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Case Report Open Access

Double Continuous Hemstitch Suture Pancreaticogastrostomy in Pancreatic Surgery: Two Case Reports and Literature Review

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Abstract

Postoperative pancreatic fistula remains a persistent problem after pancreatic surgery. Many technical modifications have been suggested for pancreaticoenteric anastomosis to reduce pancreatic leakage rate. Here, we present two cases of pancreaticogastrostomy in our center with the novel technique: two continuous hemstitch sutures. The 9 month old young boy who was the youngest child we've performed with this technique.

Keywords: Pancreaticogastrostomy; Children; Two Continuous Hemstitch Sutures.

Abbreviations: AFP: Alpha Fetal Protein; CEA: Carcino-Embryonic Antigen; CRP: C Reactive Protein; GJ: Gastrojejunostomy; NSE: Neuron Specific Enolase; PD: Pancreaticoduodenectomy; PG: Pancreaticogastrostomy; POPF: Post-operative Pancreatic Fistula.

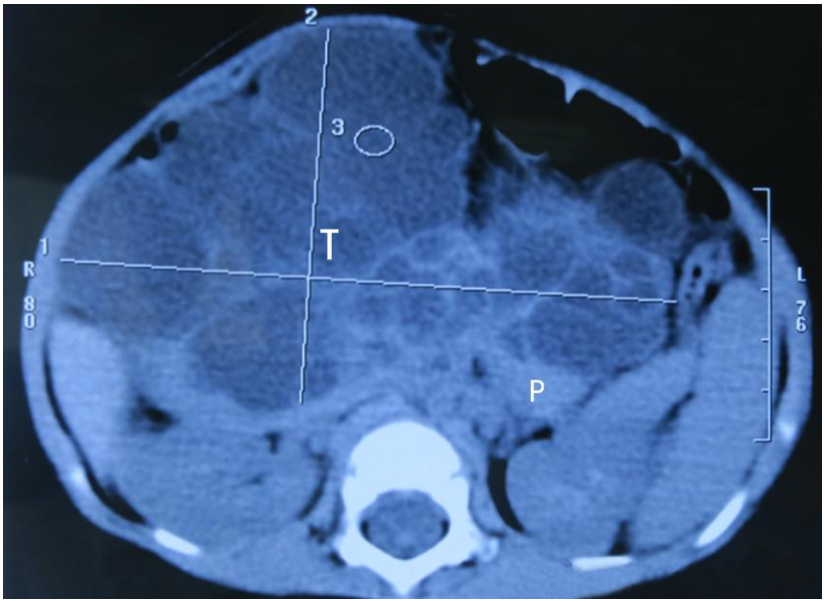
Here we are glad to report two cases of pancreaticogastrostomy (PG) after pancreatic surgery for soft pancreas with our modified technique: two continuous hemstitch sutures. Among the two patients is the youngest one we've ever dealt with this maneuver, a 9 month year old boy.

Case Report

Case 1

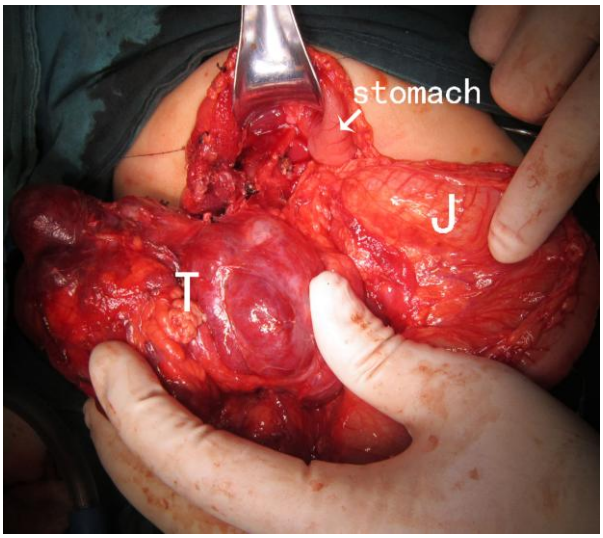
A 9 month old young boy presented with an upper abdominal mass which was noticed by his parents by chance. The patient didn't show abdominal pain, fever, vomiting or jaundice. He had no history of abdominal trauma. Then his parents took the baby checked in Wuhan Children's Hospital. Their abdominal CT plain scan revealed: an enlarged pancreas with multiple uneven size of space-occupying lesions which were considered containing mixed solid and cystic components. The margin was approximately 119mm * 73mm * 66mm (Figure 1). The imaging diagnosis turned out to be: pancreatic space-occupying lesion with mixed solid and cystic, with a propensity of tumor. He also went blood test: carcino-embryonic antigen (CEA): 3.74ng/ml and blood amylase in a normal range. After that the young patient was admitted in our hospital and our physical examination showed: no obviously distended abdomen was seen but a cystic mass in his right upper abdomen could be palpated. Laboratory findings included C reactive protein (CRP) 4.9 mg/L, neuronspecific enolase (NSE) 16.98 ug/L and total β human chorionic gonadotropin (β-HCG), carbohydrate antigen 19-9 (CA19-9), alpha fetal protein (AFP), carcino-embryonic antigen (CEA) were within normal limits. Meanwhile, urine and stool investigations were normal. Other examination included a plain chest film, which was normal and an abdominal ultrasonography revealed upper abdominal region of pancreatic mass with both solid and cystic, measuring 11.4cm * 3.3cm.

Figure 1: Enhanced computed tomography showing a 11.9 x 7.3 cm heterogeneous solid tumor arising from pancreas. T: tumor; P: pancreas.

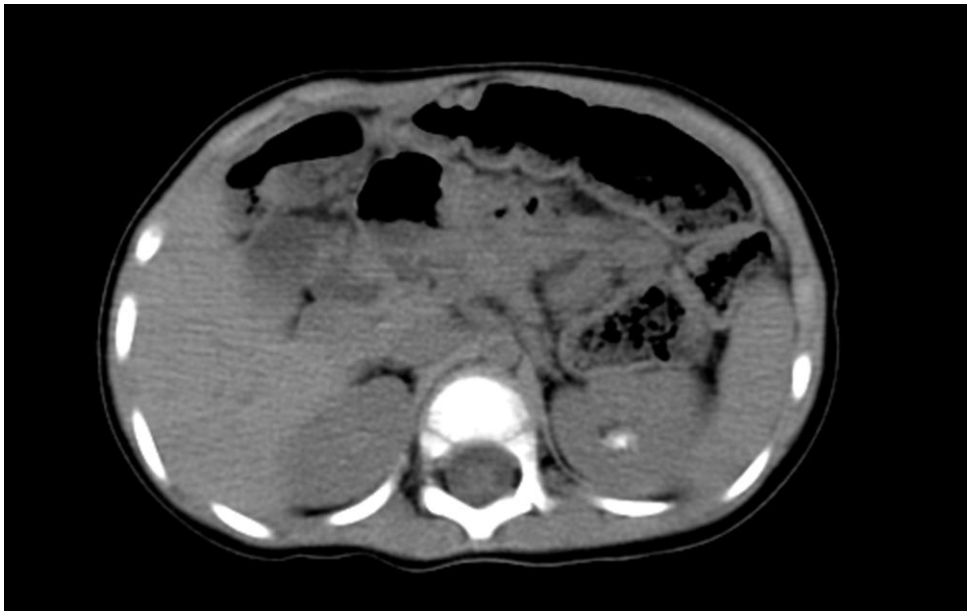


At laparotomy done and a mass with multiple cystic area measuring 8cm * 4cm that occupied the whole head of pancreas and attached to the duodenum, transverse colon, also surrounding middle colic artery and superior mesenteric artery and vein was found (Figure 2). Aspiration of the cyst was white color, which was similar to pancreatic fluid. Regional lymph nodes were grossly normal. Thus, a duodenum-preserving resection of the head of the pancreas and pancreaticogastrostomy with two continuous hemstitch sutures and Billroth-II gastrojejunostomy (GJ) was done with minimal blood loss. Histological examination showed pancreatic serous cystadenoma. The postoperative course was uneventful and the patient was discharged on the 19th postoperative day. Post-operative serum and urine amylase was in normal range. No postoperative pancreatic fistula (POPF) was observed. Other blood and laboratory findings were within normal ranges. The patient remains stable 7 month postoperatively with no complaints. Serial ultrasound scans showed no evidence of either pancreatic mass or any other intra-abdominal mass. We keep recording his weight monthly. The 6 month follow-up CT scanning shows no evidence of recurrence (Supplementary Figure 1).

Figure 2: Intraoperative picture of the tumor. T: tumor; J: jejunum.



Supplementary Figure 1: Six month follow-up CT scanning



Case 2

A ten-year-old girl complaining abdominal pain with vomitting three days was admitted. There are no positive findings after preliminary physical examination. Laboratory findings included CRP 40.3 mg/L, NSE 39.59 ug/L and other blood tests were negative. She undertook an ultrasonography in the local hospital revealed a heterogeneous mass occupied the area of the pancreas head, measuring 43 mm * 42 mm, which was considered a tumorous lesion. Our enhanced CT validated an oval-liked mass with a well defined boundary located in the head of pancreas accompanied with the dilation of pancreatic duct, regarding as a solid-pseudo papillary tumor (Figure 3). Thus, we performed a pylorus-preserving pancreaticoduodenectomy (PPPD) operation and pancreaticogastrostomy with our two continuous hemstitch sutures (Figure 4). Histological examination confirms solid-pseudo papillary tumor. No complications were observed and the patient was dismissed twenty six days after the operation. The patient remains stable 6 month postoperatively with no complaints. We keep monthly follow up to the boy and monitoring his body weight. The latest CT scanning reveals no evidence of recurrence (Supplementary Figure 2).

Figure 3: Enhanced computed tomography validated an oval-liked tumor with a well-defined boundary located in the head of pancreas accompanied with the dilation of pancreatic duct. MPD: main

Pancreatic duct; T: tumor; P: pancreas.

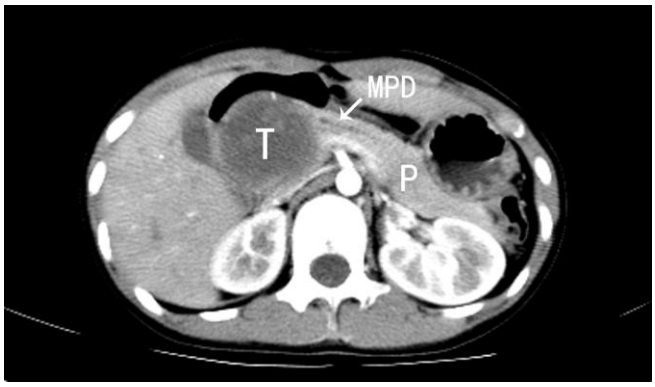
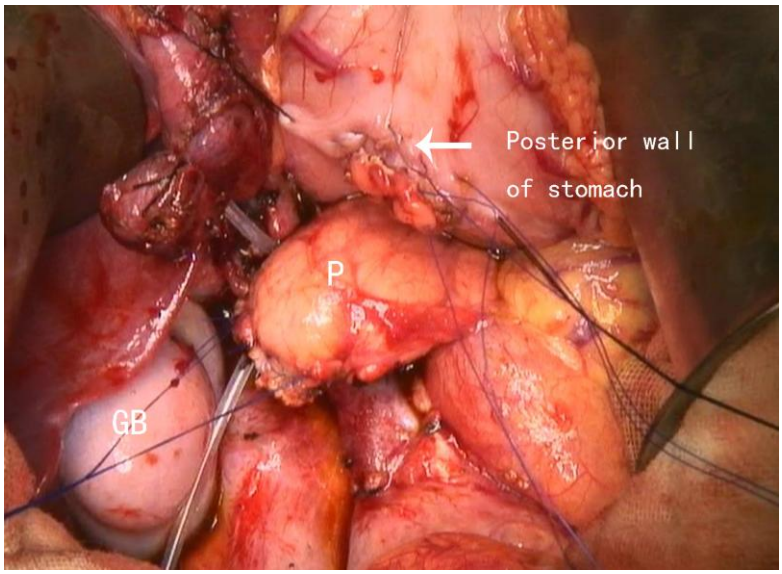
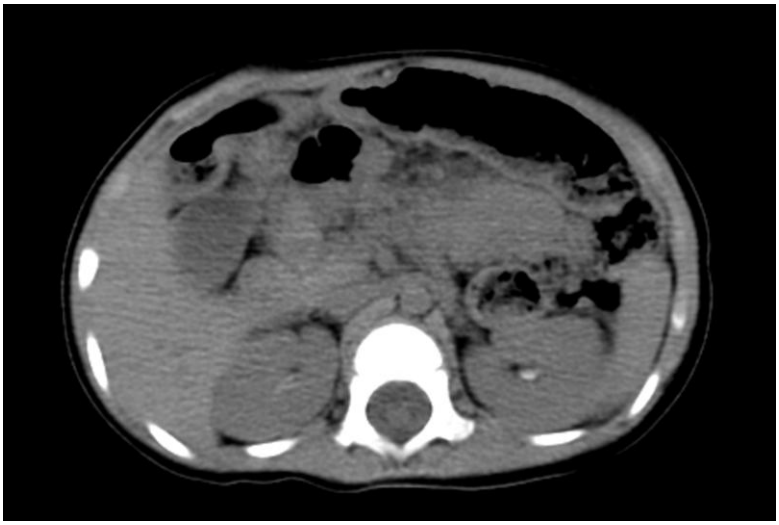


Figure 4: Intraoperative picture showing the two continuous hemstitch sutures for pancreaticogastrostomy.

GB: gall bladder; P: pancreas.



Supplementary Figure 2: Six month follow-up CT scanning.



Discussion

As we all known, POPF remains a persistent problem after pancreaticoduodenectomy (PD), especially in the presence of a soft, nonfibrotic pancreas [1]. Many technical modifications have been suggested for pancreaticoenteric anastomosis to reduce pancreatic leakage rate [2 - 4]. However, no consensus of surgical technique has been established till now. Our center has performed a single center prospective study introducing the technique of pancreaticogastrostomy, double continuous hemstitch sutures, and it turns out to be simple, safe, and reliable [5]. The 9 month old boy's case strengthens our findings for the pancreas of such child is even tiny and fragile comparing with the adults.

The reconstruction patterns of restoring digestive continuity after pancreas operation are always controversial. The reconstructive procedures of the remnant pancreas can be mainly classified as pancreaticogastrostomy and pancreaticojejunostomy (PJ). At present, there is still no consensus on the choice of anastomotic technique comparing PG with PJ [6, 7]. In one recent RCT, the pancreatic fistula rate was significantly lower after PG (4%) compared with PJ (18%). However, Watanabe et al. [8] publicized in the Japan Pancreas Surgery Group survey of 511 PG and 2483 PJ patients. There had been no significant dissimilarities between PG and PJ with admiration to the occurrence rates of intrabdominal hemorrhage and abscess or mortality [8]. The same conclusion can also be obtained in other prospective randomized trials [9-11]. Although trials showed no difference regarding pancreatic fistula or overall complication rates compared with PJ, PG is still an option for reconstruction with some merits over PJ [12].

PG, which was first reported in 1946, has been regarded as a safe procedure of anastomosis as a substitution to the standard PJ. To date, many PG anastomotic techniques have been reported. Ohigashi et al. [12] and Peng et al. [13] reported a new modified technique describing the theoretical advantages of the binding and transfixing modifications. At their procedures, the pancreatic remnant is telescoped into the gastric lumen and fixed with double purse-string sutures. This technique requires removal of the gastric seromuscular layer over the length equivalent to that of the pancreatic stump to create a gastric mucosal tube. The double purse string sutures are then placed, one at the end of the mucosal tube and one including the gastric seromuscular layer. The pancreas is subsequently telescoped into the gastric cavity and the double purse-string sutures are tied [13]. Bartsch et al. [14] reported another new technique for PG, which combines one binding purse-string and two transfixing mattress sutures between the pancreatic stump and the posterior gastric wall [14]. A seromuscular purse-string suture is placed on the posterior gastric wall similar to Peng and colleagues' techniques and 2 mattress sutures encompassing the pancreatic parenchyma and stomach wall ensure secure anchoring of the pancreas. Addeo P, et al. [15] introduced the double purse-string telescoped pancreaticogastrostomy as an expedient, safe and easy technique [15]. Several retrospective studies had demonstrated that PG was associated with a lower anastomotic complication rate compared with PJ. They suggested that complications after reconstruction with PG could be managed conservatively more often than after PJ reconstruction [16 - 20]. It's easy to identify that the approach of PG has a number of positive aspects in excess of PJ. At first, the PG anastomosis can be conducted effortlessly due to the fact that the posterior wall of the stomach lies approximately anterior to the mobilized pancreatic stump and is usually broader than the transected pancreas. Secondly, in PG, the pancreatic exocrine secretions flow into the most likely acidic gastric environment, precluding the digestive system deterioration of the pancreatoenteric anastomosis by activated proteolytic enzymes. In comparison with PJ, the triggering of pancreatic exocrine secretions can come about much more easily in the existence of intestinal enterokinase and bile. Thirdly, PG anastomosis lowers the number of anastomoses in one loop of the maintained jejunum, which most likely diminishes the probability of loop twistling. Finally, a nasogastric tube can be used as drainage if a fistula occurs after pancreaticogastrostomy. Potentially invasive procedures to drain the fistula can thus be avoided. Despite the advantages of PG stated above, our procedure has the following superiorities: Very first, only two continuous hemstitch sutures are placed in the mucosal and seromuscular layers of the posterior gastric wall. The mucosal layer of the posterior gastric wall is not removed and has only a lateral stab incision. In addition, the inner continuous hemstitch suture is preset out of the gastric cavity and drawn in through the opening of the sealed distal gastric stump. It is accessible and simple for surgeons to suture and ligate the pancreas in this way. Also, we use the opening of the sealed distal gastric stump and avoid exceeding the gastric anterior wall. Secondly, our modified technique can be carried out safely on the pancreas to avoid a PF because there is no suture through the pancreas. Moreover, the modified technique with continuous hemstitch sutures could effectively prevent hemorrhage in the cut edges of both the mucosal and seromuscular layers of the posterior gastric wall. Finally, the inner continuous hemstitch sutures are visibly tightened in the gastric cavity.

The double continuous hemstitch sutures for PG technique is expedient, safe, and reproducible, and should be part of the pancreatic surgeons' armamentarium. Results of such preliminary experience warrant additional evaluation in prospective comparative randomized studies.

Conclusions

The double continuous hemstitch sutures for PG technique is expedient, safe, and reproducible, and should be part of the pancreatic surgeons' armamentarium.

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