

Seldinger Technique for Duct-To-Mucosa Pancreaticenterostomy

Safi Khuri^{1*}
Offir Ben-Ishay¹
Subhi Mansour¹
Yoram Kluger¹

¹HPB and Surgical Oncology Unit, Rambam Health Care Campus Haifa, Israel

Abstract

Post-operative pancreatic fistula is the most common complication following pancreaticoduodenectomy. Therefore, pancreaticoenteric anastomosis is known as the “Achilles heel” of this operation. Over the last decades, numerous techniques have been described for safe anastomosis. No technique is superior. Herein, we describe a new technique, using a Seldinger approach for small caliber main pancreatic duct.

Short Communication

Pancreaticoduodenectomy is the procedure of choice for the treatment of benign and malignant tumors of the periampullary region (tumors of the pancreatic head, distal common bile duct, ampulla of Vater and second duodenal part) [1]. In the past, this procedure was associated with high morbidity and mortality rates. Nowadays, specialized institutions with high case volume report mortality rates of less than 1% [2], while surgical morbidity rates remain high at 30-40% [3].

Complications following this procedure include delayed gastric emptying, post-pancreatectomy hemorrhage, intra-abdominal collections and post-operative pancreatic fistula. Post-operative pancreatic fistula, the most common complication is reported in about 5-40% of patients [4]. Pancreatico-enteric anastomosis (Pancreaticogastrostomy vs. Pancreatojejunostomy) has been regarded as the “Achilles heel” of the modern, one stage Whipple procedure. Different techniques and adjuncts for safer anastomosis were suggested: anastomosing the duct over a stent, somatostatin analogue administration, routine use of glue, omental wrap around the anastomosis, duct to mucosa, pancreaticogastrostomy and telescoping technique. None of these techniques can completely eliminate the risk of leakage [5-7]. Ten randomized controlled trials (including 1629 patients) comparing pancreaticojejunostomy vs. pancreaticogastrostomy revealed that there is no difference between the two types of anastomosis in terms of morbidity, mortality and biliary fistula, while pancreaticogastrostomy was associated with a lower rate of pancreatic leak.

In regard to stent insertion during anastomosis, a recent Cochrane review revealed low quality of evidence regarding the use of stent vs. no stent, with no valid conclusions [8]. Routine fibrin glue usage or omental wrapping were not useful to prevent post-operative pancreatic fistula according to different randomized controlled trials and systematic reviews. Several techniques of pancreatico-enteric anastomosis have been described previously. Chilled CG III described the End-to-end pancreaticojejunostomy anastomosis with direct suturing [9], while Aston and Longmire described the End-to-end pancreaticojejunostomy with invagination technique, and later the End-to-side anastomosis [10]. Whipple AO was the first to describe the End-to-side duct-to-mucosa

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***Corresponding authors:** Dr. Safi Khuri, HPB and Surgical Oncology Unit, Rambam Health Care Campus Haifa, Israel. Tel: 00972502062169; Email: [s_khuri\(at\)rmc.gov.il](mailto:s_khuri(at)rmc.gov.il)

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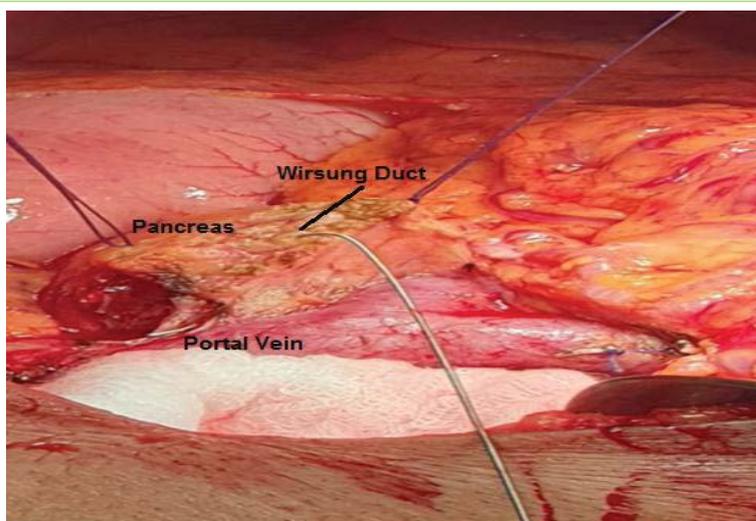


Figure 1: A guidewire is inserted into the lumen of the main pancreatic duct following completion of resection.

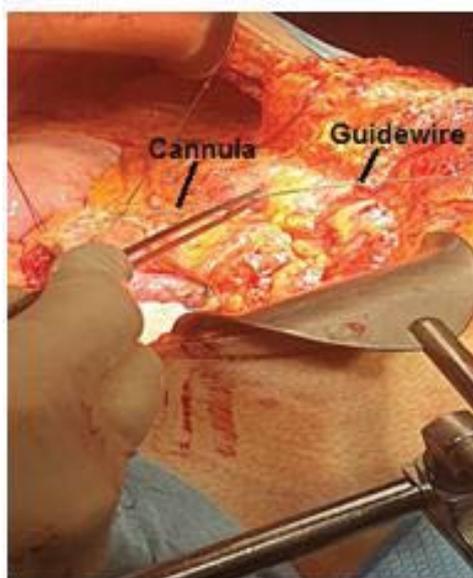


Figure 2: A cannula is passed over the guidewire into the lumen of the main pancreatic duct.

pancreatojejunostomy in 1946. This anastomosis was originally tailored with the duct anastomosed to the jejunum over a tube with the rest of the pancreatic parenchyma sutured off with mattress sutures. Later, it evolved to the current anastomosis described by Blumgart, where two concentric layered anastomoses including the rest of the pancreatic parenchyma in the anastomosis without the need for a tube [11]. Although numerous techniques have been reported, there is no universally a preferable technique for pancreaticoenterostomy, especially for the small caliber Wirsung duct (Main Pancreatic Duct). A retrospective study conducted by Z. Yang, in which modification for the traditional duct-to-mucosa anastomosis by using fewer penetrating sutures (only 6 sutures) was evaluated for post-operative pancreatic fistula. Most of the patients had small diameter main pancreatic duct (less than 3 mm), of which 15% develop pancreatic fistula [12]. Herein, we describe a new surgical technique for small diameter duct-to-mucosa

pancreatoenterostomy anastomosis during Whipple operation. This Technique enables the construction of duct to mucosa anastomosis over a stent.

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 (Figure 1).

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

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

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 is then added using prolene 4/0 or any other preferred sutures.

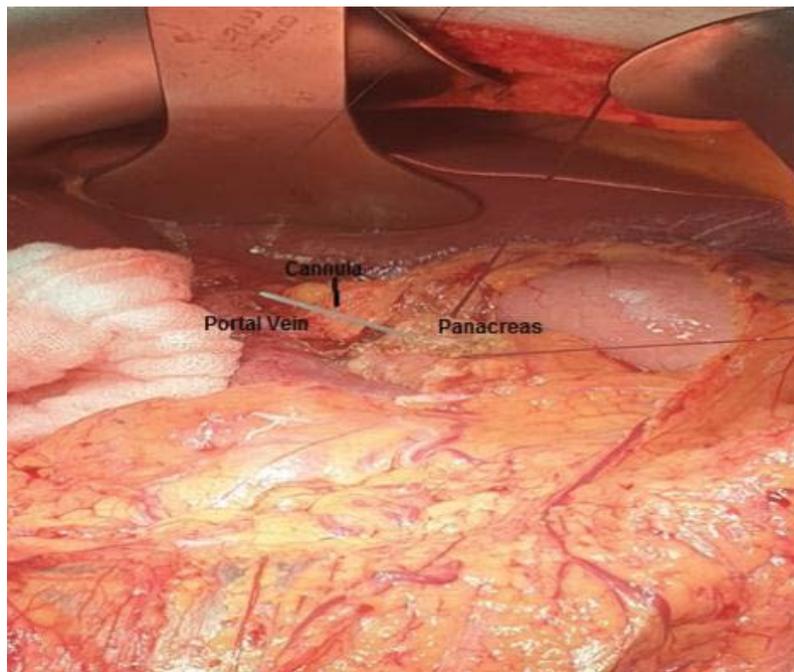


Figure 3: The guidewire is withdrawn, with the cannula inside the lumen.

As pancreatic leak following pancreaticoduodenectomy, especially in patients with small diameter main pancreatic duct, remain the most feared complication for surgeons, new technique enables duct to mucosa anastomosis over a stent for a safe and secure anastomosis.

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