



# Laparoscopic distal pancreatectomy with preservation of the splenic vessels

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**Abstract:** Laparoscopic distal pancreatectomy (LDP) was first described 25 years ago and is now a widely accepted procedure for benign, borderline, malignant, and traumatic alterations of the pancreas. With similar oncologic results and morbidity rates as for open surgery, LDP yields reduced intraoperative blood loss and shorter length of stay. Depending on indications and intrabdominal status, LDP can be performed either with or without splenic preservation. In this article we describe our approach for spleen-preserving LDP as performed in the case of a 21-year-old woman presenting with a large cyst in the pancreatic tail.

**Keywords:** Pancreas; tail; laparoscopy; distal pancreatectomy

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## Introduction

Distal pancreatectomy is indicated for a variety of pathologies including benign, borderline and malignant conditions of the pancreatic body/tail, such as tumors, intraductal papillary mucinous neoplasm (IPNM), metastases, traumatic injuries with ductal injury, and pseudocysts following pancreatitis or trauma (1). Initial descriptions of laparoscopic distal pancreatectomy (LDP) date back as early as 1994 (2); the procedure has since been increasingly applied with satisfying results in high volume centers with experience in advanced laparoscopy. The postulated advantages of minimal access surgery (reduced pain, fast recovery/reduced hospital stay and intraoperative blood loss) have also been confirmed for minimal access pancreatic surgery (3). Contraindications for the laparoscopic approach include tumor invasion of surrounding organs and critical vessels, and metastatic disease.

Spleen preserving LDP has been described as safe (3) and should be chosen whenever possible to minimize the known post-splenectomy complications (4). Splenic preservation can be performed either with preservation of the main

splenic vessels or resection of the vessels but preserving the surrounding vascular connections such as the short gastric, spleno-colic and spleno-diaphragmatic vessels [Warshaw's technique (WT) (5)] realizing that the WT is associated with a high risk for perisplenic varices (6). Our preferred technique is to save the main splenic vessels to preserve the spleen's immunologic competence, which depends on strong blood flow from the splenic artery (7). However, radical oncological resections in cancer usually demand splenectomy with resection of the splenic vessels in order to achieve an optimal lymphadenectomy, which impacts the oncologic outcome.

## Case presentation

In this video (*Figure 1*), we present the case of a 21-year-old woman complaining of unclear upper abdominal discomfort and slight protrusion of the left upper abdominal wall. The medical history was otherwise unremarkable. A pancreatic cyst of 10 cm in diameter was detected with ultrasound and confirmed by magnetic resonance imaging (MRI). Laboratory findings were within normal range, and oncologic markers were CEA <1.0 U/mL, CA 19/9 <5.0 U/mL.



**Figure 1** Laparoscopic resection of the pancreatic tail with preservation of the spleen and splenic vessels (8).

Available online: <http://www.asvide.com/watch/32947>

### *Operative technique—video comment*

#### **Positioning of the patient**

The patient is placed in a supine position with the legs apart. The surgeon stands between the legs, the first assistant to the right of the patient. Secure fixation to the operating table is essential to allow tilting as needed.

#### **Port placement**

A pneumoperitoneum (12 mmHg) is established via infra-umbilical placement of the optic trocar with the open technique (9). A 12 mm working trocar is inserted in the left lower quadrant at the medio-clavicular line and a 5 mm trocar in the right para-median epigastrium. Additional trocars placements can be applied later during the operation, as needed.

#### **Exposure of the pancreas—opening of the lesser sac**

To expose the pancreas, the gastro-colic ligament is opened with an energy device. Care must be taken to preserve the gastroepiploic arcade; the cystic tumor is easily identified when the lesser sac is entered. The stomach is mobilized from the antrum all the way to the gastro-splenic ligament; care is taken to preserve the gastro-splenic and spleno-colic ligaments, and their vascularity.

#### **Pitfalls**

An insufficient opening of the lesser sac may reduce the exposure of the operative field. Too much traction on the gastro-splenic ligament may cause splenic lacerations and subsequent hemorrhage.

#### **Development of the retro-pancreatic plane—splenic vein**

After the retro-pancreatic space is opened at the inferior aspect of the pancreas, the splenic vein is identified. At this point, care must be taken to coagulate all vascular connections between the splenic vein and pancreas (ultrasonic shears). Following the splenic vein toward the spleen, the pancreas is elevated and all tissue connected to the retroperitoneum is taken down. The cystic tumor is also freed from all adhesions. At this point an additional 5 mm trocar may be inserted to facilitate elevation/exposure of the pancreas.

#### **Pitfalls**

Separating the splenic vein from the pancreas is the most delicate part of this procedure. Dissection (both blunt and sharp) should be performed meticulously and the tissue should be handled gently to prevent tearing of the vein.

#### **Cranial dissection, completion of mobilization, stapling of the pancreas**

Next, the supra-pancreatic plane is dissected. The pancreatic branches of the splenic artery are coagulated carefully; the pancreatic tail with the cystic tumor can then be elevated gently from the splenic vessels. Now the pancreas is transected using graded compression of the stapler, allowing slow compression of the area to avoid excessive tissue damage, capsular tears, or intempestive parenchymal rupture. The stapler height is chosen based on the thickness of pancreas at the site and the texture of the parenchyma. We usually use endostaplers with medium cartridge.

#### **Pitfalls**

Fast compression and/or inadapted selection of the stapler height may damage tissue, increasing the risk for post-operative pancreatic fistula.

#### **Specimen extraction, rinsing of the operative field, fibrin sealing**

Finally, the specimen is retrieved in a bag through the umbilical incision and sent for frozen section, which in this case confirmed negative margins. The staple line of the remnant is checked for bleeding and then sprayed with fibrin glue. We recently changed from glue to collagen patch (Hemopatch®) to prevent postoperative pancreatic fistula (not shown in video). Drainage of the surgical site is optional but if considered, we recommend active drains

located several cm distant to the staple line of the pancreatic remnant (passive drainage has recently been found to be a negative predictive factor for onset of post-operative pancreatic fistula) (10).

## Outcome

The postoperative course was uneventful and the patient was discharged on postoperative day 7. Pathology confirmed the clinical diagnosis of a benign mucinous cystadenoma. No further treatment was necessary.

## Comments

In this video, we describe a spleen-preserving LDP for a benign pancreatic lesion. Given the necessary experience in advanced laparoscopic surgery, the minimal access approach may reduce length of stay and surgical trauma, and enable faster recovery, while yielding results similar or superior to the open procedure.

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## Footnote

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