# COMPARATIVE SAFETY OF EN BLOC VS. SEPARATE RESECTION OF SPLENIC VESSELS IN LAPAROSCOPIC DISTAL PANCREATECTOMY

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## INTRODUCTION

Distal pancreatectomy represents the established surgical intervention for resectable body and tail pancreatic ductal adenocarcinoma (PDAC), with laparoscopic approaches demonstrating both safety and efficacy.[1] During laparoscopic distal pancreatectomy (LDP) for malignant pancreatic pathologies, standard techniques involve ligating and transecting splenic vessels and removing the spleen. Conventionally, surgeons first isolate the splenic artery and vein from pancreatic parenchyma before individually dividing them, a method purportedly designed to mitigate potential postoperative vessel stump erosion and subsequent hemorrhage in the event of pancreatic fistula development.[2] Notably, en bloc stapling of splenic vessels has historically been associated with a theoretical risk of splenic arteriovenous fistula (SAVF) formation, despite limited empirical evidence supporting this conjecture.[3]

Several medical institutions, including our own, have begun exploring combined division of splenic vessels concurrent with pancreatic parenchyma during LDP. However, comprehensive data regarding the safety profile of this surgical technique and its comparative efficacy with traditional separate vessel ligation remain limited.[4] This retrospective review aims to critically evaluate the safety and clinical outcomes of the combined arterial and venous division technique, alongside a comparative analysis with patient cohorts undergoing separate vascular and parenchymal dissection.

## METHODS

### Study Design

This retrospective study examined medical records of patients who underwent laparoscopic distal pancreatectomy for pancreatic ductal adenocarcinoma at Mayo Clinic (January 2011–December 2024).

### Patient Characteristics and Outcome Measures

Data collected included patient demographics, operative details, postoperative complications (graded via Clavien-Dindo), and pathologic findings. Follow-up imaging evaluated splenic arteriovenous fistula occurrence.

### Operative Technique

Laparoscopic distal pancreatectomy employed a caudad-to-cephalad clockwise approach, intraoperative ultrasound for tumor localization, and mechanical staplers for pancreatic and vascular transection.

### Patient Categorization

Patients were categorized by surgical techniques for splenic vessel and pancreatic parenchyma division, comparing separate versus combined splenic vein, artery, and vessel transection approaches.

## RESULTS

A comprehensive analysis of 436 patients who underwent laparoscopic distal pancreatectomy revealed significant differences between en bloc resection (n=262) and separate vessel resection (n=174) techniques. En bloc resection demonstrated superior perioperative outcomes, including significantly shorter median operative time (112 vs. 207 minutes, $P < 0.001$), reduced estimated blood loss (50 vs. 100 mL, $P < 0.001$), and lower transfusion rates (3.1% vs. 9.0%, $P = 0.008$). Postoperatively, the en bloc group exhibited a shorter hospital stay (3 vs. 4 days, $P < 0.001$) and reduced major morbidity (7.25% vs. 16.37%, $P < 0.001$), suggesting the clinical advantages of this surgical approach.

## RESULTS

| VARIABLE | EN BLOC (N = 262) | SEPARATE (N=171) | P-VALUE |
|---|---|---|---|
| Male – N (%) | 73 (27.9) | 128 (74.9) | < 0.001* |
| Age – yrs [IQR] | 65 [54-73] | 67 [59-74] | 0.029* |
| BMI – kg/m$^2$ [IQR] | 28 [25-33] | 26 [23-30] | < 0.001* |
| OP time – min. [IQR] | 112 [85-150] | 207 [157-267] | < 0.001* |
| EBL – mL [IQR] | 50 [25-100] | 100 [50-200] | < 0.001* |
| LOS – days [IQR] | 3 [2-4] | 4 [3-5] | < 0.001* |
| PPH – N (%) | 7 (2.7) | 7 (4.1) | 0.598 |
| POPF – N (%) | 22 (8.4) | 21 (12.3) | 0.193 |
| MAE* – N (%) | 19 (7.3) | 28 (16.4) | < 0.001* |

*BMI denotes Body Mass Index; OP time, Operative time; EBL, Estimated Blood Loss; LOS, Length of Stay; PPH, Postpancreatectomy Hemorrhage; POPF, Postoperative Pancreatic Fistula; MAE, Major Adverse Event. *MAE's are defined as any Clavien-Dindo classification grade III or higher occurring within 90 days post-operation.*

## CONCLUSION

Our findings suggest that combined division of splenic vessels and pancreatic parenchyma during laparoscopic distal pancreatectomy is a safe technique with potential clinical advantages. The approach demonstrated significant benefits, including reduced operative time, decreased blood loss, and lower major morbidity. However, a prospective randomized study is warranted to definitively establish the comparative outcomes of this surgical technique.

## REFERENCES

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