Case Report

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Surgery Section

Whipple's Procedure for a Single Gunshot Wound: A Rare Case Report

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ABSTRACT

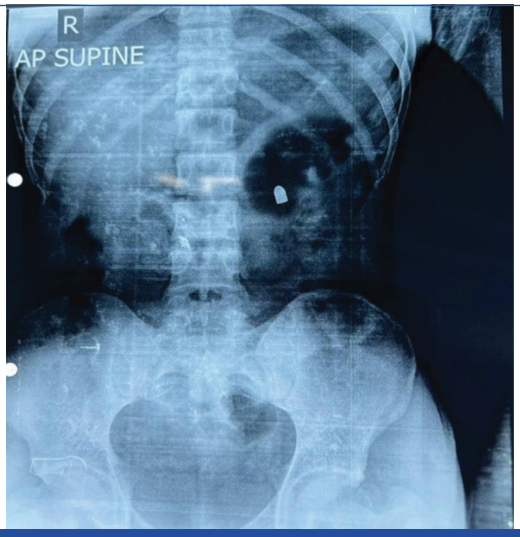
Traumatic pancreatoduodenectomy, also known as a traumatic Whipple procedure, is a complex surgical procedure reserved for severe traumatic injuries to the pancreas, duodenum, or periampullary structures. This case report details the management of a 19-year-old male who sustained a single gunshot wound to the abdomen, resulting in high-grade pancreatic and duodenal injuries. The procedure involved resection of the pancreatic head, the first and second parts of the duodenum (D1 and D2), a partial gastrectomy and a cholecystectomy. Liver haemorrhage was also controlled. Despite postoperative complications, including a pancreatic fluid leak and acute respiratory distress syndrome, the patient recovered and was discharged home. This case highlights the rarity of this procedure in trauma, its associated mortality and morbidity rates and the importance of timely and effective multidisciplinary care.

Keywords: Abdominal trauma, Duodenal injury, Pancreatic injury, Traumatic pancreatoduodenectomy, Traumatic whipple procedure

CASE REPORT

A 19-year-old male presented to the casualty department with a single gunshot wound to the right upper quadrant of the abdomen. Initial assessment revealed unconsciousness (Glasgow Coma Scale score of 7), necessitating rapid sequence intubation. A secondary survey showed a penetrating bullet wound in the right upper quadrant without an exit wound [Table/Fig-1]. An abdominal and pelvic X-ray (supine position) revealed the bullet in the left upper quadrant [Table/Fig-2].

[Table/Fig-1]: Clinical photograph showing single entry wound of the bullet with no exit wound.



[Table/Fig-2]: X-Ray image of abdomen in supine position showing bullet in the left upper quadrant.

[Table/Fig-3]: Intraoperative image showing entry wound of bullet in the 2nd part of duodenum.

Exploratory laparotomy was performed. Resuscitation involved administering three units of packed red blood cells and four units of fresh frozen plasma. Approximately, one litre of blood was suctioned. Intraoperative findings included a liver laceration (segment IV, extending 2 cm into the parenchyma), a duodenal perforation (second part), and a severe pancreatic head injury [Table/Fig-3].

Further exploration revealed a 2 cm bullet in the left peritoneal cavity, between jejunal loops, with a serosal tear in the proximal jejunum. A Whipple procedure was performed, including resection of the pancreatic head, D1 and D2, partial gastrectomy and cholecystectomy; liver haemorrhage was controlled. Two abdominal drains were placed (pelvis and Morrison's pouch). The jejunal serosal tear was primarily sutured; packing, irrigation and wound debridement were performed. Hepatic wound debridement and coagulation and a feeding jejunostomy were also undertaken.

The patient was transferred to the Surgical Intensive Care Unit (SICU) intubated and on ventilator support. Extubation occurred the

following day. On postoperative day 4, drain fluid analysis showed amylase (10200 U/L) (30-118 U/L) and lipase (13000 U/L) (8-78 U/L) elevation, indicating a pancreatic fluid leak from the anastomotic site. On postoperative day 6, acute respiratory distress syndrome developed requiring reintubation. The patient received intravenous Meropenem (1 g three times daily) and Teicoplanin (400 mg stat dose, followed by 200 mg once daily for three days). These complications resolved, allowing drain removal. The patient was discharged on postoperative day 24. Uneventful 2, 4, and 6-month postoperative follow-up appointments were conducted.

DISCUSSION

Traumatic pancreatic injuries are uncommon (0.2–12% of traumatic abdominal injuries) [1]. Severe cases may necessitate traumatic pancreatoduodenectomy. This complex procedure, typically used for pancreatic cancer, is sometimes indicated for severe traumatic pancreatic, duodenal, or surrounding organ damage. Pancreatic injury carries a 12% mortality and 50% morbidity rate [2]. Isolated pancreatic injuries are rare, potentially discovered incidentally during surgery, on imaging, or later as pancreatitis, fluid collections, or pseudocysts [2]. Initial management follows trauma protocols, focusing on airway, breathing and circulation. Definitive treatment depends on injury severity and concomitant injuries [2].

Ho VP et al., provided guidelines for managing pancreatic injuries based on severity and discovery (Eastern Association for the Surgery of Trauma (EAST) guidelines) [1]:

- Grades 1 or 2: Conservative treatment (imaging) or non resectional management (surgery).
- Grades 3 or 4: Resection (imaging or surgery).
- Grade 5: Limited guidelines due to high mortality [1].

Conservative management is often advocated, with the SEALANTS approach (Somatostatin, External drainage, Alternative nutrition, Antacids, Nil-per-oral, Total parenteral nutrition, and Stent in the pancreatic duct) showing successful recovery in 7/12 patients (various conditions, not just trauma) [3]. Delayed diagnosis increases complication rates (40% vs 18%) [4]. Management of severe (grades 4 and 5) traumatic pancreatic injuries remains debated, with external drainage often preferred over pancreatectomy [5,6]. Pancreatectomy risks postoperative complications, including fistula formation (5-37%) [6,7], many resolving spontaneously [8]. Closing the distal pancreatic stump with sutures, rather than pancreaticoenteric anastomosis, is recommended when organs are inflamed [9]. Intra-abdominal abscess formation (10-25%) is another common complication [8,10]. Early endocrine and exocrine deficiencies after pancreatectomy are uncommon [11]. Auto-islet transplantation has restored near-normal glucose tolerance after traumatic Whipple procedures [12,13].

In present case, patient had complete pancreatic head disruption with duodenal perforation. Endoscopic intervention was unsuitable. Stable haemodynamic status, with duodenal perforation and pancreatic head injury, prompted the traumatic Whipple procedure. Pancreaticoduodenal injuries have significant morbidity (47%) and mortality (11.5%) [13]. Trauma-related Whipple procedures have a higher complication rate than elective procedures. Traumatic pancreatoduodenectomy is rare, with an incidence of <0.1% of trauma-related pancreatic injuries [14].

CONCLUSION(S)

This case highlights the need for a Whipple procedure due to severe injuries from a single gunshot wound. Appropriate care, timely surgery and effective multidisciplinary management led to a positive outcome despite complications. This underscores the importance of prompt and effective treatment for severe traumatic injuries and the complexity and rarity of Whipple procedures in trauma settings.

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