

Restoration of Dehiscent Pancreaticojejunostomy Causing a Major Postoperative Pancreatic Fistula by Reinsertion of a Pancreatic Duct Tube Using the Rendezvous Technique

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Abstract

Introduction A postoperative clinically relevant pancreatic fistula can cause severe sequelae. We aimed to describe our minimally invasive procedure (rendezvous technique) for the treatment of a pancreatic fistula resulting from pancreaticojejunal anastomosis dehiscence involving a dislodged main pancreatic duct tube.

Methods In our rendezvous technique, a guidewire is advanced into the jejunal lumen from the access site of the drainage tube and is caught by a snare catheter, which is used to replace the dislodged main pancreatic duct tube. Then, the guidewire is passed from the access site of the drainage tube to the site of the dislodged main pancreatic duct tube. A sheath is inserted along the route of the dislodged main pancreatic duct tube and is placed across the pancreaticojejunal anastomosis over the guidewire. Another guidewire is advanced into the main pancreatic duct via the sheath, and a new main pancreatic duct tube is inserted into the main pancreatic duct over the second wire. This technique was performed in two patients with a pancreatic fistula.

Results Our rendezvous technique was successfully performed in a 73-year-old man with an intractable clinically relevant pancreatic fistula and large discharge from the drain and a 74-year-old woman with a pancreatic fistula and fluid collection between the elevated jejunum and

remnant pancreas. Discharge from the drain and fluid collection decreased after the procedure.

Conclusion Our rendezvous technique is an effective minimally invasive approach for a pancreatic fistula resulting from pancreaticojejunal anastomosis dehiscence.

Keywords Rendezvous technique · Pancreatic fistula · Pancreaticoduodenectomy

Introduction

A postoperative pancreatic fistulae (PPF) can cause severe complications, such as intra-abdominal sepsis and hemorrhage [1–3], and the mortality rate associated with a PPF is approximately 1% [2, 4].

When a PPF occurs after surgery, interventional drainage is effective as the standard of care in such patients [1, 3–5]. In cases of limited pancreaticojejunal anastomosis dehiscence with a local fistula resulting from dislodgement of a main pancreatic duct (MPD) tube placed during pancreaticoduodenectomy, restoration of pancreaticojejunal anastomosis by reinsertion of an MPD tube via a radiological technique might help avoid reoperation. In this report, we aimed to describe our rendezvous technique that was used to reinsert an MPD tube through the route of the dislodged MPD tube placed during surgery.

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Materials and Methods

Patients

Two patients had an anastomo-cutaneous fistula along an operatively placed drain and a dislodged MPD tube through the afferent jejunal stump. These patients underwent restoration of pancreaticojejunostomy by reinsertion of an MPD tube using our rendezvous technique. The patients provided informed consent, and IRB approval was obtained.

Rendezvous technique (Fig. 1)

- Half-diluted contrast medium (Optiray 350, Guerbet, Roissy, France) was injected via the drainage tube that drained the PPF in order to opacify the fistula tract and the previous anastomotic entry of the elevated jejunum through which the original MPD tube was placed into the jejunum.
- From the fistula tract to the entry of the jejunum, a 0.035-inch hydrophilic guidewire (Radifocus, Terumo, Tokyo, Japan) is advanced into the jejunal lumen.
- The guidewire is then caught by a 6-French snare catheter (ONE Snare, 15 mm, Merit Medical Systems, Inc., South Jordan, UT, USA), which is used to replace the original MPD tube. The guidewire is passed from the access site of the drainage tube to the site of the original MPD tube.
- The tip of a 6-French flexible sheath (Super Arrow Flex sheath, Teleflex, Wayne, PA, USA; Fig. 2) is bent, and the sheath is inserted over the guide wire from the site of the original MPD tube and placed across the fistula.
- Half-diluted contrast medium is injected from the sheath, and it shows the MPD. Subsequently, another 0.035-inch stiff guidewire (Amplatz Super Stiff, Boston Scientific, Marlborough, MA, USA) is advanced into the MPD via the sheath. Finally, a new MPD tube is inserted into the MPD over the second wire.

Results

Patient 1

A 73-year-old man had an intractable PPF after subtotal stomach-preserving pancreaticoduodenectomy for suspected bile duct cancer, which was identified as cholecystic duct cancer during surgery. The MPD tube was retained after surgery because pancreatic juice (15 ml/day) was discharged from the drain at the pancreaticojejunal anastomosis. The MPD tube accidentally dislodged from the MPD into the elevated jejunum 2 months after surgery.

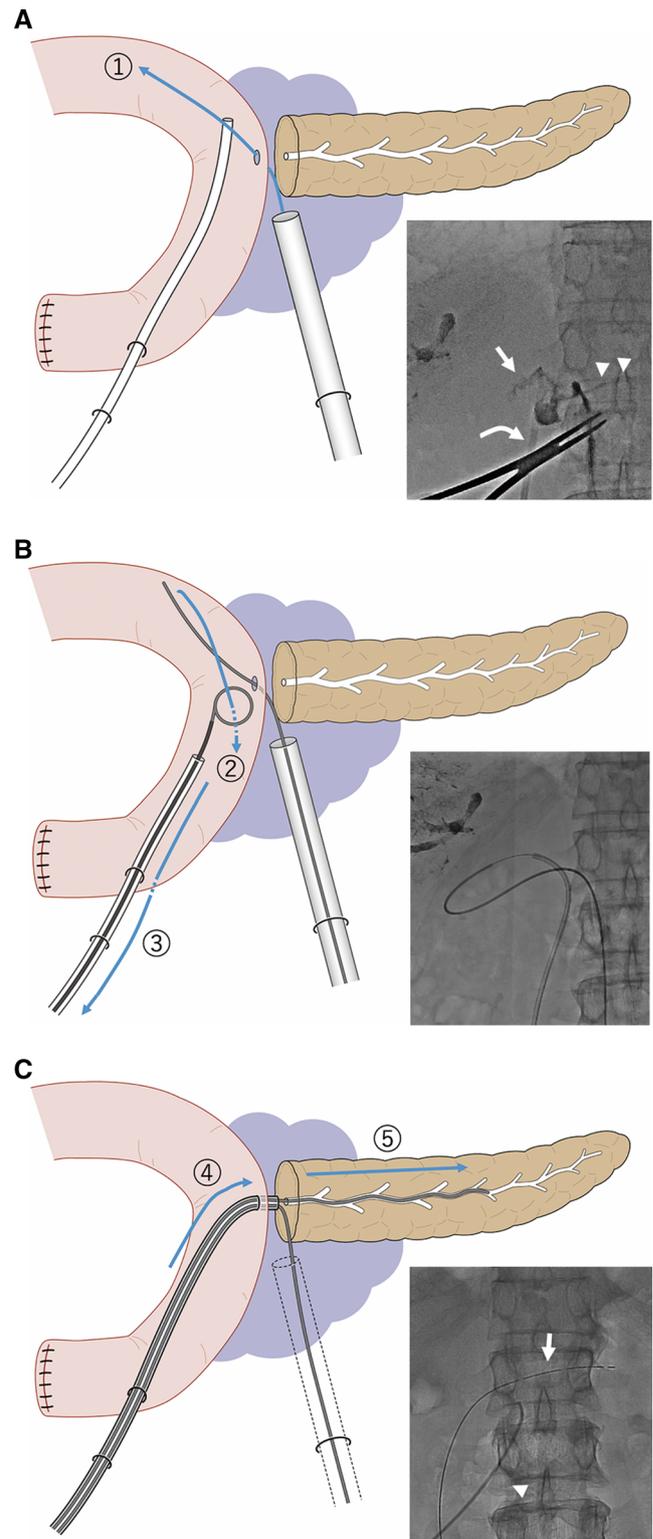


Fig. 1 Rendezvous technique **A** Advancement of the guidewire into the elevated jejunum after locating the gap at the elevated jejunum, the guidewire is advanced into it (①). Half-diluted contrast medium infused from the drainage tube shows the fistula and the elevated jejunum (arrow). Arrow head, the main pancreatic duct (MPD); curved arrow, the original MPD tube. **B** Pull-through of the guidewire A snare catheter that replaces the original MPD tube catches the guidewire (②) and pulls it out from the site of the original MPD tube (③). Therefore, the guidewire passes through the access site of the drainage tube to the site of the original MPD tube. **C** Insertion of a new MPD tube. A flexible sheath is inserted over the guidewire from the site of the original MPD tube and is placed across the fistula (④). In addition, another guidewire is advanced into the MPD via the sheath (⑤). Finally, a new MPD tube is replaced with the sheath and is inserted into the MPD over the second guidewire. Arrow, a new MPD tube; arrow head, a drainage tube

The amount of pancreatic juice from the drain increased up to 150 ml/day from the day after MPD tube dislodgement; hence, a new MPD tube was inserted into the MPD using our rendezvous technique (Fig. 1). One day after the procedure, laboratory data indicated slightly elevated levels of serum amylase, which decreased to normal the next day. The patient was asymptomatic at this time. The amount of pancreatic juice from the drain decreased to 10 ml/day 1 day after the procedure and reached almost 0 ml/day 2 weeks later.

Patient 2

A 74-year-old woman underwent subtotal stomach-preserving pancreaticoduodenectomy for intraductal papillary

mucinous neoplasm. A pancreatic fistula producing a continuous amylase-rich discharge of 100 ml/day was identified; hence, the MPD tube was retained. Abdominal radiography showed that the MPD tube was dislodged 22 days after surgery, and pancreaticojejunostomy appeared to dehisce, creating a space between the elevated jejunum and remnant pancreas as noted on computed tomography (CT) (Fig. 3A). Therefore, a new MPD tube was inserted into the MPD using our rendezvous technique. After this procedure, the patient had no symptoms and there were no changes in her laboratory findings. The fluid collection between the elevated jejunum and remnant pancreas disappeared 1 month after the procedure, as noted on CT (Fig. 3B).

Discussion

We successfully performed our rendezvous technique in two patients with a PPF after pancreaticoduodenectomy. Currently, no international guidelines exist on a recommended method for such a salvage procedure [6]. Moreover, according to several randomized controlled studies, an external tube reportedly reduced the risk of a PPF after pancreaticoduodenectomy [7–9]. The standard procedure for re-establishing the pancreaticojejunal continuity is duct-to-mucosa pancreaticojejunostomy with an external tube. One of the complications of this procedure is dislodgement of the tube from the MPD into the jejunal lumen. Patient 1 showed a sudden increase in output from the anastomotic drain after displacement of the tube,

Fig. 2 Flexible sheath. The tip of the flexible sheath can be bent easily to follow a curved route

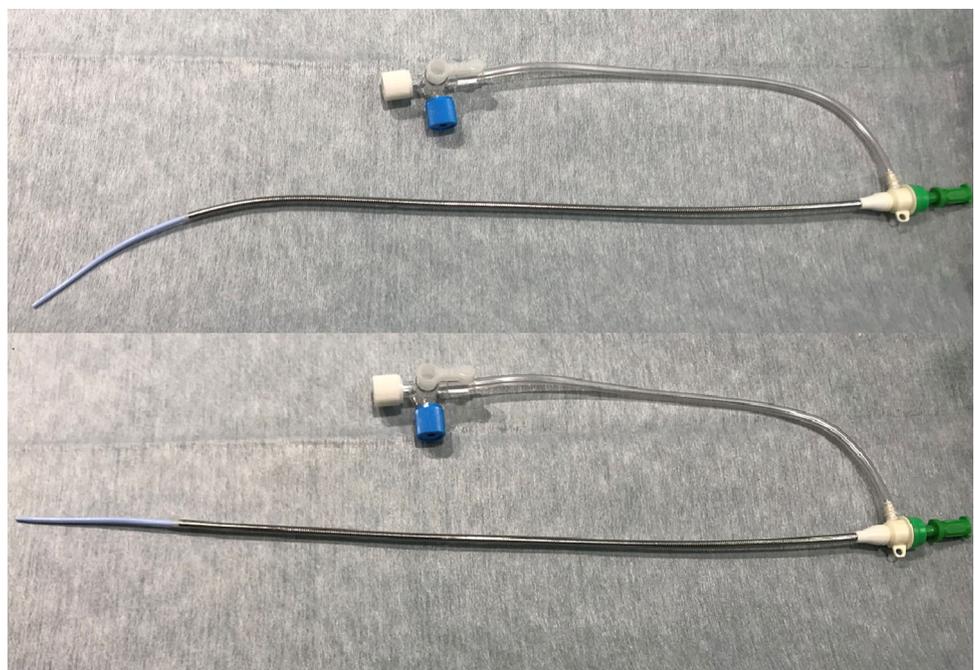
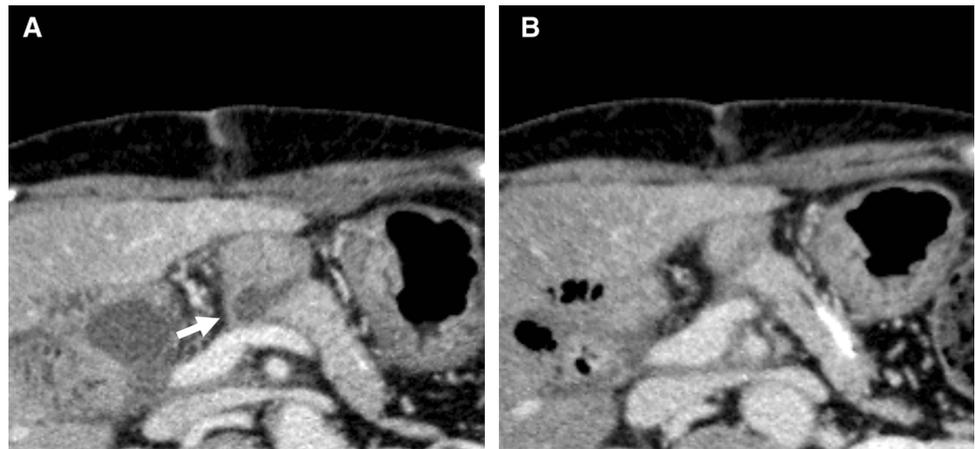


Fig. 3 Computed tomography images. The fluid space between the elevated jejunum and remnant pancreas (**A**: arrow) disappears after the procedure (**B**)



indicating anastomotic insufficiency. Patient 2 showed fluid collection at the anastomotic stump of the pancreas after accidental displacement of the tube. In such troublesome conditions, reintroduction of pancreatic juice into the jejunum would be effective for restoration of anastomosis.

The unique point of our technique is the avoidance of a new puncture site on the pancreas or skin for reinsertion of the MPD tube. Most pancreaticoduodenectomy cases presenting with a PPF and a dislodged tube have a fistula route of the operatively placed drain and an existing tube; thus, our procedure does not require any additional access for completion. There are some reports on a technique for treating a pancreatic fistula associated with pancreaticojejunal anastomosis dehiscence [10] and a rendezvous technique for treating a PPF [11, 12] involving the delivery of a balloon or a catheter by a combined radiological-endoscopic approach which requires a new puncture site.

However, our technique has some limitations. The procedure is applicable only for a major pancreatic fistula, in which the anastomotic entry of the elevated jejunum and the MPD can be opacified by fistulography. Moreover, when the original MPD tube is not placed or has already been removed, or when an internal tube from the MPD to the jejunum is not placed percutaneously through the anastomosis, an access route has to be set up for our rendezvous technique.

Conclusion

Our rendezvous technique is an effective minimally invasive approach for a pancreatic fistula resulting from pancreaticojejunal anastomosis dehiscence and ensures postoperative patient stability.

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Compliance with Ethical Standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study, and this study has obtained IRB approval.

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