

Case Report

Diagnostic and therapeutic role of endoscopic retrograde pancreatography and stent placement for grade IV blunt pancreatic trauma: A case report

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ABSTRACT

Pancreatic trauma involving ductal injury is rare but is associated with high morbidity and mortality. The benefit of endoscopic retrograde pancreatography and stent placement is unclear because there are only a few case reports on endoscopically treated pancreatic duct transection at the pancreatic head. We report a rare case of grade IV pancreatic trauma successfully treated with endoscopic pancreatic stent, which we believe makes significant contribution to the existing literature. A 17-year-old man with blunt pancreatic trauma was referred to our hospital and was diagnosed with grade IV pancreatic injury using endoscopic retrograde pancreatography. The patient was successfully managed with endoscopic pancreatic duct stenting. Although stent replacement was required three times and a trivial ductal stricture remained, the patient finally became stent-free without any symptoms and further adverse events. Endoscopic retrograde pancreatography is highly advantageous for early detection and evaluation of the severity of ductal injury. Subsequent stent insertion is well tolerated in hemodynamically stable patients and is especially beneficial for the treatment of pancreatic head injuries because it allows avoidance of sub-total pancreatectomy or high-risk reconstructive surgery. Nevertheless, the long-term outcomes and appropriate management of main pancreatic duct strictures due to stents remain to be determined. Accumulation of similar case experiences is essential to address these issues.

Case presentation

A 17-year-old man presented to the emergency room complaining of abdominal pain. He was hit by another player's knee in the upper half of the abdomen when he was playing soccer 2 days prior to presentation. He visited another hospital immediately after the injury, and computed tomography (CT) was performed; however, no organ injury was detected. Two days later, follow-up CT scan revealed pancreatic injury. He was referred to our hospital for probable surgical management. His past medical history was unremarkable.

He was clearly alert, normotensive, and not tachycardic and had normal oxygenation. On physical examination, he had tenderness in the epigastric area; however, the abdomen was not distended and there was no guarding. Laboratory data was notable for elevated serum amylase and lipase of 1076 U/l and 959 U/l, respectively. Hemoglobin was 15.4 g/dl. Enhanced abdominal CT

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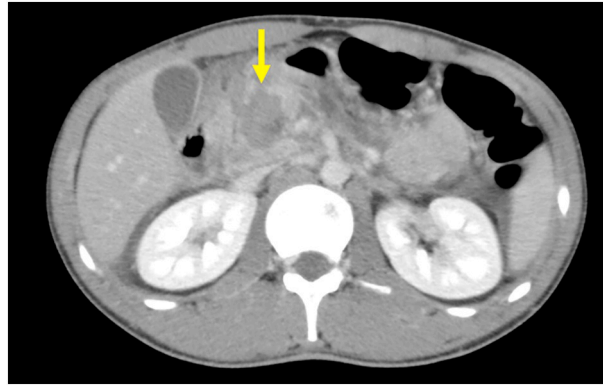


Fig. 1. CT image on arrival, showing transversely dissecting low density area in the head of the pancreas (yellow arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

showed a transversally dissecting low-density area in the pancreatic head suggesting complete transection of the main pancreatic duct (MPD) (Fig. 1). There was no other organ damage, including to the duodenum and liver. Magnetic resonant pancreatography (MRP) failed to visualize the MPD at the pancreatic head, suggesting complete dissociation of proximal and distal pancreatic duct (Fig. 2). Endoscopic retrograde pancreatography (ERP) was performed, and contrast leakage was seen at the pancreatic head (Fig. 3), confirming the diagnosis of MPD injury consistent with grade IV American Association for the Surgery of Trauma (AAST) Organ Injury Scale (OIS) [1]. We could cannulate through to the distal pancreatic duct and insert an endoscopic nasal pancreatic drainage (ENPD) tube. Follow-up ERP on hospital day 12 revealed minor leakage of contrast and minor stricture of the MPD. The ENPD tube was replaced with a pancreatic stent on hospital day 19, and the patient was discharged on day 25. Pancreatic stent replacement was required due to MPD stricture 47 days, 4 months, and 7 months after discharge, and the stricture gradually improved. Finally, the pancreatic stent was removed 11 months after discharge. The latest ERP showed only trivial MPD stricture. The patient remains asymptomatic for 3 years after the stent was removed.

Case discussion and literature review

Blunt pancreatic injury is relatively uncommon and is often associated with high morbidity rates, especially when the MPD is involved. The optimal management for duct involvement remains controversial. Current guidelines from the AAST stratify the severity according to the presence of pancreatic duct injury and the site of injury [1]. Grade III and IV indicate parenchymal injury accompanied by MPD injury. Operative management is recommended in such cases [2]; however, this is associated with higher morbidity and mortality. There is a growing movement toward non-operative management for MPD injury. Ito et al. reported that ERP stenting was successful in a case of pancreatic head injury, although the damage to the duct was milder than in our case [3]. Some retrospective studies compared operative and non-operative management of pancreatic trauma [4]. However, in these studies, hemodynamic state and presence of related organ injuries were not evaluated, both of which are strongly associated with severity of

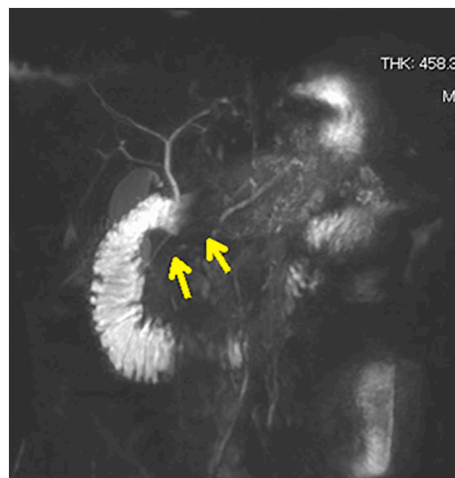


Fig. 2. Magnetic resonant pancreatography showing complete dissociation of the proximal and distal main pancreatic duct (yellow arrows). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

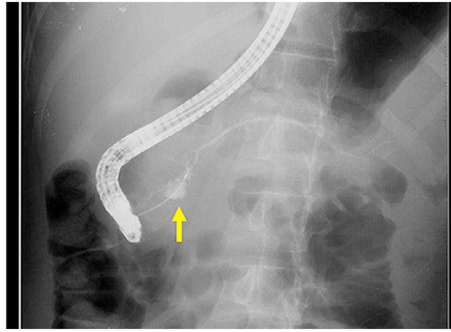


Fig. 3. Endoscopic retrograde pancreatography showing leakage of contrast medium at the head of the pancreas (yellow arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

pancreatic damage. Jahromi et al. concluded that optimal management should be individualized based on the patient's clinical condition because non-operative management yielded complication rates similar to those of operative management [4].

As a diagnostic modality, ERP has been successfully used in traumatic ductal disruption [3,5,6]. CT is faster and less invasive; however, it is less sensitive than ERP for the early detection of MPD injury. Over 40% of MPD injuries were reported to be missed by pre-endoscopic CT scan [7]. In the present case, the earlier CT failed to detect even parenchymal injury, and second CT and subsequent ERP yielded a solid diagnosis of subtotal disruption of pancreas and MPD.

In terms of therapeutic value, subsequent endoscopic stent insertion is a useful non-surgical option [3,5,6]. No significant difference was found in complication rates between stent group and operation group. The rates of other organ injury and sites of duct injury were similar in both groups [7]. Kong et al. compared endoscopic and non-endoscopic management groups of patients who underwent non-operative management for MPD injuries. Significantly lower pancreas-related complications and treatment failure were noted with the addition of endoscopic management for grade II/III injury. In that study, hemodynamically unstable patients and those with peritonitis were excluded. The authors concluded that endoscopic management may be beneficial and may lower the rate of treatment failure if applied to strictly selected patients [8]. In our case, ERP was the treatment of choice because the patient was hemodynamically stable without other related organ injuries. ERP should be considered first in subtotally dissected grade IV pancreatic trauma unless the patient is critically ill or suspected to have multi-organ injury.

The severity of ductal injury is also an important prognostic factor in treating with ERP stenting. Lin et al. [9] classified MPD injuries into three categories according to ERP findings: class 1 with normal MPD; class 2 with abnormal MPD, such as extravasation of contrast medium but preserved MPD continuity; and class 3 with completely disrupted MPD continuity, indicated by obstruction or obvious wide spread of contrast medium. In a retrospective review of 35 pancreatic trauma cases, they concluded that class 2 injury of the pancreatic head or body is an indication for ERP stenting, whereas surgery is warranted for class 3 injury [9]. They reported 11 patients with class 3 injury, and only two underwent stent placement; distal pancreatectomy was performed in 10 of the 11 patients, and only one underwent reconstruction [9]. In our opinion, ductal stenting is indicated in some class 3 cases with or without peripancreatic drainage, as long as cannulation to the distal duct is possible. If MPD is injured at the head of the pancreas, distal pancreatectomy yields uncertain long-term effects on endocrine and exocrine function; primary reconstructive surgery has a high morbidity rate. Combined with drainage procedure, class 3 cases of head injury can be successfully managed with stent placement. In the present case, complete MPD rupture was suspected at the head of the pancreas with CT and MRP; however, ERP findings suggested class 2 injury. We successfully managed the patient with ERP stenting and avoided unnecessary surgery.

A major complication of pancreatic duct stenting is stricture of the MPD. In a case series of grade III/IV pancreatic trauma treated with stents, one of six patients had mild stricture and four patients experienced severe stricture that required repeated and prolonged stenting [9,10]. A possible explanation for this extremely high rate of severe stricture is long intervals from injury to ERP (8 h, 8, 19, or 22 days) [10]. Contrarily, a case of successful ERP stenting in delayed diagnosis (5 days) has been reported [6]. In the present case, we speculate that relatively early stenting had a positive effect on the severity of stricture; however, repeated replacement and prolonged stenting caused persistent mild MPD stricture. Further investigation is necessary to define the long-term outcomes of endoscopic stent placement.

In conclusion, ERP is a useful diagnostic and therapeutic modality for grade III/IV pancreatic trauma in clinically stable patients. MPD stricture is often complicated by stent placement; however, the mechanism and its long-term outcomes are unclear. Further investigation and accumulation of clinical experiences are needed.

Declaration of competing interest

None.

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