

Clinical Science

# Routine peritoneal drainage of the surgical bed after elective distal pancreatectomy: is it necessary?

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**Abstract**

**BACKGROUND:** Recent literature suggests that peritoneal drainage (PD) is not helpful after elective pancreatectomy and may be detrimental. Data specific to distal pancreatectomy (DP) have not received prior evaluation.

**METHODS:** We performed a retrospective review of patients who underwent DP. Factors examined included postoperative morbidity and the need for therapeutic intervention.

**RESULTS:** Sixty-nine patients had DP, 30 without PD. Thirty-four patients suffered 45 complications, most were intra-abdominal in nature. Twelve, 19, and 3 patients required radiologic drainage, reoperation, or both, respectively. There was no difference between groups relative to intra-abdominal complications or the need for therapeutic intervention. Of 39 patients undergoing PD, 19 had abdominal morbidity. The drain was useful in identifying and/or treating the complication in 3 patients.

**CONCLUSIONS:** First, PD after DP does not confer a reduction in morbidity or the need for therapeutic intervention versus patients with no drains. Second, the presence of a drain infrequently was helpful in detecting complications. Third, a multi-institutional, randomized study is recommended.

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Peritoneal drainage (PD) of the surgical bed after elective pancreatectomy has been a commonly used practice. Hypothetically, these drains allow evacuation of any leaking pancreatic juice, thereby mitigating complications that can occur after resection such as bleeding, pancreatic fistulae, pseudocyst, and abscess formation, and these surgically placed drains might allow the early recognition of complications when they do occur such as bleeding and fistulae. However, drains themselves are not without complications and have been associated with the development of infectious sequelae, particularly when left in place for prolonged

periods.<sup>1–3</sup> Further, drains in and of themselves may promote fistulae from both the pancreas and surrounding hollow viscera as well as bleeding from peripancreatic vessels as a result of erosion.<sup>4</sup> In addition, sequestration of tissues around the drain may not allow the intended egress of fluids for which they were placed originally.<sup>2,5</sup> Finally, although nominal, there is a cost associated with drain placement and scientifically their routine use should be discouraged if no benefit can be shown. The only randomized controlled study to date assessing the impact of drain use after elective pancreatic resection failed to show an advantage to routine drainage.<sup>4</sup> Although distal resections were included in this study, a subset analysis specific to this group was not performed. We sought to analyze the impact of drain placement specific to those having elective distal pancreatectomy (DP) because this had not been assessed previously. We hypothesized that PD does not mitigate the morbidity associated

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**Table 1** Demographics and surgical and hospital details

	No drain (n = 30), median (range)	Drain (n = 39), median (range)	P value
Age, y	58 (52–68)	52 (44–66)	.1719
Length of procedure, min	195 (176–260)	249 (196–290)	.0750
Estimated blood loss, mL	200 (100–300)	450 (300–750)	.0003
Malignancy	25	27	.4
Organ removal	7	9	.35
ICU stay, d	0 (0–1)	1 (1–3)	.0043
Hospital stay, d	6.5 (5–8)	9 (7–17)	.0009
Soft remnant	28	31	.16
Main duct size, mm	2 (1–3)	2 (1–8)	.02

ICU = intensive care unit; OR = operating room.

with DP or the need for postoperative therapeutic intervention and may not be an effective means toward recognizing intra-abdominal complications when they do occur.

## Methods

Under institutional review board approval, the records of all patients undergoing elective distal pancreatectomy between 1997 and 2011 at Baptist Memorial Hospital, an affiliate of the University of Tennessee Health Science Center in Memphis, were reviewed retrospectively. Note was made of concurrent extrapancreatic organ removal exclusive of the spleen and whether surgery was performed for benign or malignant disease. After transection with electrocautery, the duct of Wirsung was ligated individually, if identified, and the parenchyma was closed in a vertical mattress fashion with monofilament suture. The suture line was buttressed with omentum or the falciform ligament and fibrin glue was placed over the cut surface. All patients received octreotide (Sandostatin, Novartis Pharmaceuticals, Cambridge, MA) 200  $\mu$ g subcutaneously every 8 hours until discharge or for 1 week if the hospital stay was prolonged. No patient received a stapled closure. All 3 surgeons contributing to this series used PD, however, only 1 of these 3 surgeons (S.W.B.) was responsible for those who did not receive a drain. Closed suction drainage was used with either a 12F Jackson-Pratt (Baxter Health Care, Corp., Deerfield, IL) or a 15F Blake (Bard, Covington, GA) catheter. Criteria for drain removal was output less than 50 mL/d and/or an amylase value less than 3 times the serum level.

Factors examined included the development of postoperative intra-abdominal complications including fistula, pseudocyst, bleeding, and abscess. The need for therapeutic intervention (radiologic drainage or reoperative surgery) in the postoperative period specific to these abdominal com-

plications was noted. We did not use endoscopic pancreatic stenting or transmural endoscopic drainage as a treatment modality for postoperative complications. Pancreatic fistulae (PF) were defined as greater than 30 mL of amylase-rich fluid (>3 times serum value) and were classified according to the International Study Group for Pancreatic Fistula criteria.<sup>6</sup> An abscess was defined as a culture-positive fluid collection in the surgical bed with associated fever and an increased white blood cell count or a shift to immature forms. A postoperative pseudocyst was defined as an encapsulated homogenous fluid collection in the region of the resected gland with no associated clinical or laboratory indexes suggesting infection.

Comparison between those with and without drains was made using the chi-squared analysis or the Fisher exact test where appropriate for categorical variables and the Wilcoxon rank-sum test for continuous variables. Significance was assessed at the 95th percentile.

## Results

Sixty-nine patients underwent open distal pancreatectomy during the study period, 30 (43%) of whom did not have peritoneal drainage of the surgical bed. En bloc resection of the spleen was performed in 96%. The median age was 55 years, 75% had resection performed for malignancy, and 23% had concurrent extrapancreatic organ removal exclusive of the spleen, with no difference observed between groups (Table 1). The vast majority of patients had a soft pancreatic remnant. Blood loss, intensive care unit stay, and hospital length of stay were reduced significantly in those without drainage. Those having drainage had a larger range of duct of Wirsung diameter, however, duct size measured a median of 2 mm in both groups. We examined the potential protective effect of peritoneal drainage relative to risk factors that might portend a higher rate of postoperative morbidity (Table 2). The use of a drain did not reduce the incidence of postoperative morbidity in those with antecedent diabetes, malignancy, concurrent organ removal, estimated blood loss greater than 500 mL, and failure to locate and ligate the main duct of Wirsung.

Data relative to postoperative morbidity is shown in Tables 3, 4, and 5. In total, 34 patients suffered 45 complications (Table 3). The overall complication rate for the

**Table 2** Risk factors for postoperative morbidity

	No drain	Drain	P value
Diabetes	1	5	.5455
Malignancy	14	12	.4050
Failure of main duct ligation	2	5	.4887
Estimated blood loss $\geq$ 500 mL	14	7	.2231
Concurrent organ removal	5	4	.3575

The number of patients with complications is shown.

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