

A simpler and safer anastomosis pancreaticogastrostomy using a linear stapler after pancreaticoduodenectomy

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[Introduction] Even today, postoperative pancreatic fistula (POPF) remains the major problem after pancreaticoduodenectomy (PD), leading directly to serious operative outcomes. Pancreatic juice could leak from the main pancreatic duct as well as the duct branches on the cut surface of the pancreas. To overcome the POPF, we apply the new modified anastomosis of pancreaticogastrostomy using linear stapler (stapled-PG).

[Patients & Methods] Clinical records of the totally 30 consecutive patients undergone PD were reviewed between 2013 and 2023 at an our community hospital. All cases were in soft pancreas texture. Hard pancreas texture cases, such as pancreatic cancer, were excluded from this study. Twelve stapled-PG and eighteen pancreaticojejunostomy (PJ) were performed after PD. Pancreas was transected for long compression by linear stapler as pre-compression of 5 min, stapling of 5 min, and dissection of 5 min. After removal of the staples at the main duct opening of the remnant pancreas stump, PG anastomosis was performed. The outer layer was anastomosed by a single row pancreas-transfixing suture between the remnant pancreas and gastric posterior wall, and the inner layer anastomosis was also done between a pancreatic duct and gastric mucosa. The anastomosis of PJ was performed without the transection using linear stapler. POPF was compared between the two group. POPF was defined as a clinical manifestation of POPF (Grade B/C) by ISGPF criteria.

[Results] None of the twelve patients who were undergone stapled-PG developed clinical relevant POPF, whereas 5 (27%) patients undergone PJ developed POPF. Three patients were in POPF grade B and 2 patients were in POPF grade C.

[Conclusion]. Stapled-PG after PD may reduce clinical relevant POPF. Because our sample size is small, further accumulated cases are required to validate this method

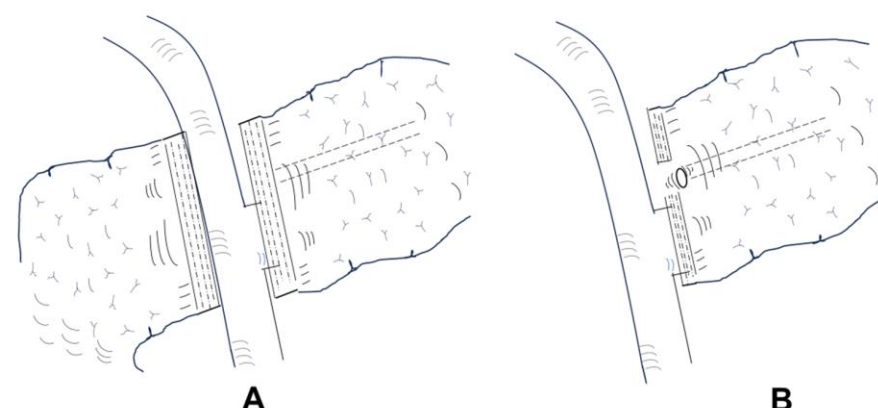
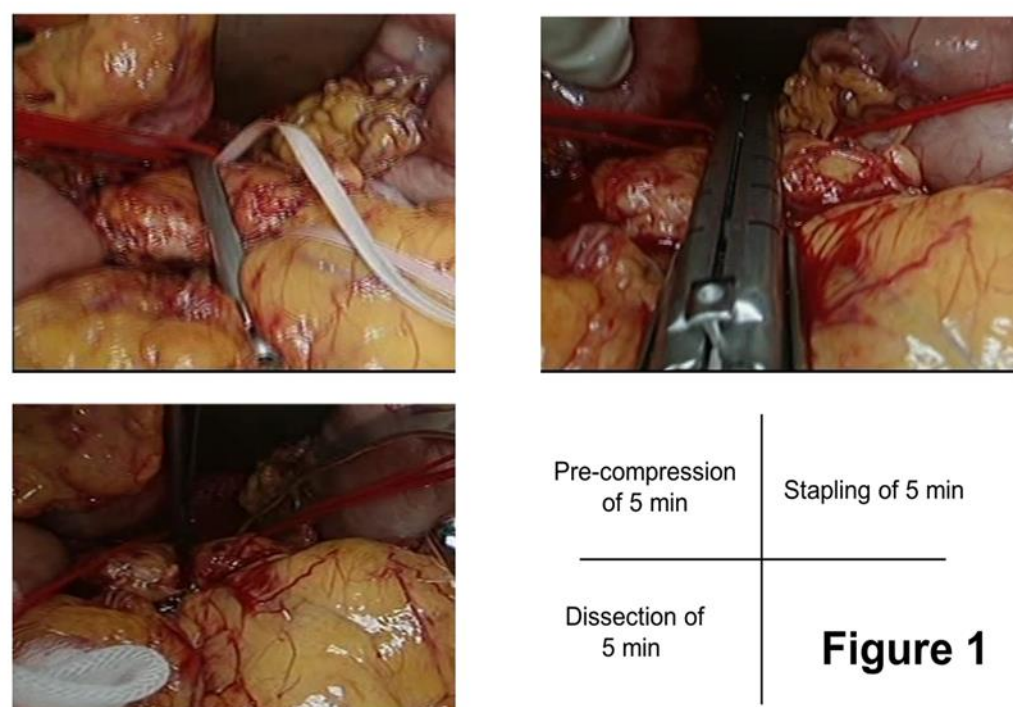


Figure 2. The pancreas was kept compressed and transected above the portal vein at the pancreas neck (A). The several staplers at the opening site of the main pancreatic duct at the stump were removed for the pancreaticogastrostomy (B).

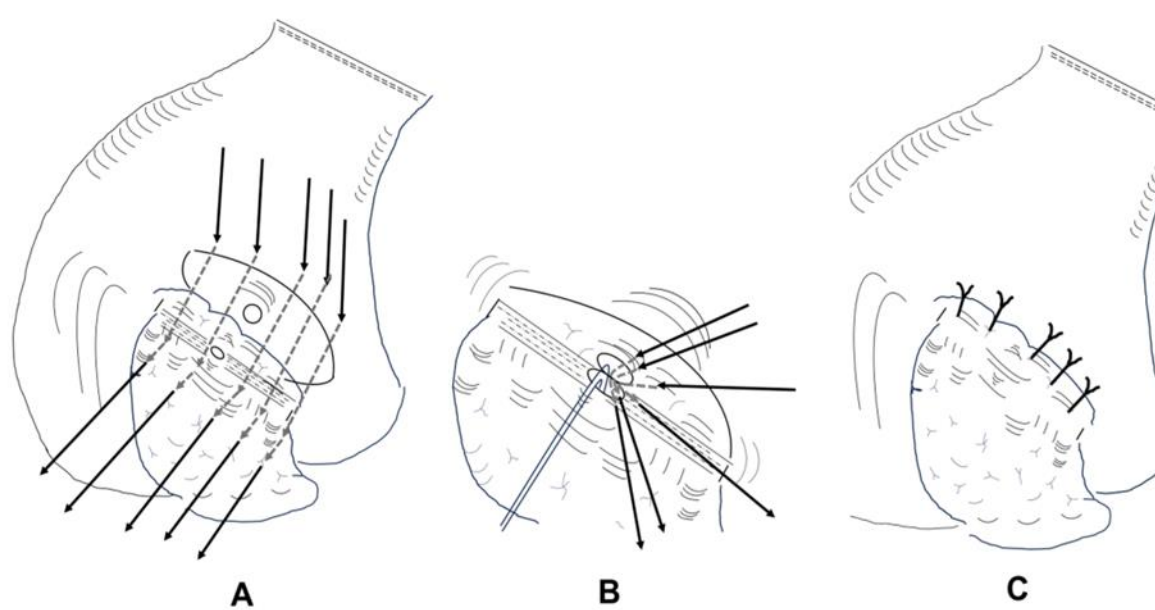


Figure 3. A. Serosal muscular incision as same in size as the remnant pancreas stump was placed in the posterior wall of the stomach and a bit mucosal incision in size about 2-3 mm was also created in order to insert of a 4-6Fr polyethylene pancreatic stent tube.

B. Pancreas duct to gastric mucosa anastomosis was also performed. After the insertion of the pancreatic tube into the main duct and the introduction of an opposite top of the tube into the stomach cavity via the mucosal incision hole were performed. Totally 8 duct-to-mucosa sutures were completed like as a radial axis manner.

C. Five to six straight transfixing sutures between the gastric posterior wall and the remnant pancreas parenchyma were placed to embed the stapled pancreas stump with gastric wall. (5)

Conclusion

Stapled-PG after PD may reduce clinical relevant POPF. Because our sample size is small, further accumulated cases are required to validate this method.

References

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Patients & Methods

Table 1 Patient characteristics

	Stapled-PG	PJ	p-Value
N	12	18	NS
Age (years ± SD)	72.4 ± 13 (54-88)	70.3 ± 11 (43-85)	NS
Gender (M/F)	5/7	2/1	NS
BMI (kg/m ²)	20.8 (17.6-22.4)	22.8 (16.8-26.2)	NS
ASA			NS
1	10	14	
2	2	2	
3	0	2	
4	0	0	
5	0	0	
Primary disease			NS
Cancer of distal bile duct	6	8	
Cancer of ampulla	2	4	
Cancer of duodenum	0	1	
IPMN	4	4	
NEC	0	1	
Operative procedures			NS
PPPD	2	10	
SSPPD	10	8	
Status of pancreas			
Thickness of pancreas (mm ± SD)	13.2 ± 2.7	14.1 ± 2.1	NS
MPD diameter (mm ± SD)	4.3 ± 1.4	4.4 ± 1.8	NS

ASA; American anesthesiology association, PDAC; Pancreatic ductal carcinoma, IPMN; Intraductal papillary mucinous neoplasia, NEC; Neuroendocrine carcinoma, PPPD; Pylorus preserving pancreaticoduodenectomy, SSPPD; Subtotal stomach preserving pancreaticoduodenectomy, PD; Pancreaticoduodenectomy, MPD; Main pancreatic duct. NS= not significant

Results

Table 2 Peri-operative outcomes

	Stapled-PG	PJ	p-Value
D-amylase at POD 3 (average;U/L)*	536 ± 725	4507 ± 3191	
POPF grade			
B	0	3	
C	0	2	
DGE			
A	8	6	
B	3	8	
C	1	4	
Morbidity rate (Hemorrhage, Pulmonary, Abscess)	0	5	
Mortality	0	0	

*Amount of amylase in the drainage fluid drains positioned near the anastomosis site on the postoperative day 3 (POD3)
POPF; Post operative pancreatic fistula. DGE; Delayed gastric emptying