

## Endoscopic Cystoduodenostomy for Pancreatic Pseudocyst After Surgery for Type-IIIb Pancreatic Injury: A Case Report

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A patient in whom pancreatic pseudocyst after the surgery for traumatic pancreatic injury was successfully treated with endoscopic cystoduodenostomy (ECD). A 27-year-old man beaten on the abdomen with a hammer underwent emergency surgery due to intraperitoneal hemorrhage and free gas development. Pancreatojejunostomy (Letton-Wilson technique) was performed because the pancreas completely ruptured just above the superior mesenteric vein was diagnosed as type IIIb pancreatic injury. Right hemicolectomy was performed because of the extensive perforations and crush of the right side of the colon. A pancreatic juice fistula observed postoperatively was resolved with conservative therapy, and he was discharged on the 40th disease day. Epigastric pain developed about three months after he was injured. Examinations resulted in the diagnosis as pancreatic pseudocyst occurring from the caudal side of the ruptured pancreas. The fluid pooled in the pseudocyst was drained by endoscopically puncturing the elevated site on the posterior wall of the duodenal bulb with a needle knife. Then, all associated symptoms were resolved and the pseudocyst disappeared. Since then, he has been followed for about one year without recurrence, with his pancreatic function being normal. Endoscopic cystoduodenostomy (ECD) can reliably puncture even a small cyst when it is expanded on the wall. It has other advantages that it can easily change a fistula to an internal fistula even in cases with the communication to the pancreatic duct, such as the present case, and that it is unlikely to produce a pancreatic juice fistula. Therefore, ECD is considered easy, safe, and effective for treating pseudocyst after pancreatic injury.

### Introduction

Pancreatic pseudocysts develop from the acute exacerbation of pancreatitis, as iatrogenic lesions, or after injuries. Pseudocysts are unlikely to be resolved spontaneously if they persist for more than 6 weeks. They have to be appropriately treated because they may cause complications including infections, hemorrhages, and ruptures<sup>1)2)</sup>.

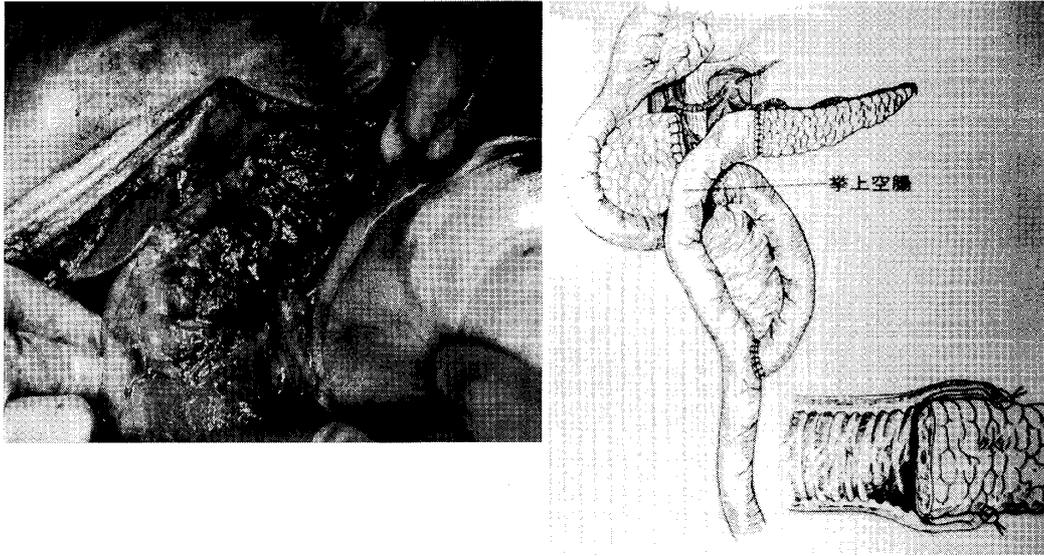
This paper reports a case where a pancreatic pseudocyst that developed after surgery for traumatic pancreatic injury was successfully treated with endoscopic cystoduodenostomy.

### Case

**Patient:** 27-year-old man

**Main complaint:** epigastric pain

**Medical history at injury:** The patient was hit



**Fig. 1** Surgical finding

Pancreatojejunostomy (with Letton-Wilson technique) was performed because the pancreas was completely ruptured at the right margin of the SMV representing a type-IIIb pancreatic injury.

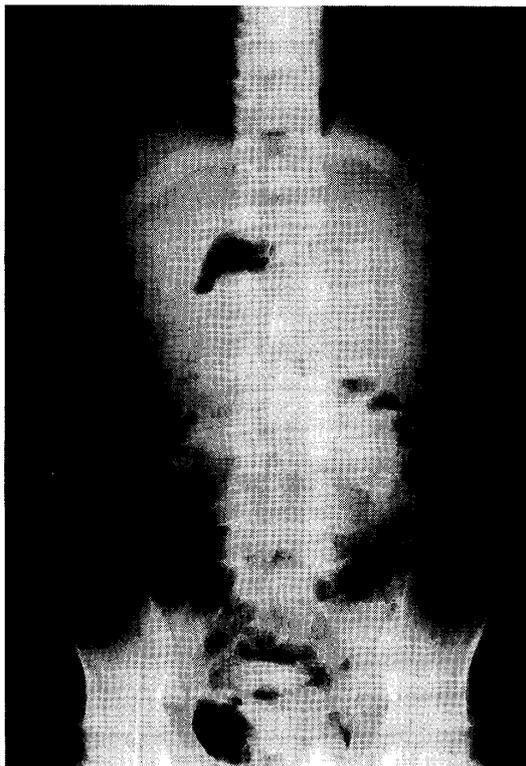
by a co-worker on his abdomen with a hammer. He called an ambulance because the abdominal pain became very severe. He underwent emergency surgery because he showed shock as indicated by blood pressure of 60 mmHg when he was admitted into the hospital and because abdominal US and CT indicated intraperitoneal hemorrhage and free gas. Since the pancreas completely ruptured at the right margin of the superior mesenteric vein (SMV) representing a type-IIIb pancreatic injury<sup>3)</sup>, the stump on the pancreatic head side was sutured for closure, and the caudal stump was treated with pancreatojejunostomy (Letton-Wilson technique) (Fig. 1). A right hemicolectomy was also performed because of the extensive perforations and crush of the right side of the colon. A pancreatic fistula observed postoperatively was resolved with conservative therapy. He was discharged 40 days after admittance.

**Medical history at re-hospitalization:** Epigastric pain developed about three months after he was injured. He was hospitalized again because

he was suspected to have pancreatic pseudocyst because of the examinations including physical examinations, hematological tests, and abdominal US. Half-round elevation at the duodenal bulb by abdominal plain X-P (Fig. 2) and the cyst that seemed to be in contact with the duodenal bulb was shown by abdominal CT (Fig. 3).

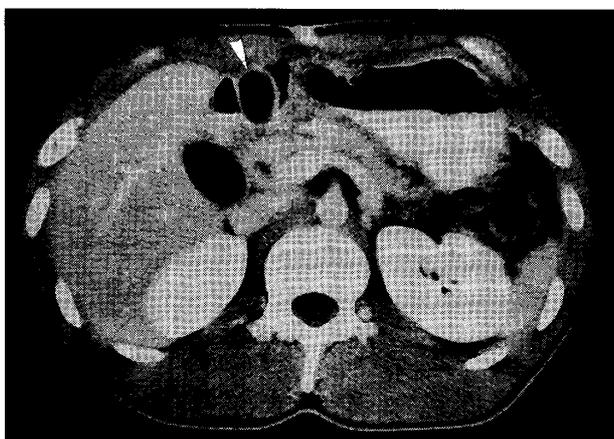
**ERCP (with fistelography) :** The posterior wall of the duodenal bulb was expanded by the diameter 2 cm round shape cyst. The duodenal mucosa showed evident flare and edema (Fig. 4). Although the common bile duct was normal, the pancreatic duct could not be shown by ERCP. With reference to the abdominal US and CT findings, as well as the positional relationship between the cyst and duodenum, the elevated posterior wall of the duodenal bulb was punctured. Concomitant ERCP showed the caudal pancreatic duct communicating with the cyst (Fig. 5). Based on these results, it was determined that the pseudocyst developed from the caudal side of the ruptured pancreas.

**Treatment:** The elevated posterior wall of the



**Fig. 2** Abdominal plain X-P

A half-round elevation is observed at the duodenal bulb.



**Fig. 3** Abdominal CT finding at the re-hospitalization

A cyst seems to be in contact with the duodenal bulb.

duodenal bulb was punctured with a needle knife (KD-10Q, Olympus) under endoscopic monitoring. An incision of about 5 mm was made on the cystic wall to drain the fluid from it. Subse-



**Fig. 4** ERCP finding

The posterior wall of the duodenal bulb is expanded by the cyst. The duodenal mucosa shows evident flare and edema.



**Fig. 5** Fistelography finding

ERCP by puncturing the elevation of the posterior wall of the duodenal bulb shows the cyst communicating with the caudal pancreatic duct.



**Fig. 6** Abdominal CT finding after drainage

The cyst has been resolved, with no abnormality of the caudal part of the pancreatic body, such as atrophy, except for mild distention of the pancreatic duct.

quently, clinical symptoms such as fever up and abdominal pain could not be observed, and the meal was started after two days fasted. The cyst was shown to have been resolved by abdominal CT (Fig. 6) and upper digestive tract endoscopy. About one year has passed since treatment without any recurrence of the cyst. No abnormalities have been detected in 75 g OGTT and PFD tests. Endocrine and exocrine pancreatic functions have been normal.

### Discussion

Pancreatic injuries are relatively infrequent and rarely develop by themselves. They are often associated with the injury of other organ(s) and therefore become serious<sup>4)5)</sup>. Although many investigators have reported acute phase treatments for saving life including the resectioning of the head of the pancreas and the preparation of an external fistula by stenting the main pancreatic duct<sup>6)</sup>, few have reported the subsequent conservation of the pancreatic functions<sup>7)</sup>. The selection of appropriate surgical techniques based on the severity of the pancreatic injury has not yet been established. The surgical treatment of pancreatic injury basically consists of 2 factors: preventing the leakage of pancreatic juice and

controlling hemorrhage.

The surgical techniques for pancreatic injuries complicated by pancreatic duct injuries can be roughly divided into 2 groups: one is conservation, and the other is the resectioning of the ruptured pancreas. Conservative surgical techniques include pancreatojejunostomy such as the Letton-Wilson technique<sup>8)</sup> and the Jones-Shires technique<sup>9)</sup>, and pancreatic duct anastomosis such as the Martin technique<sup>10)</sup>. Although conservative surgery should be selected based on maintenance of the exocrine and endocrine functions of the pancreas, many medical institutions do not select this for patients with pancreatic injuries complicated by intestinal injury and peritonitis, such as in the present case because pancreatojejunostomy frequently results in insufficient sutures.

Our center basically selects the resectioning of the tail of the pancreas when it has been injured, and the reparative conservative surgery of the pancreas as much as possible when the head of the pancreas has been injured. We think that conservative surgery should be selected for the pancreatic rupture at the right margin of the SMV as seen in the present case because more than 80% of the pancreas has to be resectioned if resectioning is selected, which may postoperatively reduce the exocrine and endocrine functions of the pancreas.

Pancreatic injury with the rupture of the main pancreatic duct normally indicates surgery. Favorable results have recently been reported, however, from conservative therapies in which patients were followed only with conservative therapy and pancreatic pseudocyst, if any, was treated with drainage<sup>11)12)</sup>. It has also been reported that pancreatic injuries could be conservatively treated without surgery or drainage by the long-term administration of a somatostatin derivative that inhibits the exocrine function of the

pancreas<sup>13)14)</sup>.

Pancreatic pseudocyst may cause complications such as infections, hemorrhages, and ruptures when it is left untreated. It has to be drained unless it is resolved with conservative therapy. Since Hancke & Pedersen reported the technique of treating it by puncture and aspiration under ultrasonic guidance in 1976<sup>15)</sup>, it has been generally treated with percutaneous drainage. However, because this technique has occasionally caused complications, endoscopic cystoduodenostomy based on the best use of endoscopic techniques has been attempted for cysts in contact with the stomach or duodenum.

Endoscopic cystoduodenostomy has mainly been performed in European countries and the United States since it was first reported by Rogers et al<sup>16)</sup> in 1975. Sahel<sup>17)</sup> proposed that this procedure was indicated (1) when the cyst was in contact with the gastric or duodenal wall with an endoscopically evident elevation of the digestive tract wall, and (2) when the distance between the cyst and digestive tract wall was less than 10 mm. This procedure allows the puncture of the cyst in contact with the stomach or duodenum under direct vision through a shorter route than percutaneous drainage.

Even a small cyst can be reliably punctured when it is expanded on the duodenal wall. The procedure also offer the advantages that it can easily change cysts communicating with the pancreatic duct, as seen in the present case, to internal fistula, and that it is unlikely to produce pancreatic fistula. Attention should be paid to possible complications including hemorrhages and cystic infections. To prevent hemorrhages, it is necessary to avoid any preoperatively confirmed intervening blood vessels, avoid preparing large incisions on the duodenal walls, and vertically puncturing the walls. In fact, the present case underwent a careful puncture under endoscopic and

fluoroscopic guidance. The preparations for hemostasis, of course, must be made before starting this procedure. Cystic infection should be prevented by the patient not eating and administering appropriate antibiotics immediately after operation. Cystic irrigation should be combined, if necessary.

Endoscopic cystoduodenostomy is expected to be effective in cases that it is indicated for. Attention, however, should be paid to cysts containing large amounts of debris or possible cystic infections in patients who have received gastrectomy<sup>18)</sup>. Since unexpected complications may occur even after successful drainage, careful postoperative management is necessary as for other surgical techniques.

### Conclusion

Endoscopic cystoduodenostomy is a simple, safe, and effective technique for treating pancreatic pseudocysts in contact with the duodenal wall after pancreatic injuries.

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### IIIb 型膵損傷術後膵仮性嚢胞に内視鏡的十二指腸・嚢胞ドレナージ術が奏功した 1 例

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外傷性膵損傷術後に発生した仮性嚢胞に対して内視鏡的に十二指腸・嚢胞ドレナージを行い良好な経過を得たので報告する。

症例は 27 歳，男性。ハンマーで腹部を強打され受傷し，腹腔内出血・遊離ガス像を認めたため緊急手術となった。膵は SMV 直上で完全断裂しており IIIb 型膵損傷を呈していたため膵空腸吻合術 (Letton-Wilson 法) を施行し，また右半結腸の広範な穿孔・挫滅があり右半結腸切除術を施行した。術後，膵液瘻がみられたが保存的治療で軽快し第 40 病日に退院となった。受傷より約 3 カ月後に上腹部痛が出現し，諸検査で離断した尾側膵から発生した膵仮性嚢胞と診断した。内視鏡的に十二指腸球部後壁の隆起部を針状ナイフで穿刺し貯溜液のドレナージを図った。その後，症状は軽快し嚢胞も消失し，処置後約 1 年が経過した現在も再発はみられず，膵機能も正常である。

内視鏡的十二指腸・嚢胞ドレナージ術は小さな嚢胞でも壁に圧排像として認められれば確実に穿刺できる。また，今回のように膵管と交通性のある症例に対しても内瘻化が容易であり，膵液瘻を作りにくいなどの利点を有しており，膵損傷後の仮性嚢胞の治療に簡便にまた安全に施行でき有効な治療手段と考えられた。