



## Case Report

# Conservative treatment using an endoscopic pancreatic stent in a patient with delayed diagnosis of pancreatic injury after blunt trauma: A case report

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## ABSTRACT

The diagnostic evaluation of pancreatic injuries has improved dramatically in recent years. However, it is sometimes difficult to diagnose pancreatic injuries. Surgical treatment after delayed diagnosis is associated with increased risks of mortality and morbidity. A 47-year-old man was referred to our emergency department after experiencing blunt abdominal trauma 5 d earlier. The patient was diagnosed with a grade-III pancreatic injury. His hemodynamic status remained stable. He was managed successfully using endoscopic pancreatic stenting and percutaneous drainage catheter insertion.

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## Introduction

The diagnostic evaluation of pancreatic injuries has improved dramatically in recent years [1]. However, it is sometimes difficult to diagnose pancreatic injuries due to the limited accuracy of diagnoses based on laboratory findings (serum amylase and lipase levels), diagnostic peritoneal lavage, ultrasound, and abdominal computed tomography (CT) [1,2]. Radiological imaging often fails to identify pancreatic injuries in the acute phase [3]. Advanced inflammation and autodigestion can occur in sites surrounding pancreatic injuries if diagnosis is delayed. Therefore, surgical treatment after delayed diagnosis is associated with increased risks of mortality and morbidity [2,4]. Endoscopic retrograde cholangiopancreatography (ERCP) is one of the most accurate ductal evaluation modalities, and endoscopic pancreatic stenting might allow unnecessary surgery to be avoided [1].

In this paper, we report a case of pancreatic injury that was diagnosed late after the initial trauma without injury to any other intra-abdominal organs. The patient was managed successfully using endoscopic pancreatic stenting.

## Case presentation

A 47-year-old man was referred to our emergency department after experiencing blunt abdominal trauma 5 d earlier. The mechanism of injury was a blow to the epigastrium caused by a fall. His vital signs included a blood pressure of 120/70 mmHg, heart rate of 72 beats per min, body temperature of 37.2 °C, and respiratory rate of 20 breaths per min. Laboratory tests revealed a white blood cell count of 21,310/mm<sup>3</sup>, mild increases in serum amylase/lipase levels (471/688 U/L), and a C-reactive protein level of 25.71 mg/dL. An abdominal CT scan revealed discontinuity between the pancreas head and neck with peripancreatic fluid collection (Fig. 1). The patient was diagnosed with a grade-III pancreatic injury. His hemodynamic status

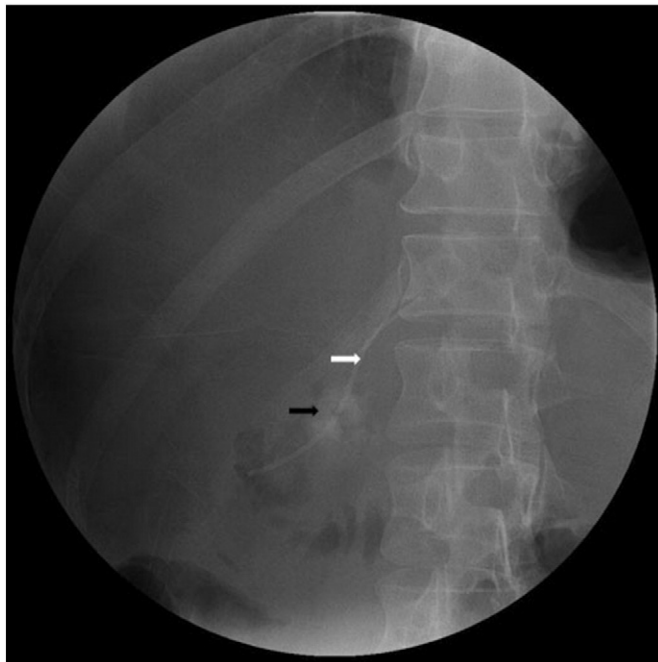
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**Fig. 1.** Abdominal computed tomography showing pancreatic neck transection (white arrow) and phlegmon formation.

remained stable over the 5 d following the fall. First, we performed ERCP, which demonstrated disruption of the main pancreatic duct with leakage at the neck portion of the pancreas. A 5-Fr 9-cm endoscopic pancreatic stent was inserted into the pancreatic duct across the disrupted portion (Fig. 2). Next, a percutaneous drainage catheter was placed at the site of peripancreatic fluid collection. A follow-up CT scan revealed no exacerbation of the pancreatic injury and decreased peripancreatic fluid collection volume. The patient's symptoms improved after endoscopic treatment and percutaneous catheter insertion. The percutaneous catheter was removed on hospital day 20, and the patient was discharged on hospital day 26. Four months after discharge, follow-up ERCP was performed and revealed no leakage at the disruption site but stricture around the leakage site. The initial stent was replaced with a 7-Fr 9-cm endoscopic pancreatic stent to dilate the stricture site. ERCP was performed again at 7 months after discharge, and revealed mild stricture of the leakage site without leakage. Therefore, the stent was removed. Another 4 months later, the patient had experienced no further adverse events.



**Fig. 2.** Endoscopic retrograde cholangiopancreatography showing leakage at the neck portion of the pancreas (black arrow) and an inserted pancreatic stent (white arrow).

## Discussion

The pancreas is a relatively uncommon site of traumatic injury, and the incidence of pancreatic injury accounts for only 5% of significant blunt abdominal trauma [5,6]. This rarity is due to the anatomical location of the pancreas within the retroperitoneum [7]. The fixed position of the pancreas (anterior to the vertebral column) provides excellent protection against deceleration injuries and posterior stab wounds [8]. Blunt trauma to the pancreas is caused by a sudden localized force applied to the upper abdomen that compresses the pancreas against the vertebral column [9]. Disruption of the main or minor pancreatic ducts is frequent in these situations. Patients with clinically significant pancreatic injuries can experience pancreatic juice leakage into the abdominal cavity due to disruption of the ducts [3]. The typical clinical triad of pancreatic trauma is upper abdominal pain, leukocytosis, and elevated serum amylase level. However, this clinical triad may be absent during the first or several days following onset [3,10]. Pancreatic injury frequently results in delayed diagnosis, followed by significant complications including pseudocyst, fistula, abscess formation, false aneurysm, and sepsis, ultimately leading to high rates of morbidity and mortality [1–4].

The decision to use a conservative or surgical approach in cases of pancreatic injury depends on the integrity of the main pancreatic duct, extent of pancreatic parenchymal damage, anatomical location of the injury, stability of the patient, and degree of associated organ damage [11]. Conservative management may be warranted in patients with an isolated pancreatic contusion or superficial lacerations without ductal disruption (Grade I or II). The treatment of traumatic pancreatitis consists of bowel rest, nasogastric suction, and nutritional support [12]. Grades I and II are treated with non-operative techniques or simple drainage, whereas grade-III or higher injuries often require resection combined with possible reconstruction and/or drainage procedures [13]. Due to the development of ERCP, conservative treatment is the preferred initial treatment option in cases of pancreatic ductal injury in modern clinical practice. Among the available non-operative methods, ERCP and endoscopic pancreatic stent placement are becoming the main methods of diagnosis and minimally invasive treatment, respectively, and may decrease the need for operative therapy. Huckfeldt et al. reported the first successful ERCP and stent placement. In this previous report, ERCP was performed only a few hours after the initial pancreatic trauma [14]. Other studies have reported successful duct stent placement for the treatment of traumatic duct disruption [15,16]. Rogers et al. reported that endoscopic treatment for ductal injury was possible in 42% of patients, with or without the need for additional surgery [17]. Most previously published reports describe early stenting, and there are limited reports regarding successful ERCP in cases involving delayed presentation [7]. In the present case, pancreatic duct injury was detected 5 d after blunt trauma, and grade-III pancreatic injury was demonstrated on a CT scan. Because the patient's vital signs were stable, endoscopic stenting was the first treatment choice and was performed safely with no need for additional surgery. Percutaneous drainage was performed to treat an abscess around the pancreatic rupture site after endoscopic stenting.

Endoscopic stenting can improve outcomes in patients with high-grade pancreatic injury, but some complications can occur in the long-term that require stent replacement. Ductal stricture is the most common complication, and can be caused by the trauma itself or stent/side-branch occlusion [18]. This complication may necessitate several stent placements [19]. Other complications, including occlusion, migration, duodenal erosion, and infection, have also been reported [16]. In the present case, mild stricture occurred but only one stent replacement was required, and no other complications occurred.

## Conclusion

Although we have accumulated only limited experience with this strategy, we believe that it is effective in the treatment of patients who are diagnosed late but are hemodynamically stable if the patient's condition is managed carefully. This method may reduce the need for unnecessary surgery.

## Consent

Written informed consent was obtained from the patient and his wife for publication of this case report and accompanying images.

## Conflict of interest

The authors declare no conflict of interest.

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## Authors' contributions

KKH has made substantial contributions to conception and design. KKH and KSH wrote the paper. KSH checked bibliographic reference. KKH had primary responsibility for the content. Both authors read and approved the final manuscript.

## References

- [1] D.K. Bhasin, S.S. Rana, P. Rawal, Endoscopic retrograde pancreatography in pancreatic trauma: need to break the mental barrier, *J. Gastroenterol. Hepatol.* 24 (5) (2009) 720–728.
- [2] L.S. Kao, E.M. Bulger, D.L. Parks, G.F. Byrd, G.J. Jurkovich, Predictors of morbidity after traumatic pancreatic injury, *J. Trauma* 55 (5) (2003) 898–905.
- [3] U. Linsenmaier, S. Wirth, M. Reiser, M. Körner, Diagnosis and classification of pancreatic and duodenal injuries in emergency radiology, *Radiographics* 28 (6) (2008) 1591–1602.
- [4] R.L. Cirillo, L.G. Koniaris, Detecting blunt pancreatic injuries, *J. Gastrointest. Surg.* 6 (2002) 587–598.
- [5] C.R.J. LinBC, J.F. Fang, Y.P. Hsu, Y.C. Kao, J.L. Kao, Management of blunt major pancreatic injury, *J. Trauma* 56 (2004) 774–778.
- [6] A. Subramanian, C.J. Dente, D.V. Feliciano, The management of pancreatic trauma in the modern era, *Surg. Clin. N. Am.* 87 (2007) 1512–1532.
- [7] A. Vezakis, V. Koutoulidis, G. Fragulidis, G. Polymeneas, A. Polydorou, Complete traumatic main pancreatic duct disruption treated endoscopically: a case report, *J. Med. Case Rep.* 8 (2014) 173.
- [8] U. Debi, R. Kaur, K.K. Prasad, S.K. Sinha, K. Singh, Pancreatic trauma: a concise review, *World J. Gastroenterol.* 19 (47) (2013) 9003–9011.
- [9] S.K. Venkatesh, J.M. Wan, CT of blunt pancreatic trauma: a pictorial essay, *Eur. J. Radiol.* 67 (2008) 311–320.
- [10] J.W. Meredith, D.D. Trunkey, CT scanning in acute abdominal injuries, *Surg. Clin. North Am.* 68 (1988) 255–268.
- [11] J.C. Duchesne, R. Schmieg, S. Islam, J. Olivier, N. McSwain, Selective nonoperative management of low-grade blunt pancreatic injury: are we there yet? *J. Trauma* 65 (2008) 49–53.
- [12] R.H. Wilson, R.J. Moorehead, Current management of trauma to the pancreas, *Br. J. Surg.* 78 (1991) 1196–1202.
- [13] M. Fisher, K. Brasel, Evolving management of pancreatic injury, *Curr. Opin. Crit. Care* 17 (2011) 613–617.
- [14] R. Huckfeldt, C. Agee, W.K. Nichols, J. Barthel, Nonoperative treatment of traumatic pancreatic duct disruption using an endoscopically placed stent, *J. Trauma* 41 (1996) 143–144.
- [15] J.J. Telford, J.J. Farrell, J.R. Saltzman, S.J. Shields, S.J. Banks, P.A. Banks, et al., Pancreatic stent placement for duct disruption, *Gastrointest. Endosc.* 56 (1) (2002) 18–24.
- [16] H.S. Kim, D.K. Lee, I.W. Kim, S.K. Baik, S.O. Kwon, J.W. Park, et al., The role of endoscopic retrograde pancreatography in the treatment of a pancreatic duct injury, *Gastrointest. Endosc.* 54 (2001) 49–55.
- [17] S.J. Roger, J.P. Cello, W.P. Schecter, Endoscopic retrograde cholangiopancreatography in patients with pancreatic trauma, *J. Trauma* 68 (3) (2010) 538–544.
- [18] V. Brasoveanu, I. Bălescu, C. Anghel, I. Barbu, M. Ionescu, N. BBacalbasa, A case report of pancreatic transection by blunt abdominal trauma, *Chirurgia (Bucur)* 109 (1) (2014) 123–127.
- [19] D.E. Coelho, J.C. Ardengh, M.T. Carballo, E.R. de Lina-Filho, T.H. Baron, J.F. Coelho, Clinicopathologic characteristics and endoscopic treatment of post-traumatic pancreatic pseudocysts, *Pancreas* 40 (3) (2011) 469–473.