

Alternative Technique to Prevent Postoperative Pancreatic Fistula (POPF) After Laparoscopic Distal Pancreatectomy: Connection no Leakage (Co. Lea) Technique. An Intent to Treat

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ABSTRACT

Laparoscopic Distal Pancreatectomy (LDP) is a commonly technique applied for the resection of pancreatic diseases located in the body and tail of the pancreas. Many surgical techniques for LDP were significantly improved outcomes but the complications rate following LDP were still high especially PostOperative Pancreatic Fistula (POPF). We present a review of various techniques involving in reduce risk of POPF and present a new experimental technique, as called COnnection no Leakage (Co.Lea) technique, to reduce it.

Keywords: Laparoscopic Distal Pancreatectomy (DP); Postoperative Pancreatic Fistula (POPF); Techniques

AIM

The aim of this paper is to report useful aspects in the practice about various techniques involving in reduce risk of POPF and presenting a new experimental technique to reduce it as called Connection no Leakage (Co.Lea) technique.

BACKGROUND

Distal pancreatectomy is a commonly technique applied for the resection of pancreatic diseases located in the body and tail of the pancreas, such as pancreatic ductal adenocarcinoma, cystic neoplasm, neuroendocrine neoplasm, chronic pancreatitis, metastases (mainly clear cell renal cell carcinoma, melanoma, breast cancer, lung cancer, gastric cancer, colorectal cancer, gallbladder cancer), Intraductal Papillary Mucinous Neoplasm (IPMN), pseudocysts or traumatic lesions [1-3]. The first documented distal pancreatectomy was performed 100 years ago by Mayo. Distal pancreatectomy may involve splenectomy or may be spleen-sparing such as Warshaw or Kimura techniques [4]. Many surgical techniques for DP were significantly improved but the complications rate following DP were still high especially Postoperative Pancreatic Fistula (POPF) (1). In 2005 According to the definition provided by the International Study Group of Pancreatic Fistula (ISGPF), POPF manifests as a drain output with amylase content greater than three times the upper limit of the normal level of serum amylase on or after the third postoperative day. Furthermore,

ISGPF also divided POPF into three grades, grade A, B and C. Grade A pancreatic fistula, also called a “biochemical leak” is an asymptomatic fistula; while grade B and C pancreatic fistula are symptomatic fistula which needs therapeutic intervention (such as antibiotics and/or percutaneous drainage for grade B; resuscitation and/or exploratory laparotomy for grade C) [2-4]. In 2017 the updated definition and grading of pancreatic fistula was published. Only Grade B and C pancreatic fistula should be taken into consideration during diagnosing and treatment pancreatic fistula [5]. Postoperative Pancreatic fistula (POPF) is a common complication following Laparoscopic Distal Pancreatectomy (LDP). However, the risk factors of this complication in patients after LDP still remain controversial. Studies suggested that patients with male gender, age, soft pancreas, higher Body Mass Index (BMI), blood transfusion, elevated intraoperative blood loss, longer operative time, low albumin levels, high ASA (American Society of Anesthesiologists) score, extensive lymphadenectomy, extensive resections, large pancreatic stump had an increased risk for POPF [6-10]. The incidence of fistula is particularly high (60%) after distal pancreatectomy, with mortality rates <2% [6].

MATERIALS AND METHODS

A literature research was carried out including PubMed, Medline, Embase, Cochrane and Google Scholar databases to identify articles reporting on the incidence, definition and treatment of POPF.

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INCLUSION AND EXCLUSION CRITERIA

The keywords used were “Laparoscopic Distal Pancreatectomy (LDP), Postoperative Pancreatic Fistula (POPF), Techniques. We analyzed all full-texts, randomised and nonrandomised clinical trials and observational studies. We exclude all manuscript who talked about small duodenal perforation, abstract and non-English manuscript. Two independent research reviewed articles.

OUTCOMES

Studies analyzed various techniques to prevent and reduce POPF: “Techniques for pancreatic transection,” “Techniques for the management of pancreatic stump”. For what concern “Techniques for pancreatic transection” studies demonstrated the use of ultrasonic knife, other surgical tools, such as radiofrequency ablation device, bipolar tweezers, LigaSure or coagulation [11]. Suzuki et al. [12] demonstrated only 4% of POPF after pancreatic transection with ultrasonic knife procedure and in 26% of patients after conventional transection technique ($p=0.02$). For what concern “Techniques for the management of pancreatic stump” a great number of techniques for stump management after distal pancreatectomy may be found in the literature. Stump management techniques include transecting and closing the pancreas with a linear stapler, closing the stump with mattress sutures, hand sewing of the stump; coverage of the stump with a fragment of the greater omentum, falciform or round ligament flap; use of a serous-muscular flap, the use of biological adhesive, wrapping the stump with a mesh; stenting of the pancreatic duct before or during surgery or pancreatoenteral anastomosis. Current studies do not clearly determine which of the above mentioned techniques is superior. Therefore the question which of these methods should be chosen is still open [13].

INTENT TO TREAT

Our "Intent to treatment" is to start a study on a new surgical technique in order to be able to reduce the incidence of postoperative pancreatic fistula (POPF). The future study plans to treat the distal pancreatectomy with the Connection no Leakage (Co.Lea) technique. After having carried out the distal pancreatectomy or spleno-pancreatectomy, the head of the residual pancreas will be anastomosed with the stomach after it undergoes a partial subtotal sleeve.

TECHNIQUE

Positioning the patient in a supine position. Introduction of Verres needle into the left hypochondrium on the Palmer's point. Palmer's test. Introduction of 12 mm optical trocar in the supra-umbilical site. Introduction of 12 mm trocar operator in the left side and 5 mm trocar in the right side. Another trocar in epigastrium. Exploration of the peritoneal cavity, peritoneal washing. Exploration of the liver and peritoneum. Exploration of the Treitz angle and the transverse mesocolon. Incision of the colo-epiploic ligament or gastro-colic ligament. Access to the back cavity of the epiploons visualizing the anterior face of the pancreas. Detachment of the gastro-colic ligament will begin from the Bouchet's line and it will extend to the right up to the right gastro-epiploic vessels and to the left until the short gastric vessels afferent to the spleen which are identified and sectioned on clips. An intraoperative ultrasound is performed, which allows to identify the site of the lesion, the size, the distance from the vessels. The use of the echo-color Doppler will allow to

identify the splenic vein, on the lower edge of the pancreas, the splenic artery, on the upper edge of the same, the confluence of the splenic vein with the inferior mesenteric vein and the superior mesenteric vein to form the portal vein, which will be the landmark for the parenchymal transection. The Echocolor Doppler will also allow the identification of the celiac axis, before dissection, to avoid errors such as resection of the hepatic artery instead of the origin of the splenic artery. Proceeds to dissect the lower edge of the pancreas. The splenic vein is isolated and is found on tape. It's prepared up to the origin where it joins with the portal vein. This maneuver will allow the sub-pancreatic passage. At this point, continue with the dissection of the upper edge of the pancreas, isolating and finding on the tape the splenic artery that is prepared up to the origin of the celiac tripod. The sub-pancreatic passage on the upper part is completed and a tape will find the pancreas in its portal portion. Three landmarks distinguish, in the cranio-caudal and middle-lateral sense respectively, the splenic artery, the body-tail pancreas and the splenic vein. In benign tumors the Warshaw technique can be implemented (sparing of short gastric vessels and section of the vessels splenic) or the Kymura technique (sparing of the splenic vessels and section of the short gastric vessels). Both techniques allow the rescue of the spleen. In malignant tumors, we prefer to implement spleno-pancreatectomy with section of the splenic vessels at the origin. The splenic artery at the origin is then dissected in sequence with the use of clips or vascular stapler. The same is done for the section of the splenic vein. Finally, the pancreas is dissected, usually with an endo-suturing machine with porcine coating, totally uncovering the anterior face of the portal vein. The dissection will be completed with the en bloc dissection of the pancreas body-tail and the spleen which is released from the spleno-colic, spleno-renal and spleno-phrenic ligaments (Figure 1). The second phase involves the packaging of a gastro-pancreatic anastomosis, called Connection no Leakage technique (Co.Lea) or technical reverse Montenegro or partial subtotal sleeve. The large curvature of the stomach is sectioned transversely with the use of an endo stapler at about 5 cm from the pylorus, preserving the entire arch of the gastroepiploic arteries. The partial sleeve gastrectomy is completed with the use of a stomach protection probe that extends in the direction vertical to the body of the stomach. The distal portion of the sleeve is then, inosculated on the transition edge of the pancreas, whose Wirsung duct was cannulated with tube. Anastomosis is completed with two pursestrings in pds 3/0 or at interrupted points between the serous-muscular layer and the pancreatic parenchyma (Figure 2). Revision of hemostasis. Apposition of drainage in the anastomotic site. Resolution of the pneumoperitoneum. Skin synthesis of trocar site.

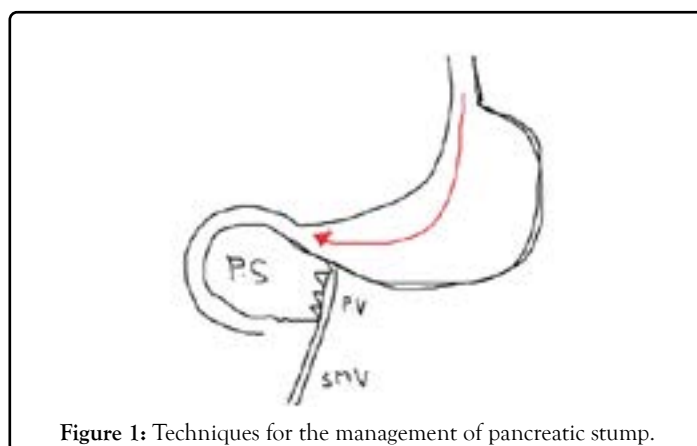


Figure 1: Techniques for the management of pancreatic stump.

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