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Challenging Pancreato-enteric Anastomosis during Whipple Procedure: How to Overcome this Problem?

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Abstract

Among the complications following Pancreato-Duodenectomy (PD), Post-Operative Pancreatic Fistula (POPF) is the most common complication. Different techniques and adjuncts for safer anastomosis were suggested, mainly for small caliber main pancreatic duct, none can completely eliminate the risk of leakage. Recently, we have introduced a new technique, using a Seldinger approach for small caliber main pancreatic duct. Since then, we have used this maneuver several times with encouraging results.

Keywords

Pancreato-Duodenectomy (PD); Pancreato-Enteric Anastomosis; Seldinger Technique; Post-Operative Pancreatic Fistula (POPF)

Commentary

Pancreato-Duodenectomy (PD), firstly reported by Allen Whipple in 1945, is the surgical procedure of choice for the treatment of variant diseases of the peri-ampullary region, highly selective cases of chronic pancreatitis, and for severe trauma to the pancreatic head and

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duodenum [1,2]. Although the mortality rates following PD have fallen to less than 1%, especially in high volume centers, morbidity rates following PD remains high, with almost 30%-40% of patients developing one or more complications [3-6]. Complications following PD include delayed gastric emptying, intra-abdominal collections, biliary anastomotic leakage, post-PD hemorrhage and Post-Operative Pancreatic Fistula (POPF), with the latter being the most common and feared, reported in about 5%-40% of patients [7]. The two main factors affecting the development of POPF are pancreatic tissue consistency, as well as the caliber of the main pancreatic duct (Wirsung duct).

Pancreatico-enteric anastomosis (Pancreatic gastrostomy vs. Pancreatojejunostomy) has been regarded as the “Achilles heel” of the modern, one stage PD procedure. Although different techniques and adjuncts for safer anastomosis were suggested, such as routine use of glue, anastomosing the duct over a stent, omental wrap around the anastomosis, somatostatin analogue administration, duct to mucosa, or pancreatic gastrostomy and telescoping technique, None can completely eliminate the risk of leakage [8,9]. Nowadays, there is no universally a preferable technique for pancreatocenterostomy, especially for the small caliber Wirsung duct. Recently, we have introduced a new surgical technique for small diameter duct-to-mucosa Pancreato-enteric anastomosis during PD [9]. This technique enables the construction of a safer duct-to-mucosa anastomosis over a stent (Fig. 1).

Since its introduction, we have used this technique during five PD procedures, of which 2 were females and 3 were males (Table 1). Average age of the patients reported was 64 years old. Pancreatic ductal adenocarcinoma was the most common primary histopathology, found in all patients. The average diameter of the main pancreatic duct was 2 mm. As our routine practice, all patients were treated with subcutaneous somatostatin analogue for 5 days post-operatively. None developed POPF (according to the International Study Group of Pancreatic Fistula-ISGPF- definition of POPF). One patient suffered superficial surgical site infection treated by drainage, and another one suffered delayed gastric emptying treated conservatively with Nasogastric tube, total parenteral nutrition and intravenous motilin agonist.

The following is a description of the technique:

Step 1: Following completion resection of the pancreatic head, the main pancreatic duct is detected and a guidewire is advanced through its lumen.

Step 2: Cannula (of blood vessel line) is then passed over the guidewire into the lumen.

Step 3: Once the cannula is inside the lumen, the guidewire can be withdrawn.

Step 4: Completion of the Duct-to-mucosa pancreaticoenterostomy is carried out using 5/0-6/0 prolene sutures.

Step 5: An outer serosa-pancreas running or interrupted sutures are then added using prolene 4/0 or any other preferred sutures.

Figure 1: A description of the steps for the newly introduced Seldinger technique for pancreato-enteric anastomosis.

Age (years)	Gender	Primary Hisopathology	Wirsung Duct Diameter	POPF	Other complications
70	M	PDA	2 mm	None	Delayed gastric emptying
64	F	PDA	2 mm	None	None
60	M	PDA	3 mm	None	Superficial SSI
68	M	PDA	2 mm	None	None
58	F	PDA	2 mm	None	None
(POPF: Post-Operative Pancreatic Fistula; PDA: Pancreatic Ductal Adenocarcinoma; SSI: Surgical Site Infection)					

Table 1: Summarizes demographic characteristics, as well as complications of the treated patients.

Conclusion

As POPF being the most feared complication following PD, the newly suggested Seldinger technique enables safer duct-to-mucosa anastomosis, with encouraging initial results. Due to the small number of patients included, multi-centric high volume studies are encouraged.

Ethical Approval

This article does not contain any experimental studies with human participants or animals performed by any of the authors. Informed consent was given from involved patients to publish their cases.

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