Interventional Endoscopic Ultrasonography in the Pancreas

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KEYWORDS

- Pancreatic fluid collections (PFC) • Endoscopic transmural drainage
- EUS-Guided access • EUS-Guided pancreatic duct intervention (EUS-PDI)
- Rendezvous procedures

KEY POINTS

- The use of endoscopic ultrasonography (EUS) has greatly expanded the capabilities of therapeutic endoscopists to treat a variety of benign pancreatic disease.
- EUS facilitates the localization of inflammatory pancreatic fluid collections and may provide some key safety advantages over conventional endoscopic transmural drainage.
- Skillful application of EUS may allow for access into the pancreatic duct to provide therapy when other routes are not a possibility.

INTRODUCTION

Endoscopic ultrasonography (EUS) has become indispensable in the treatment of nonmalignant conditions of the pancreas. It is frequently used in the treatment of inflammatory pancreatic fluid collections (PFCs), and to facilitate access to the pancreatic duct when a transpapillary or transanastomotic approach is not technically feasible (see Amit H. Sachdev and Frank G. Gress article's, "Celiac Plexus Block and Neurolysis," in this issue). This article reviews the evidence and current state of the art in EUS-guided techniques for these indications.

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ENDOSCOPIC ULTRASONOGRAPHY FOR THE TREATMENT OF PANCREATIC FLUID COLLECTIONS

Background

Encapsulated inflammatory fluid collections of the pancreas manifest in 1 of 2 varieties: pancreatic pseudocysts (PP) and walled-off necrosis (WON).[1] Pancreatic pseudocysts represent collections of fluid without a solid component surrounded by an inflammatory wall, and in general form in communication with the pancreatic duct. They may develop as a delayed complication of acute pancreatitis or in the context of chronic pancreatitis. In contrast, WON represents an organized collection of necrotic debris arising as a sequelae of necrotizing acute pancreatitis.

Most PPs arising from acute pancreatitis resolve spontaneously, whereas those associated with chronic pancreatitis often persist.[2–4] The decision to treat PPs is usually based on whether they are symptomatic (eg, causing abdominal symptoms, infected, leading to gastric outlet obstruction, or impairing biliary drainage),[5] although at times there may be special indications for treatment for asymptomatic collections.[6]

Once the decision is made to treat an inflammatory fluid collection, endoscopic therapy is preferred over percutaneous catheter or surgical drainage on the basis of higher treatment success rates and lower costs and morbidity.[7,8] One of the principal endoscopic approaches used to drain these collections relies on transmural access[a], which is facilitated by the use of endosonography.

History and Present Application of Endoscopic Ultrasonography in the Treatment of Inflammatory Fluid Collections of the Pancreas

Early experience with endoscopic transmural drainage of PFCs did not use endosonography, and relied almost exclusively on a visible luminal bulge to target the site for intervention (conventional transmural drainage [CTD]).[9,10] It was not until the early 2000s that EUS was explored for this indication (EUS-guided transmural drainage [EUD])[b][11] and despite growing experience and prospective study, it was not clear that routine use of this technology was necessarily advantageous.[12] This would later be explored in 2 randomized controlled trials comparing CTD with EUD for PPs. In both studies, technical success was greater with EUD (94%–100%) compared with CTD (33%–72%).[13,14]

There was also a nontrivial frequency of crossover to EUD from CTD groups in these 2 studies. Overall 28% (n = 8 of 29) to 60% (n = 9 of 15) of patients randomized to CTD could not be successfully treated with esophagogastroduodenoscopy alone due to the absence of an identifiable luminal compression or "bulge," but were successfully treated after crossing-over to the EUS-guided method. Similarly, meta-analysis including these 2 trials (and 2 additional nonrandomized prospective studies) found overall higher technical success with EUD compared with CTD.[15] On the other hand, short-term and long-term clinical outcomes (ie, clinical and radiologic resolution

[a] An alternative endoscopic method for treating PPs relies on retrograde pancreatography and transpapillary drainage (TPD). This is sometimes considered for small (ie, <5–6 cm) PPs communicating with the main pancreatic duct, and is probably most successful in cases of partial duct disruption and where a pancreatic duct stent can be positioned to bridge the duct disruption.[32,45] Furthermore, although there has been conflicting evidence, it is not convincing that combining TPD with transmural drainage improves outcomes in the treatment of PPs.[46] Transpapillary drainage is not considered to be an appropriate option for treating WON.

[b] An echoendoscope may be used to identify an underlying fluid collection in the absence of luminal compression, and identify intervening vasculature, as well as properties and contents of the collection. Transmural access may be performed under direct EUS guidance. Alternatively, the echoendoscope may be used just to localize and mark an entry site with biopsy forceps or ink.