

## HOW I DO IT

## Pancreato-Enteric Anastomosis: The Duct Evagination Technique

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Pancreatic anastomotic failure remains the most frequent and potentially life-threatening complication following Pancreatoduodenectomy. Numerous modifications in the technique of the pancreatoenteric anastomosis have been reported. We suggest a simple modification which involves “evaginating” the cut end of the pancreatic duct. This technique helps avoid a compromise of the pancreatic ductal patency, and by achieving a wide pancreatic ductal opening can facilitate a safer pancreato-enteric anastomosis. In addition, by possibly decreasing the likelihood of post-operative pancreatic ductal stenosis, it has the potential to reduce post-Pancreatoduodenectomy pancreatic exocrine insufficiency. The modification acts as an adjunct to an already established technique yielding good results.

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**KEY WORDS:** pancreatoduodenectomy; anastomosis; technique

## INTRODUCTION

Pancreatoduodenectomy (PD) is the surgical treatment of choice for malignant lesions of the pancreatic head and periampullary regions [1–3], as well as for certain benign lesions such as chronic pancreatitis when associated with an enlarged pancreatic head [4]. The reduction in the mortality rates in centers across the world to less than 5% has prompted pancreatic surgeons to focus on reducing morbidity rates which still remain between 30% and 50% [1,5–7]. Pancreatic anastomotic failure remains the most frequent and potentially life-threatening complication following PD [7].

Numerous attempts have been made in terms of modifications in the technique of performance of the pancreato-enteric anastomosis, including the use of pancreatic duct stents, as well as, the use of drugs like octreotide to improve outcomes following PD. The focus has been on the impact of pancreatic tissue texture and duct size on the outcomes of pancreatic anastomoses, and consequently anastomotic techniques have been developed to minimize or prevent pancreatic leaks [8,9].

The “duct-to-mucosa” technique of performance of the pancreato-enterostomy has been shown to be associated with the best reported outcomes [10]. Besides the short-term benefits of improved peri-operative outcomes, patency of the main pancreatic duct (involved in the pancreato-enterostomy) is an important factor that influences the function of the remnant pancreas post-PD [11]. Bai et al. [11], using an animal model, have shown that the pancreato-enteric anastomosis is prone to stenosis because of the narrow ductal lumen and post-operative fibrosis of the proximal pancreas.

Binding pancreaticojejunostomy technique introduced by Peng et al. [12] offers a successful leak-proof and patent anastomosis. However, it involves placement of a suture between the jejunal mucosa and the pancreatic duct wall plus the entire radial length of the peri-ductal pancreatic tissue. Such a suture traversing through the entire half-width of the pancreas as well as securing the anastomosis may easily cut through the pancreatic duct or parenchyma.

We suggest a simple procedure to avoid a compromise of the pancreatic ductal patency by “evaginating” the cut end of the pancreatic duct.

## TECHNIQUE

Following the completion of the resection of the duodenum and pancreatic head and uncinate process, haemostasis is secured on the cut end of the pancreas.

Modification (Fig. 1A,B).

The cut end of the pancreatic duct wall is “everted” and tagged to the peri-ductal parenchyma with multiple interrupted polypropylene/polydioxanone sutures (size 5-0)—A small bite of the peri-ductal parenchyma is taken and the suture is passed through the ductal wall, 2–3 mm caudal to the cut end. The suture is then externalized through the ductal lumen, a small bite of proximal duct tip is included and a knot is tied at the suture insertion point on the pancreatic cut surface away from the duct. Multiple single suture ties are placed around the entire circumferential opening of the duct. An internal thoracic artery holder may be used to open the small orifice of the pancreatic duct while performing this technique instead of a stay suture or forceps [13]. This may minimize any trauma to the pancreatic duct as well as allow precise placement of tension-free sutures.

Thereafter, the pancreato-enteric continuity may be restored by any technique (duct-to-mucosa, dunking, etc.) with which the surgeon is comfortable with.

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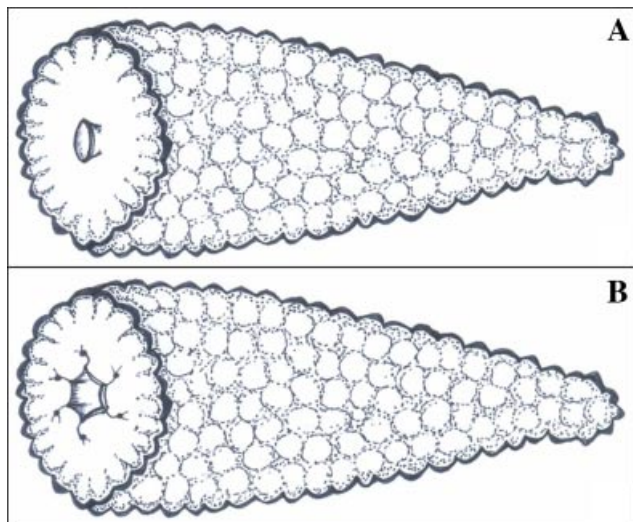


Fig. 1. **A:** Cut end of the proximal pancreatic duct post-pancreatic head resection. **B:** “Evaginated” cut end of the pancreatic duct tagged to the peri-ductal parenchyma.

## RESULTS

The “evagination” technique has been used at the senior author’s (VN) centre in nine patients (over the past 3 years), who underwent PD for pancreatic head adenocarcinoma. There was no pancreatic anastomotic leak in any of these patients, and no mortality either.

## DISCUSSION

The aforementioned procedure serves as an additional step in the creation of a pancreatic anastomosis. A duct-to-mucosa anastomosis is difficult to perform when the pancreatic duct is not dilated. The effaced end of the pancreatic duct enables a more precise placement of sutures. On completion of the described technique, any suitable kind of anastomosis may be subsequently performed. “Evagination” of the pancreatic duct facilitates an open and patent pancreatic duct. The goal is to minimize or prevent pancreatic ductal stenosis.

## CONCLUSION

This modification, aims at achieving a wide pancreatic duct not only to facilitate a safer pancreatoenteric anastomosis, but also to possibly

decrease the likelihood of pancreatic ductal stenosis post-operatively. This may also help reduce post-PD pancreatic exocrine insufficiency.

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