

Pancreatic stones formation in the pancreatic stent after central pancreatectomy: A case report

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Case Report

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Abstract

Background

Pancreatic stenting is a common method to prevent pancreatic anastomosis stricture and pancreatic fistula after pancreaticoduodenectomy, pancreatectomy, and other pancreatic surgeries. Since the decomposition and digestive ability of pancreatic juice is strong, there is reportedly a low risk of stone formation in the tube.

Case presentation

A 68-year old female patient who was diagnosed with a pancreatic space occupying lesion was admitted to our department. Central pancreatectomy was performed with the insertion of an internal pancreatic stent, and the patient recovered well postoperatively. However, she was hospitalized again 1 year later with complains of exudation from the abdominal incision. Detailed clinical, imaging, and laboratory examinations revealed multiple stones in the pancreatic stent, which was the major cause of a pancreatic pseudocyst and pancreatitis. During the operation, we anastomosed the cyst to the jejunum and inserted another pancreatic stent without fixation in case of an anastomosis stricture or recurrence of pancreatic stones occurs. The patient was discharged 7 days postoperatively and no other complications were reported during the patient's follow-up visit half a year later.

Conclusion

We described a rare case of postoperative pancreatic stent stones complicated by chronic pancreatitis and pancreatic pseudocyst after central pancreatectomy. Application of pancreatic stent should be carefully evaluated considering its potential complication presented in this report.

Introduction

Pancreatic stenting is a commonly used method for preventing both pancreatic anastomosis strictures and pancreatic fistula after pancreaticoduodenectomy, pancreatectomy, and other pancreatic surgeries. Although there is no consensus on the necessity of catheterization, some studies have shown that the insertion of a pancreatic stent leads to a lower incidence of postoperative pancreatic fistula, especially in patients with a narrow pancreatic duct (< 3 mm in diameter) (1, 2). Tube blockage caused by stones is a common complication that occurs in exogenous tube placement in multiple surgeries, which may result in severe inflammation and even fatal consequences (3, 4). However, due to the strong decomposition and digestive abilities of the pancreatic juice, the morbidity of postoperative stone formation in pancreatic stents is low according to current literature. To the best of our knowledge, no article has reported relevant cases or researches previously. The understanding of long-term complications with pancreatic stenting remains unclear. In this article, we report a rare case of postoperative pancreatic stent stones complicated by chronic pancreatitis and pancreatic pseudocyst in a patient who had undergone

central pancreatectomy. We shared our ideas and treatment strategies in this case report, and have suggested a new treatment option for patients with this condition.

Case Presentation

A 68-year old female patient, who had an asymptomatic space-occupying pancreatic lesion that was identified during routine check-up, was admitted to our hospital two years ago. She had hypertension for about 10 years, and her blood pressure was maintained at approximately 130/80 mmHg using oral antihypertensives. The patient had no relevant history of other diseases, surgery, or trauma. No abnormality was found on physical examination. Contrast-enhanced computed tomography revealed a cystic low-density mass with a clear boundary in the pancreatic head that measured approximately 3.1 × 5.0 × 3.4 cm in size and was slightly enhanced. Magnetic Resonance Cholangiopancreatography (MRCP) revealed a cystic long T1 and long T2 signal mass in the body of the pancreas, with thin division walls in the cyst. The pancreatic duct ran at the edge of the mass and was slightly compressed and tortuous. All laboratory examinations including tumor markers were normal.

Since the tumor could become malignant and the patient strongly requested for surgery, central pancreatectomy was performed. During the operation, the gastrocolonic ligament was opened using an ultrasonic scalpel to explore the pancreas. A tumor with a diameter of 5.0 cm was found in the pancreatic body. The splenic artery and vein were dissected 2 cm to the right of the pancreatic mass. The pancreatic neck was incised using a cutting-closure device. The splenic artery and vein were also incised and clamped using hemo-lock clamps. The pancreatic body was dissected using an ultrasonic scalpel at the left edge of the mass, and the main pancreatic duct was revealed. The specimen was removed from the abdominal cavity, and frozen sections showed that the tumor was benign. Subsequently, the section of the pancreatic head was closed using a linear stapler and bridge catheter internal drainage—a novel pancreatic reconstruction technique proposed by our team—was performed (5). During the anastomosis, a silicone pancreatic stent with a length of 20 cm was selected, and two non-absorbable strings were tied at both ends. At the pancreatic tail side, the tube was inserted into the main pancreatic duct (MPD) for 5 cm, and a U-suture parallel to the pancreatic section was placed to buttress the pancreas. Afterwards, the string of the tube was knotted with the U-suture in an interlocking manner for fixation. On the intestinal side, the jejunum was lifted to the ligament of Treitz. A corresponding hole was made on the jejunum, and a purse-string suture was placed around the hole. The catheter was inserted into the intestinal lumen for 5 cm, and the purse-string suture was tightened to close the anastomotic stoma. For further fixation of the pancreatic stent, the string of the catheter was knotted with the purse-string suture. Thus, the bridge catheter internal drainage was successfully created. Finally, an abdominal drainage tube was placed at the pancreatic section and the surgery was completed. Intraoperative bleeding was 100 mL and blood transfusion was not required. Postoperative pathology examination showed that the tumor was a cystadenoma. Routine treatment was administered, and the patient was discharged 10 days postoperatively.

However, 6 months later, the patient was hospitalized again with a chief complain of exudation from the incision site. The patient had noticed consistent exudation from the abdominal incision 1 month after she was discharged. The fluid was colorless, odorless, and transparent with an approximate volume of 30 mL daily. The abdominal wall drainage tube was indwelling at the local hospital. Nonetheless, after conservative treatment for more than half a year, her symptoms persisted. Physical examination showed that a sinus had formed at the abdominal incision, and the surrounding skin was red and edematous. The amylase level in the fluid was 12,311 U/L. Contrast-enhanced computed tomography revealed an encapsulated effusion between the pancreatic head and the abdominal wall. The pancreatic duct at the pancreatic tail was also dilated. The pancreatic parenchyma was atrophic while the pancreatic head was enlarged, which suggested the possibility of pancreatitis. MRCP also revealed a cystic long T1 and long T2 signal shadow in front of the pancreas measuring approximately 2.9 × 1.8 cm, which was attached to the pancreatic neck and the distal pancreatic duct.

To relieve the patient's symptoms and treat complications, an exploratory laparotomy was performed. After accessing the abdominal cavity through the original incision, a 4 × 4 cm cyst was exposed at the anastomotic stoma of the pancreas. A sinus was formed between the cyst and the abdominal wall. After opening the cyst, the pancreatic duct stent, suture strings, and multiple free hemo-lock clips were found. We considered that the patient was intolerant to these surgical materials, and an exogenous rejection reaction had occurred in the abdominal cavity. The cystic contents were cleared, and the pancreatic stent was pulled out. We injected water along one end of the tube, and several stones measuring 0.3–0.5 cm in size were discharged. A diagnosis of postoperative pancreatic stent stone formation complicated by pancreatic pseudocyst and pancreatitis was made. Subsequently, the jejunum was lifted to the pancreas, and the cyst was anastomosed to the jejunum. During the procedure, another short support tube (5 cm in length) was placed in the MPD of the pancreatic tail in case a stricture develops; however, it was not fixed. Finally, a drainage tube was placed nearby, and the operation was completed. The patient recovered well after surgery and was discharged 7 days postoperatively.

The patient was followed up for half a year. The sinus was closed, and the abdominal incision healed adequately. There were no gastrointestinal complications, such as fatty diarrhea. Furthermore, the patient's blood glucose level was not elevated, and there was no significant weight loss.

Discussion

The formation of pancreatic duct stones is related to diet, weight, inflammation, the pH of the pancreatic juice, and other factors. Currently, the specific mechanism is still unclear. Some studies found that the decreased expression of pancreatic stone protein, as well as the increased expression of osteopontin, may be critical reasons (6–8). Although pancreatic duct stone is a common cause of acute and chronic pancreatitis, to the best of our knowledge, no studies have ever reported the formation of pancreatic stones in pancreatic stent specifically. A study by Hirashita considered that the length of the pancreatic stent is a risk factor for pancreatic fistula. If the tube is too long, it may be folded in the intestinal loop, thus obstructing the pancreatic outflow (9). Therefore, the tube should be as short as possible. The

treatment of such complications mainly includes endoscopic retrograde cholangiopancreatography (ERCP), extracorporeal shock wave lithotripsy (ESWL), and surgery (10). Some advantages of ERCP are low trauma and the simplified nature of the procedure, which is the first choice for small calculi (< 5 mm in diameter) (11). Drawbacks include difficulties in locating the pancreaticojejunostomy as well as the risk of lateral injury when pulling out the stent, which results in a low success rate of the operation. For large pancreatic stones (> 5 cm in diameter), ESWL is the recommended method with a high success rate ranging from 70–90% (12, 13); however, limitations include the failure of fragmentation as well as recurrence of stones. Additionally, surgery can provide a clear diagnosis and can thoroughly relieve the obstruction. Drawbacks are that the procedure is invasive and patients experience significant trauma after the operation. Besides, postoperative abdominal adhesion increases the difficulty of manipulation, which raises the risk of surgical injury and secondary complications (14).

Internal drainage of the bridge catheter is an original pancreaticojejunostomy technique proposed by our team, which combines the supporting function of the pancreatic stent with internal drainage. The catheter in the abdominal cavity acts as a “bridge” to divert pancreatic juice from the MPD into the intestine. The pancreatic outflow tract is reconstructed through the healing of the pancreaticointestinal epidermals along the surface of the catheter instead of using conventional sutures. In this case, the patient had previously undergone central pancreatectomy with long bridge catheter internal drainage, and had pancreatic stent stones, pancreatic pseudocysts, and chronic pancreatitis. Additionally, the patient had a specific rejection constitution, and the surgical materials used during the previous surgery were encapsulated and not absorbed by the body. During the operation, we cleared the foreign bodies in the cyst and performed an anastomosis of the cyst with the jejunum for pancreatic reconstruction. In case a stricture of the anastomotic stoma occurs, another pancreatic stent was placed to play a supporting role in the short term; however, since it was not fixed with the pancreas and jejunum, it would be discharged through the digestive tract later, thus avoiding stone recurrence.

Conclusion

In summary, we reported a rare case of pancreatic stones formation in pancreatic stents, and describe relevant treatment strategies and clinical outcomes. Follow-up examinations revealed that the patient’s digestive function recovered well postoperatively, which suggested that this was a safe option for managing this condition. Besides, application of pancreatic stent should be carefully evaluated considering its potential complication presented in this report. Further studies are needed to investigate a comprehensive research of the effects and drawbacks of pancreatic stenting in the long term.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the Ethic committee of Shengjing Hospital (Number: 2022PS067K). The patient provided written informed consent to participate in this study. No potentially

identifiable human images or data is presented in this study.

Consent for publication

Not applicable

Availability of data and materials

The original contributions presented in the study are included in the article. Further inquiries can be directed to the corresponding author.

Competing Interest

The authors declare that they have no competing interests

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Author Contributions

YWG contributed to data collection and analysis, visualization, manuscript writing.

HTW contributed to manuscript editing and revision.

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Figures

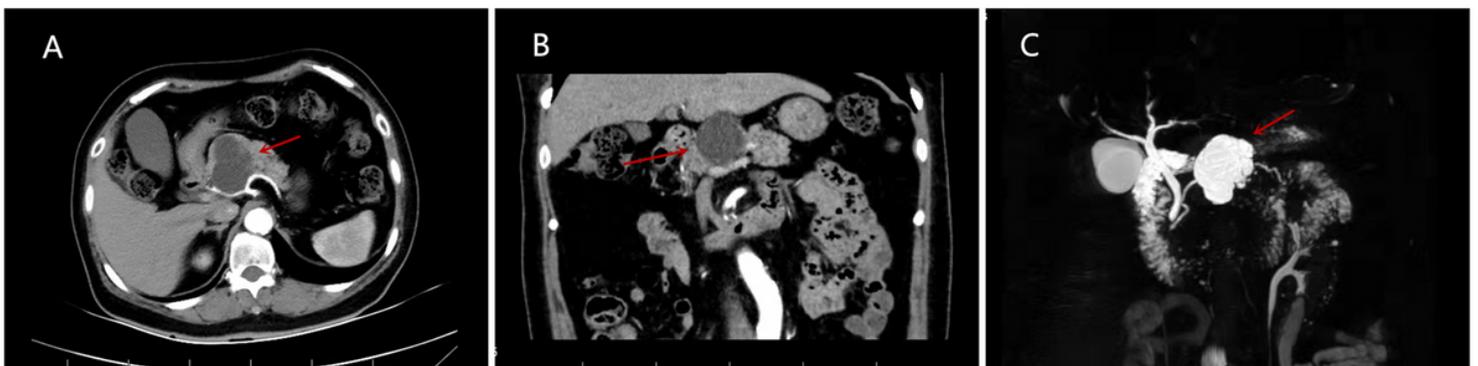


Figure 1

Preoperative imaging examination. **a, b.** Computed tomography images. Pancreatic cystoma (red arrow). **c** Magnetic resonance cholangiopancreatography image. Pancreatic cystoma (red arrow).



Figure 2

a. Sketch map of the bridge catheter internal drainage. **b.** Tumor specimen. **c.** Pathological section.

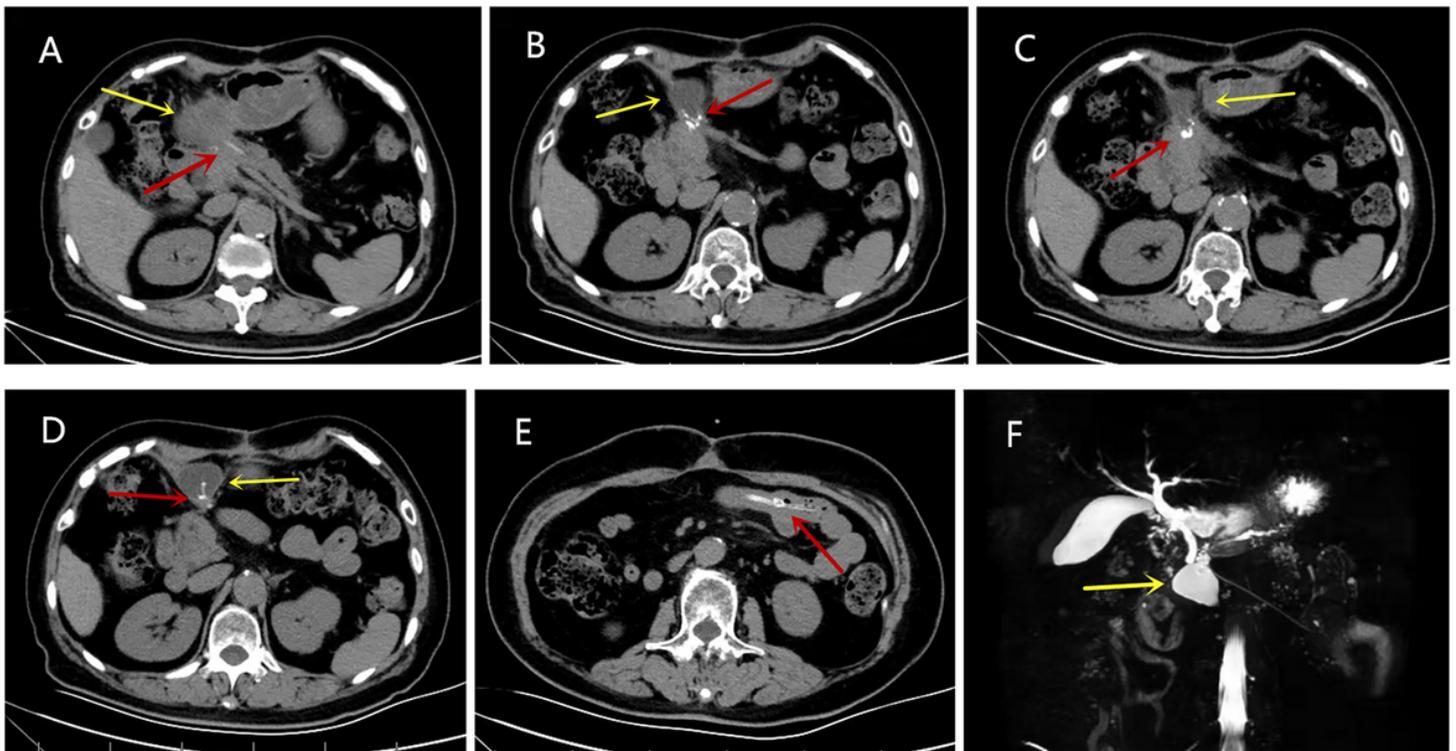


Figure 3

Preoperative imaging examination. **a,b,c,d,e.** Computed tomography images. Pancreatic stent stones and surgical materials (red arrow). Pancreatic pseudocyst (yellow arrow). **f.** Magnetic resonance cholangiopancreatography image. Pancreatic pseudocyst (yellow arrow).

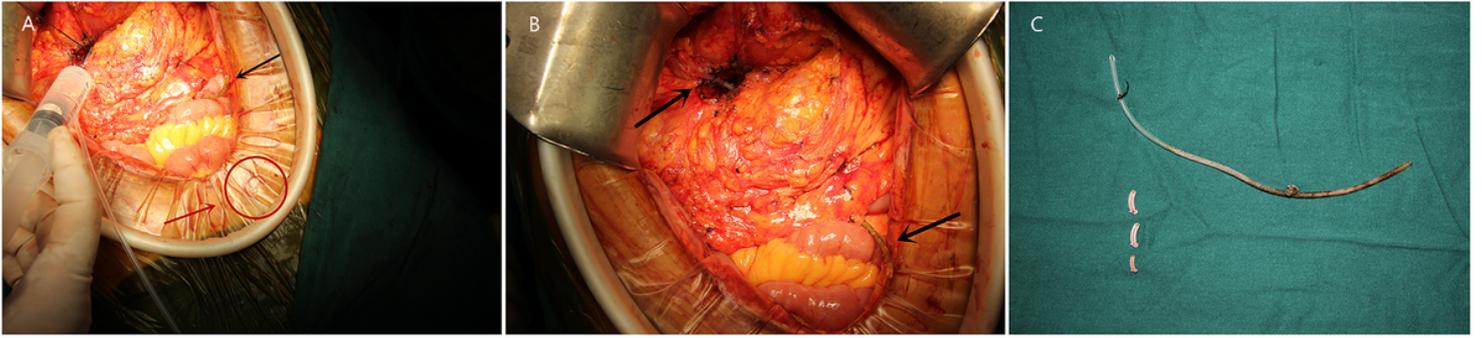


Figure 4

Intraoperative findings. **a.** Pancreatic stent (black arrow). Pancreatic stones (red arrow). **b.** Pancreatic stent (black arrow). **c.** Pancreatic stent and Hem-o-lock clips in the pseudocyst.