



Treatment of postoperative pancreatic fluid collections

There is little debate that endoscopic transmural drainage of amenable pancreatic fluid and necrotic collections is preferred to surgical drainage as first-line treatment.^{1,2} Note the term “amenable,” which may be interpreted differently. With a growing workforce (>70 fellows trained each year in advanced endoscopy programs), there is a veritable battalion of endoscopists capable of performing transmural drainage procedures. The advent of lumen-apposing metal stents has inspired an even larger staff of representatives willing and able to assist these physicians and their teams. Consequently, few if any hospital systems in the United States should have to resort to percutaneous or surgical approaches alone in treating pancreatic fluid collections. Therefore, all gastroenterologists should be familiar with the indications for endoscopic transmural drainage. The classic teaching has focused on 2 key morphologic characteristics of pancreatic collections: first, the collection must appose the gastroduodenal lumen; second, it must be mature; otherwise, transmural drainage could result in extravasation of the GI contents into the retroperitoneum or peritoneum. According to the revised Atlanta criteria, a collection must have existed ≥ 4 weeks to be defined as a pseudocyst (if fluid) or walled-off necrosis (if primarily solid in content).³ In this month's *Gastrointestinal Endoscopy*, Storm et al⁴ challenge the latter criterion by reporting their experience with endoscopic transmural drainage for patients with acute symptomatic pancreatic fluid collections.

In this retrospective cohort study, a total of 75 patients underwent early—defined as within 30 days of onset—transmural drainage ($n = 42$, 56%; of those, 20 were within 14 days of the index surgery) or delayed ($n = 33$, 44%). The authors reported high technical (100%) and clinical (93%) success, the latter defined by resolution of symptoms and the collection on follow-up imaging. There were no observed differences in clinical success or adverse events (19/75, 25%); most importantly, the authors did not observe postdrainage perforations in the 42 patients who underwent early transmural drainage. Although the authors did not identify the factors associated with adverse events in their regression model, the sample size and event rate are too small to be definitive. In addition, the inclusion of adverse events such as nausea in this

regression model is questionable because it is implausible that the timing of drainage would have an impact on such mild adverse events. Nevertheless, their observation in 42 patients that drainage can precede the traditional 4-week definition for maturity is novel and worth studying in larger cohorts.

Many surgeons routinely leave percutaneous drains in the resection bed after distal pancreatectomy. Although this has not been shown to affect the rate of postoperative adverse events, the incidence of early postoperative fluid collections is lower. In a randomized trial ($n = 344$) evaluating the routine use of a postoperative drain, the incidence of symptomatic fluid collections was lower (9% vs 22%, $P = .0004$) when a drain was left in place.⁵

The risks of secondary infection or peritonitis with early endoscopic drainage should be balanced against the potential benefits of internalizing a pancreatic leak and shortening the time to full recovery. The present evidence does not give gastroenterologists carte blanche: the management of local adverse events still requires a thoughtful multidisciplinary discussion.

In the same trial, the use of a drain did not affect the incidence of clinically significant pancreatic fistulae, which was a historical concern among pancreatic surgeons. In centers where drains are routinely left in place postoperatively, it is highly unlikely that gastroenterologists will be consulted during the first 30 days postoperatively. As a result, only 3 of 42 (7%) of early collections underwent prior percutaneous drainage as compared with 10 of 33 (30%) in the delayed group. Nevertheless, these findings should prompt a discussion between gastroenterologists and pancreatic surgeons regarding the management of postoperative pancreatic fluid collections. Does the option for early endoscopic drainage further reduce the value of routinely leaving a postoperative drain? Given the limited sample size, any systematic adoption of early endoscopic drainage should still be done in the context of a longitudinal cohort study.

Collections that develop after pancreatic surgery usually occur from a pancreatic duct leak along the suture line. Although not discussed extensively in this cohort,

postoperative pancreatic fluid collections are typically defined as an abnormal communication between pancreatic ductal epithelium and another epithelial surface. This may occur from incomplete healing of the pancreatic cut surface, such as after distal pancreatectomy, or a leak from a pancreatic–enteric anastomosis, such as after pancreaticoduodenectomy.⁶ A pancreatic duct leak after distal pancreatectomy is graded from A to C. Grade A is now designated a biochemical leak because it is defined as a leak that resolves without the need for procedural manipulation. Grade B requires endoscopic or percutaneous treatments, whereas grade C requires surgery or is associated with organ failure. This is relevant to the approach to postoperative pancreatic fluid collections because the majority of collections are small, self limited, and will resolve without recurrence. When a postoperative drain is left in place routinely, the surgeon may observe output for a few days before it resolves spontaneously. It is likely that many of the collections treated within 30 days of surgery were biochemical leaks (grade A). When surgeons do not routinely leave a drain, a symptomatic fluid collection may develop in some of these individuals. Should we move to early drainage in all cases, or consider these like an early fluid collection in the setting of acute pancreatitis? How many will resolve without intervention? Is there a danger in prolonged observation, other than the obvious negatives of prolonging illness and increasing the overall costs of care? The present study provides us with a potential early intervention; these more complex questions will require larger cohorts and ideally a comparative effectiveness study to determine who benefits from early drainage. Higher-grade leaks will often require transpapillary drainage to internalize, although those by definition require several weeks of persistent output from percutaneous drains; if the collection is drained transmurally alone, these higher-grade leaks would presumably be defined by recurrence of a fluid collection. In those cases, ERCP with placement of a pancreatic duct stent remains the standard of care for internalizing these fistulae, hopefully before additional local adverse events ensue.^{7,8}

We should not equate postoperative pancreatic fluid collections, which most commonly occur in patients who have undergone distal pancreatectomy, with pancreatic fluid collections that develop in the setting of acute pancreatitis. In the setting of evolving pancreatitis, we know that many acute fluid collections will resolve spontaneously or coalesce into asymptomatic collections that do not require treatment. Furthermore, many of these acute fluid collections will not have a defined margin to support internal drainage: in the absence of a mature collection, transmural drainage could lead to extravasation of the GI contents into the retroperitoneum or peritoneum, depending on the anatomic boundaries of the collection and the location of the transmural drain. However, the present findings warrant further investigation in cases of severe acute pancreatitis, whereby patients with

an obvious and ongoing pancreatic duct leak with enlarging pancreatic fluid collection(s) or infected necrosis are often treated conservatively until maturation of the collection or are referred for percutaneous drainage when the collections are deemed immature. These management options are being tested in the management of infected pancreatic necrosis, comparing percutaneous drainage within the first 24 hours with the standard approach of waiting until maturation of the collection (endoscopic interventions are not included in the randomization schema).⁹ The risks of secondary infection or peritonitis with early endoscopic drainage should be balanced against the potential benefits of internalizing a pancreatic leak and shortening the time to full recovery. The present evidence does not give gastroenterologists carte blanche: the management of local adverse events still requires a thoughtful multidisciplinary discussion.

Although most readers of this editorial are probably advanced endoscopists, we would be remiss if we did not acknowledge the continued important role of interventional radiology in these cases. Percutaneous drainage represents a complementary approach to endoscopic transmural drainage; percutaneous drains serve as a pathway for video-assisted retroperitoneal debridement, and they are ideal when collections do not abut the gastroduodenal wall, cases in which transmural drainage is inadequate, or cases requiring emergent decompression such as septic shock in a patient whose condition is too unstable for endoscopy. The role of the gastroenterologist in managing pancreatic adverse events continues to expand, now with the potential for acute interventions. Market your technical capabilities, and prepare for consultation!

DISCLOSURE

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