

Case Report

Severe pancreatic injury with total disruption of main pancreatic duct successfully managed by multi-stage endoscopic therapy: a case report

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Background: The management of pancreatic injury is not well-established. Recently, endoscopic therapy has been reported as a treatment option for main pancreatic duct disruption.

Case Presentation: A 68-year-old man presented to our hospital and was diagnosed with severe traumatic pancreatic injury that developed 2 days prior. Endoscopic retrograde cholangiopancreatography revealed main pancreatic duct disruption. Although initial stenting to the distal main pancreatic duct was not achieved because of the widespread intermediate fluid collection, an endoscopic naso-pancreatic drainage tube was successfully inserted into via the main duodenal papilla. After drainage, the endoscopic naso-pancreatic drainage tube was replaced with an endoscopic retrograde pancreatic drainage tube, and a stent was successfully placed into the distal main pancreatic duct via the minor papilla.

Conclusion: We report a case of severe pancreatic injury managed using multi-stage endoscopic therapy that could be a possible treatment strategy for pancreatic injury with total main pancreatic duct disruption.

Key words: Case report, endoscopic therapy, ERCP, main pancreatic duct injury, pancreatic injury

BACKGROUND

PANCREATIC INJURY OCCURS in 2% of blunt trauma cases. Although the mortality rate of pancreatic injury without main pancreatic duct (MPD) injury is ~7%, which of pancreatic injury with MPD injury is 29%.^{1,2} Because of the low prevalence of pancreatic injury, there have only been a few large clinical trials or cohort studies, resulting in a lack of established treatment strategies with sufficient evidence.

With progress in endoscopic technology, non-operative management for pancreatic injury has become increasingly common. It was mostly performed in stable patients with pancreatic injury with Organ Injury Scale (OIS) grades I, II, and III. In cases of pancreatic injury with OIS grade \geq IV, surgical management remains the gold standard.³

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CASE PRESENTATION

A 68-year-old male complaining of abdominal pain and diarrhea was admitted to a previous hospital and diagnosed with severe acute pancreatitis. He developed fever and oliguria 2 days later and was transferred to our hospital for intensive care. His vital signs on arrival were as follows: blood pressure, 158/99 mm Hg; pulse rate, 116/min; and oxygen saturation, 99% on a 1 L nasal cannula. There was no reported history of trauma; however, physical examination revealed bruising on the upper middle quadrant. An abdominal computed tomography (CT) scan showed total disruption of the pancreas anterior to vertebral body, which accompanied massive fluid collection in the lesser sac (Fig. 1). The findings of the laboratory tests were as follows: white blood cell counts, 6,800/ μ L; C-reactive protein, 46.43 mg/dL; total bilirubin, 0.8 mg/dL; and serum amylase, 479 U/L. Police investigation led to a strong suspicion of domestic assault. The patient was diagnosed with traumatic pancreatic injury with MPD disruption (OIS grade IV).

Emergency endoscopic retrograde cholangiopancreatography (ERCP) revealed total MPD disruption. Because stent

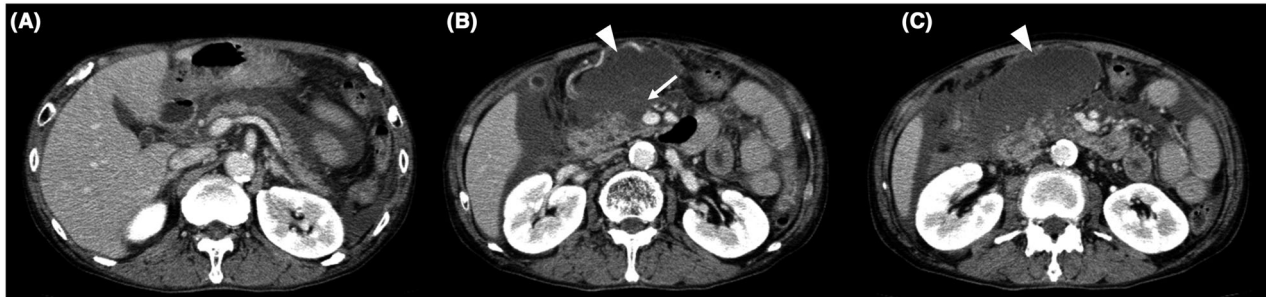


Fig. 1. The initial CT scan reveals peripancreatic fluid collection A, OIS grade IV pancreatic injury with disruption of the pancreatic body, B, (arrow) and fluid collection in the lesser sac, B, C, (arrowheads). CT, computed tomography; OIS, Organ Injury Scale.

placement into the distal MPD was not feasible because of the largely filled intermediate cavity and edema of accessory papilla aperture, pancreatic fluid collection drainage *via* major duodenal papilla was performed using a 6Fr endoscopic naso-pancreatic drainage (ENPD) tube (Fig. 2). An 8.5Fr 5 cm biliary plastic stent was also placed to prevent biliary duct stenosis. Although the fluid collection was spread to Morrison fossa, we expected that the fluid collection could be drained through the foramen of Winslow. The amylase level of in the drained fluid was 433,544 U/L. Meropenem and octreotide were administered after the procedure. The meropenem was initiated to cover for potential bacterial infection. Octreotide was administered for 4 weeks.

On day 2 of hospital admission, his symptoms and laboratory data improved as follows: white blood cell count, of 8,300 μ L; C-reactive protein, 34.0 mg/dL; and serum amylase, 143 U/L. The fluid from ENPD decreased 1,000 mL

on day 1 to 300 mL on day 2. Follow-up CT performed on day 2 showed a reduction in peripancreatic fluid collection. Antibiotics were changed to ampicillin sulbactam on day 6 and continued for 4 weeks. On day 18, oral food intake was initiated. On day 44, ERCP was performed because the fluid collection was sufficiently reduced. Because the patient was considered unable to endure further placement of ENPD, the ENPD tube was switched to an endoscopic retrograde pancreatic drainage tube through the major duodenal papilla. A 7Fr 4 cm Advanix double-pig tail stent was used to minimize the risk of dislodging. Although access to the distal MPD *via* the major duodenal papilla was not achieved, a 5Fr 7 cm Harmo Ray stent was successfully placed in the distal MPD *via* the accessory pancreatic duct without incision of the minor duodenal papilla, preventing the obstruction of the distal MPD (Fig. 3). Endoscopic sphincterotomy was also performed, and the biliary plastic stent was removed. The

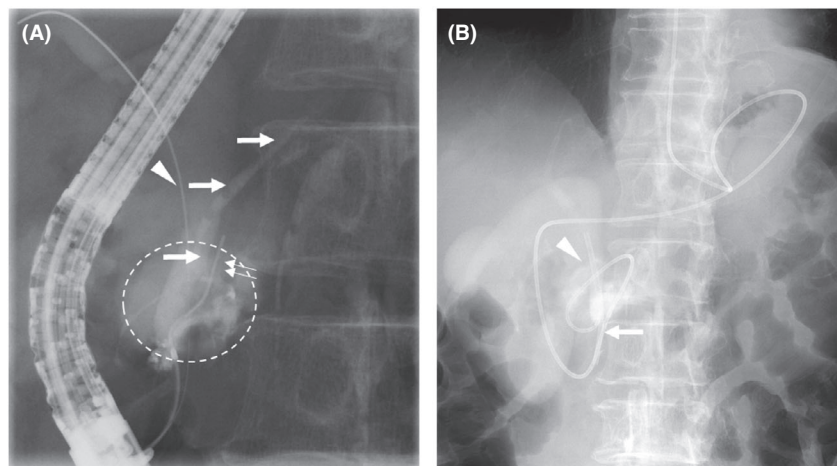


Fig. 2. The initial ERCP reveals MPD disruption, A, (arrows), and peripancreatic fluid collection, A, (dotted line). The distal MPD was contrasted via fluid collection, A, (arrows), A 0.89 mm guidewire was not successfully passed through the distal MPD, A, (double arrow). Guidewire was successfully passed through the bile duct, B, (arrowhead), and bile duct stent was placed, B, (arrowhead). ENPD tube was placed into the fluid collection, B, (arrow). ERCP, endoscopic retrograde cholangiopancreatography; MPD, main pancreatic duct.

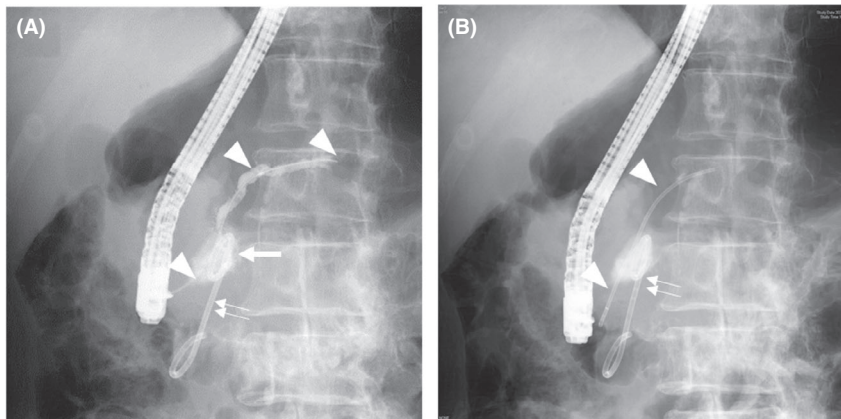


Fig. 3. Follow-up ERCP reveals reduction of peripancreatic fluid collection, A, (arrow). The distal MPD was not contrasted from the main papilla, A, (arrowheads), so a stent was placed into the distal pancreatic duct via the accessory pancreatic duct, B, (arrowheads). A double-pig tail stent was used for fluid drainage via MPD, A, B, (double arrow). ERCP, endoscopic retrograde cholangiopancreatography; MPD, main pancreatic duct.

patient had an uneventful post-procedural course without any complications and was discharged on day 55. Two months post-discharge, the stent and drainage tube were replaced. Although the stent and drainage tube were going to be left as drainage access for potential future recurrence of abscess, these were removed 4 months post discharge because the patient was not compliant to the treatment course.

DISCUSSION

THE TREATMENT STRATEGY for pancreatic injury depends on multiple factors, including the anatomic severity of pancreatic damage (e.g., contusion or laceration), presence or absence of MPD injury, injuries to other organs, and physiological state of the patient. Exploratory laparotomy is recommended for abdominal trauma patients with evident pancreatic transection or extensive peripancreatic fluid collection on CT. Although contusion or laceration of the pancreas with a low risk of MPD injury can be managed with closed suction drainage, a laceration with a high risk of MPD injury or massive disruption of the pancreatic head generally requires pancreatectomy.³ Pancreatic injury on the right and left sides of superior mesenteric vein requires pancreaticoduodenectomy and distal pancreatectomy, respectively.³

Generally, an endoscopic stent placement into the MPD is used for benign pancreatic pathologies, such as MPD stenosis or divisum. The immediate diagnosis of MPD injury is often challenging. Recently, there have been reports on the clinical use of ERCP in the diagnosis and treatment of MPD injuries.⁴ ERCP could be a more useful diagnostic modality for detecting MPD injury than CT particularly in those with a stable hemodynamical status. Furthermore, subsequent endoscopic stent

placement into the distal MPD may be a definitive treatment for MPD injury in the absence of other organ injuries, given that the gastroenterologist has sufficient experience performing procedure.⁵ The outcomes from stent placement and surgical repair are similar in terms of death and complications.⁶

Ito *et al.*⁷ reported that the major complication of endoscopic pancreatic stent placement in trauma cases was late-phase pancreatic ductal stenosis. Lin *et al.*⁸ reported that stents might be removed early (i.e., 52-day post-placement) in patients with mild MPD stenosis, whereas patients with severe MPD stenosis might require repeat stent placement and a have longer stent management (average duration, 25 months). Further studies are necessary to determine when pancreatic stent should be removed.

Although this case avoided surgical procedures and the associated potential complications associated (e.g., other organ injury, bleeding, pancreatic insufficiency because of the resection), long-term follow-up regarding late-phase pancreatic ductal stenosis is required.

In the present case, the stenting *via* MPD was not achieved, but stenting *via* the accessory pancreatic duct was achieved. The patency rate of the accessory pancreatic duct is ~40%, and there is a report of severe pancreatitis after the stenting from accessory pancreatic duct.⁹ Therefore stenting *via* the accessory pancreatic duct might be a treatment option for pancreatic injury with total MPD disruption when stenting *via* the MPD is not possible.

CONCLUSION

WE ENCOUNTERED A case of pancreatic injury with total MPD disruption that was successfully managed with multi-stage endoscopic therapy. Further investigations

on endoscopic therapy are required to determine its target patient population, efficacy, safety, and long-term outcomes.

DISCLOSURE

Approval of the research protocol: Not applicable.

Informed Consent: Written informed consent was obtained from the patient. Moreover, the authors declare no conflict of interest.

Registry and the Registration No. of the study/Trial: Not applicable.

Animal Studies: Not applicable.

Conflict of Interest: None declared.

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REFERENCES

- 1 Debi U, Kaur R, Prasad KK, Sinha SK, Sinha A, Singh K. Pancreatic trauma: a concise review. *World J. Gastroenterol.* 2013; 19: 9003–11.
- 2 Kao LS, Bulger EM, Parks DL, Byrd GF, Jurkovich GJ. Predictors of morbidity after traumatic pancreatic injury. *J. Trauma* 2003; 55: 898–905.
- 3 Biffl WL, Moore EE, Croce M *et al.* Western Trauma Association Critical Decisions in Trauma: management of pancreatic injuries. *J. Trauma Acute Care Surg.* 2013; 75: 941–6.
- 4 Kopelman D, Suissa A, Hashmonai Y. Pancreatic Duct Injury. *J. Trauma* 1998; 44: 555–7.
- 5 Huckfeldt R, Agee C, Nichols WK, Barthel J. Nonoperative treatment of traumatic pancreatic duct disruption using an endoscopically placed stent. *J. Trauma* 1996; 41: 143–4.
- 6 Kim S, Kim JW, Jung PY *et al.* Diagnostic and herapeutic role of endoscopic retrograde pancreatography in the management of traumatic pancreatic duct injury patients: single center experience for 34 years. *Int. J. Surg.* 2017; 42: 152–7.
- 7 Ito Y, Kenmochi T, Irino T *et al.* Endoscopic management of pancreatic duct injury by endoscopic stent placement: a case report and literature review. *World J. Emerg. Surg.* 2012; 7: 21.
- 8 Lin BC, Liu NJ, Fang JF, Kao YC. Long-term results of endoscopic stent in the management of blunt major pancreatic duct injury. *Surg. Endosc.* 2006; 20: 1551–5.
- 9 Benage D, McHenry R, Hawes RH *et al.* Minor papilla cannulation and dorsal ductography in pancreas divisum. *Gastrointest. Endosc.* 1990; 36: 553–7.