

EUS-guided drainage of pancreatic fluid collections: Double pigtails, metal biliary, or dedicated transluminal stents?

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Pancreatic fluid collections (PFCs), most notably pseudocysts and walled off pancreatic necrosis, generally require drainage when they are symptomatic (causing pain, gastric outlet obstruction, biliary obstruction, or if they are infected). Endoscopic ultrasound (EUS) guided drainage with transmural stent placement is the favored approach to draining PFCs in good candidates. Compared to surgical and percutaneous approaches, EUS-guided drainage is minimally invasive, avoids some of the potential complications of percutaneous drainage (such as formation of pancreatico-cutaneous fistulas), has lower morbidity rates, and is less expensive.^[1] EUS-guided drainage has been shown to lead to complete resolution of PFCs in 78-100% of reported cases (although many patients have symptomatic improvement without complete resolution of the PFC).^[2-11] Complications of EUS-guided drainage include secondary infection, perforation, bleeding, loss of patency of the transmural stent and/or the drainage tract, and stent migration either into the PFC or the luminal tract.

Historically, double pigtail plastic stents have been the mainstay of therapy, however the off-label use of biliary fully covered self-expandable metal stents (FCSEMSs)

and specially designed lumen-apposing metal stents with wide flanges on either end such as the AXIOS (Xlumena, Mountain View CA) and Nagi (Taewoong, South Korea) stents, are just now beginning to come into widespread use.^[8-11] Some authors have even used fully covered esophageal stents for PFC drainage.^[12,13]

Despite new advances in metal stent development and the theoretical advantages of metal stents over plastic stents, there is no universal agreement on which type of stent to use for transmural drainage of PFCs. When choosing a stent for endoscopic drainage of PFCs, double pigtail plastic stents may be favorable because they are significantly less expensive and may have a lower risk of causing mucosal injury and bleeding than metal stents if they become dislodged. Multiple plastic stents are often deployed simultaneously in hopes of more effective and complete drainage of the PFC by allowing drainage not just through but also between the plastic stents. The practice of placing multiple plastic stents is often time-consuming and tedious, and several additional procedures with stent revisions may still be required due to stent migration or loss of patency of the transenteric drainage tract.

The off-label use of FCSEMSs has become appealing for many endoscopists due to the shorter procedure time with single stent deployment and the creation of a wider diameter drainage tract (up to 10 mm).^[6] The wider diameter of biliary FCSEMSs is thought to result in faster drainage of PFCs and to facilitate more complete drainage of more viscous fluid or

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debris-filled PFCs that are seen in patients with walled off pancreatic necrosis (WOPN). Still, despite their successes, FCSEMSs are not designed to be used in this manner and can still become clogged or migrate just like plastic stents and can also cause erosions in the stomach or PFC cavity.

Recently endoscopists have seen the development and commercial release of specially designed, fully covered, transluminal self-expandable metal stents, such as the AXIOS and Nagi stents, which are designed with wide flanges on both ends to help prevent migration. These devices offer an even wider diameter (10-16 mm) than biliary FCSEMSs, have a short length, and, to some extent, can actively hold a PFC to the lumen of the stomach or the duodenum. With the wider diameter, endoscopic necrosectomy can be performed directly through these devices without having to remove them—a significant advantage. If a necrosectomy is required following drainage by plastic stents and biliary FCSEMSs, the endoscopist has to first remove the stents and then drive the scope through the drainage tract to extract the necrotic material, which often requires multiple tract dilations and scope insertions into the PFC which increases the risk of procedural morbidity, and incurs a small risk of tract disruption—a major difficulty if it develops. From a cost perspective, the biliary FCSEMSs are significantly more expensive than plastic stents, and the cost is even greater for dedicated transluminal stents.

A general assumption in the endoscopic management of PFCs is that a larger diameter stent will result in more effective drainage and fewer complications. The medical literature, however, does not completely support this assumption. A recent retrospective study of 93 patients reported treatment success rates of 93.6% using a single plastic stent and 97.4% using multiple plastic stents. Interestingly the use of a single plastic stent with smaller diameter (8.5 Fr or less) had a lower, though statistically non-significant, secondary infection rate of 3.5% while larger stent diameter (10 Fr or more) had a higher infection rate of 17.2%.^[4] A recent systematic review including 17 studies and 881 patients undergoing endoscopic treatment of PFCs with plastic versus biliary FCSEMSs reported similar pooled success rates for metal stents (81.9%) and plastic stents (80.7%), and higher pooled complication rates (such as bleeding, secondary infection, stent migration) with metal stents (23.3%) when compared to plastic stents (16.1%).^[14] Both stent types have an overall high complication rate likely due to the

high-risk nature of endoscopic PFC drainage. Plastic and metal stents also had similar success rates with treatment of specific PFC types, such as pseudocysts (85.1% and 83.3% with plastic and metal stents, respectively) and treatment of walled off necrosis (69.5% and 77.9%, respectively).^[14]

The AXIOS and Nagi stents have high reported treatment success rates of 93-100%,^[8-11] but in small studies of 10-33 patients. Recent studies report a significant range of migration rates with each stent type, including 0.67-18% with plastic stents, 0-10% with FCSEMSs, and 3-6.7% with new AXIOS and Nagi stents.^[2,3,5,6,8,9,10,11,15] The rates of secondary infection with each stent type is also widely variable in clinical studies, ranging 2.7-12% of plastic stents, 0-28% of FCSEMSs, and 0-15.2% in new AXIOS and Nagi stents.^[2,4,5,6,8,11,15] Larger studies of these devices are, no doubt, forthcoming.

Based on the current literature, one stent type cannot be clearly recommended over other types for EUS-guided transmural drainage of PFCs. Endoscopists should choose a stent type they are comfortable using and one they feel is most appropriate for each individual case. The AXIOS and Nagi stents may be preferable when necrosectomy is required, as the endoscopist can drive the scope directly through the stent and into the PFC for removal of solid necrotic material. Operator preferences and experience are also important factors that should not be discounted. Future studies may more clearly delineate which type of stent is best suited to specific PFCs.

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