodenum (Fig. 1). He also had a 2 cm right lobe liver laceration that was not actively bleeding. Intra operatively the patient was hemodynamically stable. The duodenum stumps were closed separately and a gastrojejunostomy fashioned. The main duct of the proximal pancreatic head segment was suture ligated and the pancreatic edge closed with an omental buttress. The edge of the distal pancreas was freshened and an end to side anastomosis with distal loop of jejunum was done. Post-intervention considerations were of a pancreatic fistula and hence a drain was left in situ. Another consideration was of nutritional support. A nasogastrojejunal feeding tube was inserted for post-operative feeding. The procedure was performed by two general surgeons, assisted by two surgical trainees.

Post operatively the patient developed a grade B (International study group of Pancreatic fistula, ISGPF grading) [6] pancreatic fistula (PF) with fluid amylase of 26 075IU/L at postoperative day 10. The patient was subsequently discharged with the abdominal drain in situ 2 weeks post operatively. He adhered to keeping the abdominal drain in situ. The patient was followed up as an outpatient and the drain was removed after one month. After ten months of follow up the patient was well and has no signs and symptoms of pancreatic insufficiency. The patient was grateful to the hospital staff.

### 3. Discussion

Traumatic pancreatic and duodenal injuries are rare, especially in the setting of blunt abdominal trauma [4]. They reportedly constitute about 2% of all blunt abdominal trauma [2]. Morbidity and mortality associated with pancreatic and duodenal trauma is high [4]. There are reported mortalities of up to 30% in patients with blunt pancreatic trauma and up to 25% in patients with duodenal injuries [7,8]. Early mortality is usually due to severe hemorrhage from associated vascular injury and multiple coexisting injuries [4]. Severe anterior posterior trauma such as handlebar compression, deceleration trauma and seatbelt injuries, compresses these organs against the spine [4]. Early diagnosis is crucial, because delay of even 24 h can increase the risk of death 4-fold [2]. Common complications of duodenal and pancreatic injuries include pancreatitis, pseudocysts, fistulas, intraabdominal abscesses, and bowel anastomosis breakdown leading to sepsis and multi-organ failure [4]. Our patient presented early and had immediate surgical intervention.

The treatment of pancreatic and duodenal injuries depends on the American Association for the Surgery of Trauma (AAST) Organ Injury Scale (OIS) [7]. Our patient had a pancreatic OIS grade IV injury and a duodenal OIS grade V. Injuries to the pancreatic head represent the most challenging dilemmas [7]. Grade IV pancreatic injuries are managed by a distal pancreatectomy with or without a splenectomy, depending on the intraoperative hemodynamic status of the patient. The proximal stump is managed by suture ligating the duct and oversewing the parenchyma. Omentum is used to cover the stump and a drain is left in situ [1]. When there is concern that the residual proximal pancreatic tissue is inadequate to provide endocrine or exocrine function, preservation of the pancreatic tissue distal to the injury becomes an option [7]. Trauma pancreatoduodenectomy (Whipple) is an alternative [1,7,8]. In our patient there was a clean complete transaction of the pancreas across its neck. The duct on the head of the pancreas was suture ligated and the parenchyma was oversewn and buttressed with omentum. We opted to avoid distal pancreatectomy, and instead freshened the left stump and fashioned an end to side pancreatojejunostomy. Because our patient remained haemodynamically stable intra operatively, we opted for definitive surgery as opposed to damage control surgery.

Duodenal injuries can be managed by simple repair with pyloric exclusion and gastroenterostomy as an adjunct in more severe injuries [7]. In our case there was a clean transaction of the duodenum in the first part. The duodenal stumps were closed separately and a gastrojejunostomy was fashioned. Our patient had a grade B postoperative pancreatic fistula which resolved spontaneously. Although pancreatic resection is now considered a safe procedure, PF from pancreaticoenteric anastomosis is a significant problem [9]. The most likely risk factors, among others, are a soft pancreatic parenchyma, small pancreatic ducts, resection of ampullary, duodenum, cystic and islet cell pathology and excessive blood loss. Non-operative management strategies form the cornerstone of management in majority of the patients and include managing fluid balance, parenteral nutritional support, antibiotics or octreotide. Persistent large fluid collections, clinical patient deterioration, peritonitis and pancreatic anastomosis disruption are indications for image guided drainage or surgical exploration [9].

Nutritional support in the post-operative management of such patients is fundamental for a good outcome. Although we used a nasogastrojejunal tube for early feeding in our patient, a feeding jejunostomy is a viable option especially in a setting where total parenteral nutrition (TPN) is unavailable.

### 3.1. Conclusion

Pancreatic and duodenal injuries are both uncommon and difficult to diagnose. Because of delays in diagnosis and the significant morbidity and mortality associated with these complex injuries, outcomes are usually poor. While lengthy, complex procedures in these cases are best avoided, we describe a definitive non-resectional procedure that had a satisfactory outcome. In pancreatic transection injuries where there is concern that distal pancreatectomy could result in pancreatic insufficiency, preservation of the pancreatic tissue distal to the injury may be an option. Because of the large number of possible combinations of injuries to the pancreas and duodenum, no single form of therapy is appropriate for all patients.

### Conflicts of interest

There is no conflict of interest.

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**Ethical approval**

Consent obtained from the patient.

**Consent**

Signed consent obtained from the patient.

**Author contribution**

Simbarashe Gift Mungazi – case report design, subject research, consent and writing.

Chenesa Mbanje – case report design, subject research and writing.

Onesai Blessing Chihaka- editing and writing.

Noah Madziva – editing and writing.

**Registration of research studies**

Not applicable. This is a case report with no recruitment of patients.

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