

Pancreaticoureteric fistula following penetrating abdominal trauma: A Case Report

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Abstract

Pancreaticoureteric Fistula (PUF) is a very rare complication secondary to penetrating abdominal trauma involving the ureter and pancreatic parenchyma. Pancreatic injuries carry high morbidity due to the involvement of surrounding structures and are difficult to diagnose due to their retroperitoneal location. A case of a patient is reported at Civil Hospital, Hyderabad who presented with a history of firearm injury and missed pancreatic duct involvement on initial exploration that eventually led to the development of Pancreaticoureteric Fistula. He was managed via percutaneous nephrostomy (PCN) for the right ureteric injury and pancreatic duct (PD) stenting was done for distal main pancreatic duct injury (MPD).

Keywords: Pancreatic injury, Pancreaticoureteric Fistula, Penetrating abdominal trauma.

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Introduction

Pancreatic injuries can be difficult to diagnose due to the low frequency of these injuries and the associated nonspecific clinical features, subtle imaging findings, and multi-organ trauma. Owing to the retroperitoneal location, pancreatic injuries occur in only about 2% of all patients with trauma injuries and 10% of those with other intra-abdominal injuries.¹⁻³ Although most cases of pancreatic injuries are secondary to blunt trauma; those from penetrating trauma occur more frequently on a per-case basis, and penetrating trauma may more frequently involve the pancreatic tail.^{4,5} An abdominal computed tomography (CT) allows diagnosis and severity assessments of pancreatic trauma, presence of pancreatic duct injury, or associated bleeding.⁶⁻⁹ A delay in diagnosis or underestimation of its severity may be responsible for serious complications such as intra-abdominal bleeding, pancreatic fistula, or intra-abdominal collections.¹⁰⁻¹²

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Presented here is the case of a penetrating abdominal injury secondary to a firearm, On exploration, the injury to ureter and the pancreatic duct was missed, and delayed diagnosis led to the development of Pancreaticoureteric Fistula. The management of American Association for the Surgery of Trauma Organ Injury Scale (AAST-OIS) grade III/IV pancreatic injuries is still controversial and are commonly managed surgically to prevent pancreatic ascites or a major fistula¹³ however, endoscopic retrograde cholangiopancreatography (ERCP) can be done to prevent fistula formation. This case highlights the importance of endoscopic management of pancreatic injuries involving the distal main pancreatic duct.

Case Report

A 50-year-old male with a history of firearm injury presented at Civil Hospital Hyderabad in September 2021. Upon examination, an entry wound about approximately 5 cm lateral to the umbilicus and an exit wound at the level of L3-L4 in the left lumbar region was noted. The patient underwent a damage control laparotomy on the same day. During the operation, active bleeding from the omental vessels, contusion on the body of the pancreas, and a retroperitoneal haematoma was noted. The patient experienced continuous fluid leakage from the exit wound following the surgery. A CT pyelogram was performed revealing a left ureteric injury. As a result, the patient was referred to a tertiary care facility for further management.

The patient was admitted to Liaquat National Hospital in Karachi in October 2021 where a repeat CT pyelogram showed pancreatic laceration and a left proximal ureteric injury. A left sided percutaneous nephrostomy procedure was performed. Analysis of the PCN fluid indicated significantly elevated levels of amylase, urea and creatinine. A left retrograde pyelogram (RPG) was planned but the patient chose to leave against medical advice.

However, the patient was readmitted to the Sindh Institute of Urology and Transplantation in Karachi in December 2021 due to a dislodged left-sided PCN. A left-sided PCN procedure was successfully attempted, and repeat analysis of the PCN fluid revealed amylase levels of 3136 U/L and creatinine levels of 24.8. A repeat CT Pyelogram confirmed the presence of a grade III pancreatic laceration involving

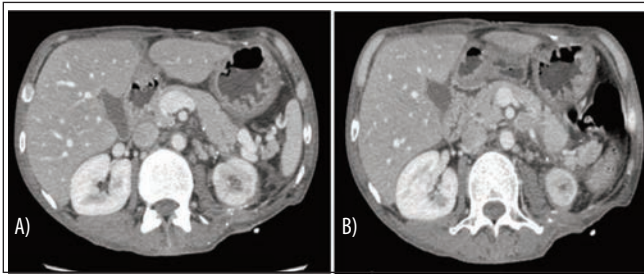


Figure-1 A & B: CT abdomen showing distal parenchymal injury with Grade III pancreatic duct injury.

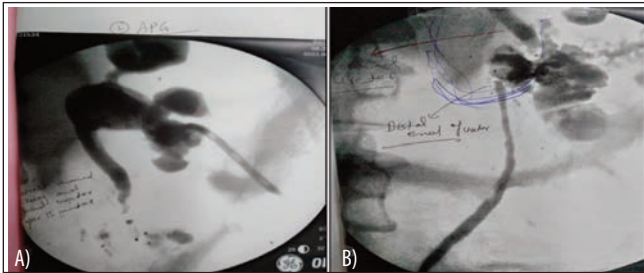


Figure-2 A & B: Left antegrade and retrograde pyelogram: contrast reaching up to proximal ureter. Both proximal and distal ends of the ureter can be identified separately.

the pancreatic tail and reaching the pancreatic duct (Figure 1A and 1B). The left PCN was in place with mild residual hydronephrosis. A small pocket of collection along the left psoas muscle, measuring 3.4×1.3×6 cm, containing specks of calcification was observed. Contrast extravasation was noted on delayed images from the proximal ureter at the level of L3-L4 with no visualization of the distal ureter. Both ends of the ureter were identified separately on the left antegrade and retrograde pyelogram with significant contrast extravasation suggestive of ureteric injury (Figures 2A and 2B).

An ERCP was performed to assess the pancreatic duct disruption. The ampullary opening appeared normal but upon injecting dye into the pancreatic duct; leakage of contrast confirmed a pancreatic duct injury. A 7fr×5cm pancreatic duct stent was deployed over the guidewire and free flow of pancreatic juice was observed.

During a follow-up visit to the clinic after 15 days, repeat analysis of the PCN fluid showed normal fluid amylase levels. The patient is currently attending regular follow-ups with the urology team.

Discussion

In any penetrating injury to the abdomen secondary to gunshot; surgical exploration is indicated and the first step in the procedure is to check all potential sources of bleeding because an uncontrolled bleeding is the most frequent cause of intra-operative death. In a seriously injured patient, the technique of damage control surgery

must be employed. After the major sources of bleeding have been checked, a thorough exploration of all abdominal organs should be performed and in case of pancreatic injury, assess the grade of injury according to The American Association for the Surgery of Trauma to decide an appropriate therapy. Exploration for injury to other organs that often accompanies pancreatic trauma is necessary. Pancreaticoureteric Fistula in this case resulted from a gunshot injury to both the pancreatic duct and left ureter. The pancreatic juice most probably started collecting in the left psoas region, creating thus a fistulous communication with the left ureter resulting in high PCN fluid amylase levels.

A multimodality approach is often required. Contrast-enhanced CT serves as the initial imaging modality, and MR Cholangiopancreatography (MRCP) and/or ERCP serves as a problem-solving modality in haemodynamically stable patients, for whom there is no immediate indication for laparotomy to assess MPD integrity. Although, MRCP and ERCP have higher diagnostic accuracy than CT for the evaluation of the MPD. However, advancements in CT technology and post-processing techniques have led to improved direct CT assessment of the MPD.¹⁴ Compared with ERCP, MRI/MRCP enables evaluation of the MPD upstream of a laceration and is noninvasive, typically more readily available, faster, and more accurate for delineation of pancreatic parenchymal injury and identification of fluid collections upstream of the site of MPD transection. If MPD injury is present, MRCP can assist in directing ERCP-guided therapy.¹⁵

In the setting of an abdominal trauma, the initial management is based on the patient's stability with priority given to controlling bleeding and intestinal content spillage. Unstable patients are often managed immediately with exploratory laparotomy and damage-control surgery.¹⁰ Once the patient is stabilized, subsequent management of the pancreatic injury can be planned based on patient factors and the extent of pancreatic and associated organ damage. Low-grade (grades I and II) pancreatic injuries are typically managed non-surgically, as these injuries do not involve the MPD.¹⁶ Once there is an involvement of the MPD (i.e., high-grade [grades III–V] injury), there is an increased risk of complications such as an abscess or fistula formation and more aggressive treatment such as ERCP or surgery which is usually recommended.¹⁷

Conclusion

Blunt traumatic pancreatic injuries can be easily overlooked by low frequency of occurrence, subtle imaging findings, and associated multi-organ trauma. The integrity of the

MPD is the major determinant of the patient outcome, predicting morbidity and mortality. Low-grade pancreatic injuries (grades I and II) are typically managed non-surgically, whereas high-grade injuries (grades III–V) may require resection with possible reconstruction and/or drainage procedures.

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HB: Writing, evidence collection, literature review.

MN: Critical revising

MAK: Revision, final approval, accountable for all aspects of the work.