EUS-guided Management of Pancreatic Pseudocysts and Walled-off Necrosis

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Abstract

The outcome for endoscopic management of pancreatic fluid collections is dependent on the type of collection being treated. While pseudocysts have an excellent treatment response, the outcomes are modest for walled-off pancreatic necrosis. Recent advances in cross-sectional body imaging have enabled more accurate distinction of pancreatic fluid collections, which in turn facilitates correct triage of patients to receive the appropriate treatment. Newly described endoscopic techniques and development of dedicated accessories have improved the clinical outcomes in WOPN with treatment success rates comparable to that of minimally invasive surgery. This review summarizes the key concepts and provides a concise update on the endoscopic management of pancreatic fluid collections.

Key words: Walled-off pancreatic necrosis; pancreatic pseudocyst; endoscopic outcomes; endoscopic ultrasound; endoscopic drainage

Why is accurate distinction of pancreatic fluid collections important?

Pancreatic pseudocysts can occur as a consequence of duct leak or pancreatic inflammation and when the inflammatory process is severe, the liquefied parenchyma matures into a contained collection termed walled-off pancreatic necrosis (WOPN). While most pseudocysts and WOPN resolve without intervention, those causing pain, gastric outlet, intestinal or biliary obstruction, organ failure or infection warrant intervention. In a recent study of 211 patients with symptomatic pancreatic fluid collections (PFCs), while the rate of treatment success for sterile and infective pseudocysts was 93.5%, it was only 63.2% for WOPN.1 Therefore, clinical outcomes are directly related to the type of fluid collection being treated and hence accurate distinction is important prior to undertaking any intervention. While computed tomogram (CT) continues to serve as a ‘work horse’ for the diagnosis of pancreatitis, evaluation of local complications and as prognostic indicator of disease severity, T2-weighted magnetic resonance imaging (MRI) enables identification of solid debris within a necrotic collection and thereby determines the need for necrosectomy and other interventions.2,3 This is particularly relevant because contrast-enhanced CT cannot reliably detect necrotic debris within a PFC and inadvertent transluminal drainage of a WOPN by conventional endoscopic cystogastrostomy predisposes to infection with adverse clin-
clinical outcomes\(^4\). In one study, the sensitivity of MRI for detection of solid debris was shown to be 100% compared to only 25% for CT.\(^3\)

**Bottom line:** Correct categorization of a PFC is the first step in disease management.

**What is new in the endoscopic management of pancreatic pseudocysts?**

Two randomized trials have conclusively proven that EUS-guided transluminal drainage is associated with significantly higher rates of technical success than conventional endoscopic drainage (95% vs. 60%).\(^5,6\) Also, a retrospective study and a randomized trial have proven that the clinical outcomes of EUS-guided drainage is comparable to that of surgical cystogastrostomy.\(^7,8\) Both studies also suggest that EUS-guided drainage is associated with shorter length of hospital stay and is less costly than the surgical approach. Patients treated by endoscopy also reported better quality of life at 18-months follow-up.

One technical limitation of the EUS-based approach is the lack of dedicated accessories that necessitates multiple-steps for transluminal stent placement: puncture of the PFC using a 19G needle, passage of a stiff guide-wire, transmural fistula creation and then stent deployment. Recently, a novel lumen apposing self-expandable metal stent has been developed that can be deployed in a ‘single-step’ process.\(^9\) The stent has a dumbbell-shaped configuration that foreshortens on deployment thereby minimizing the possibility of leak or perforation. Additionally, the wider stent lumen facilitates better drainage of the cyst contents and enables passage of a gastroscope into the cyst cavity for performing necrosectomy. Despite the increasing enthusiasm for placement of metal stents, there is no data to justify their routine placement during pseudocyst drainage. In a meta-analysis that was presented at Digestive Diseases Week 2014, 14 studies involving 698 patients were evaluated and no difference was detected in the rates of treatment success between patients managed with multiple plastic stents vs. metal stents at 89% (95% CI, 87-91%) vs. 87% (95%CI, 76-91%) \(p=0.22\), respectively.\(^10\) Also, there was no difference in the rates of adverse events or pseudocyst recurrence between the two cohorts.\(^10\) In another retrospective study of 122 patients with pancreatic pseudocysts who underwent placement of single or multiple 7 or 10Fr plastic stents, the overall treatment success was 94.3% with no relationship between the size/number of stents placed and number of interventions required for treatment success.\(^11\)

**Bottom line:** Given the high technical success rates, EUS is the endoscopic modality of choice for drainage of pancreatic pseudocysts with treatment outcomes comparable to that of surgery. Also, despite its increasing use, current evidence does not support the routine placement of metal stents for drainage of pancreatic pseudocysts.

**What is new in the endoscopic management of walled-off pancreatic necrosis?**

Historically, a subgroup of patients with PFCs had poor clinical outcomes for unclear reasons. It is now becoming apparent that WOPN was erroneously misclassified as pseudocysts and inadequately treated with transmural stenting alone. Although endoscopic necrosectomy was advocated as a definitive treatment measure in patients with WOPN, the procedure is associated with high morbidity and mortality, is labor-intensive, resource consuming, and technique-specific devices are lacking. In the multicenter GEPARD study, procedure-related adverse event rate of 26% was observed with 2.1% mortality, 5.3% perforation, 14% bleeding and clinically significant air embolism in 2 patients.\(^12\) There is now growing evidence that aggressive irrigation and drainage of WOPN yields
comparable outcomes, while avoiding the major complications of direct endoscopic necrosectomy. In a randomized trial that compared minimally invasive step-up approach to open surgical necrosectomy, one third of patients managed by percutaneous drainage did not require surgery. In our opinion, treatment approaches to WOPN must improve clinical outcomes while at the same time avoiding deterioration. Superior outcomes can be achieved by tailoring the endoscopic approach to the specific characteristics of each collection. While small collections (<12 cm) with minimal debris can be managed by transluminal nasocystic drainage catheter placement, larger collections and those with extensive necrosis require placement of multiple internal conduits that are performed under EUS-guidance for better drainage. In a study of 60 patients with WOPN, treatment was successful in 91.7% of patients treated with multiple internal conduits compared to only 52.1% in patients treated by standard transluminal drainage. In our clinical practice, in patients with WOPN measuring >12cm and extending to the paracolic gutters, we place a 24Fr percutaneous catheter and create multiple internal conduits under EUS-guidance to serve as gateways for efflux of the necrotic contents. This yields successful treatment outcomes in greater than 90% of patients and precludes the need for endoscopic or surgical necrosectomy in the vast majority of patients.

**Bottom line:** EUS facilitates the creation of multiple internal conduits for better drainage of necrotic debris in patients with WOPN. However, management of WOPN involves multidisciplinary care with close collaboration between endoscopists, surgeons and interventional radiologists.

**References**