

What is the best endoscopic treatment for pancreatic pseudocysts?

The management of pancreatic pseudocysts (PPs) has traditionally been surgical. Although highly effective, surgery may be associated with a complication rate of 35% and a mortality rate of 10%. This has encouraged the development of nonsurgical approaches. Percutaneous puncture and aspiration under US or CT guidance have been used, but aspiration alone was found to be ineffective, because of high recurrence rates, up to 71%. Continuous percutaneous drainage with indwelling catheters reduces the relapse rates but may be associated with a complication rate, ranging from 5% to 60%. Complications include fistula formation, infection, and bleeding.

Endoscopic transmural drainage of a PP is an alternative nonsurgical approach. Since the first reports by Sahel et al¹ and Cremer et al,² endoscopic drainage of PPs has become established. This entails the creation of a fistulous tract between the PPs and the gastric lumen (cystogastrostomy) or the duodenal lumen (cystoduodenostomy). After establishing endoscopic access to the PP, a nasocystic catheter or a stent can be placed for continuous drainage.

More recently, a Web-based survey was sent to U.S. and international members of the American Society for Gastrointestinal Endoscopy.³ Of the 3054 endoscopists to whom the survey was sent, 266 (8.7%) replied: 198 performed pseudocyst drainage (103 [52%]), and the transgastric route was the most commonly used drainage route (65%). The number of stents placed ranged from 1 to 5, and these remained in place for 2 to 30 weeks. A CT was used before drainage by 95% of all respondents. EUS imaging was used before drainage by 72 of 103 U.S. endoscopists (70%) compared with 56 of 95 international endoscopists (59%) ($P = .1$). EUS-guided drainage was used by 56% of U.S. endoscopists compared with 43% of international endoscopists ($P = .06$). The most common site of transmural entry for drainage of PPs appears to be the transgastric route. Although CT is the most commonly used predrainage imaging modality, EUS is used before and during transmural drainage of pseudocysts. But some questions still remain: (1) What is the better endoscopic treatment, the transmural or the transpapillary route? (2) What type of drainage is

better, nasocystic drain, or stent placement? (3) How many stents should be inserted, and how many times? (4) What is the role of EUS?

WHAT IS THE BEST ENDOSCOPIC TECHNIQUE?

Intervention is indicated for PPs that are symptomatic, in a phase of growth, or complicated (infected, hemorrhage, biliary, or bowel obstruction), or in those occurring together with chronic pancreatitis and when malignancy can-

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not be unequivocally excluded. The current options include percutaneous catheter drainage, endoscopy, and surgery. The choice depends on the mode of presentation, the cystic morphology, and available technical expertise. Percutaneous catheter drainage is recommended as a temporizing measure in poor surgical candidates with immature, complicated, or infected PPs. The limitations include secondary infection and pancreatic fistula in 10% to 20% of patients, which increase complications after eventual definitive surgery. Endoscopic therapy for PPs, including cystic-enteric drainage (and transpapillary drainage), is an option for PPs that bulge into the enteric lumen with a wall thickness of less than 1 cm and no intervening major vascular structures or those that communicate with the pancreatic duct above a stricture.

OUTCOMES OF PATIENTS TREATED BY TRANSMURAL ENDOSCOPIC DRAINAGE FOR PPs

Weckman et al⁴ aimed to assess the effectiveness of therapeutic endoscopy in the treatment of PPs and to define factors that limited endoscopic therapy in 170 patients

with PPs during the 6-year period from 1998 to 2003. The therapeutic endoscopy success rate was 86.1%, with 23 patients (13.9%) requiring operative treatment, because therapeutic endoscopy was unsuccessful or technically impossible. There was little morbidity and no procedure-related mortality. The majority of the 38 complications, which arose from 380 procedures, could be treated conservatively. The same results are published by Cahen et al.⁵ This retrospective study evaluated the short- and long-term results with this technique and aimed at identifying procedural modifications that would improve its safety and efficacy in 92 patients. The technical success rate of the drainage procedure was 97%, whereas mortality was 1%. Complications occurred in 31 patients (34%), 8 of which (9%) were major and required surgery: hemorrhage in 4 cases (3 of which were caused by erosion of a straight endoprosthesis through the cyst wall), secondary infection in 3, and perforation in 1. During a median follow-up period of 43 months, 10 patients (11%) underwent additional (non-endoscopic) treatment for a persistent cyst and 5 patients (5%) for a recurrent cyst. Overall, endoscopic drainage was successful in 65 patients (71%).

OUTCOMES OF PATIENTS TREATED BY TRANSPAPILLARY DRAINAGE FOR PPs

A recent study reported the results of transpapillary drainage in 30 patients.⁶ The main indications for pancreatic-duct stent placement were the following: PP, pancreatic ascites, pancreatic-duct leak after necrosectomy, and pancreaticopleural fistula. The median duration of stent placement was 6 weeks for fistulas and 10 weeks for PPs. Twenty-one patients (70%) had complete resolution. After a median follow-up of 45 months, no recurrence was noted in successfully treated patients. Hookey et al.⁷ published a comparative study on transmural and transpapillary drainage for PPs. Patient data, collection characteristics, drainage technique, and outcomes were obtained through chart review and prospective follow-up for 116 patients with attempted endoscopic drainage of symptomatic pancreatic-fluid collections. The drainage technique was transpapillary in 15 patients, transmural in 60, and both in 41. Successful resolution of symptoms and collection occurred in 87.9% of cases. No difference in success rates was observed between patients with acute versus chronic pancreatitis. No significant differences were observed regarding success when disease, drainage technique, or site of drainage was considered. Complications occurred in 13 patients (11%), and there were 6 deaths in the 30 days after drainage, including 1 that was procedure related.

WHAT TYPE OF DRAINAGE SHOULD BE USED?

The choice between a nasocystic catheter or a stent for drainage will depend upon the appearance of the cyst

contents. A chronic cyst with clear liquid contents can be drained with a 7F or 8F stent alone. On the other hand, an infected cyst mandates irrigation by nasocystic catheter, which could eventually be removed after 7 days and exchanged for a 10F stent. PPs that complicated necrotizing pancreatitis can be managed endoscopically but require aggressive irrigation and drainage over an extended period of time. One approach consists of dilating the opening with a 15-mm balloon catheter for continuous saline solution irrigation through a nasocystic catheter. Once the cyst contents are cleared, the nasocystic catheter may be exchanged for one or two 10F stents. If the transmural drainage is not effective, a surgical approach must be discussed.

HOW MANY STENTS MUST BE PLACED, AND HOW MANY TIMES?

The randomized study published in this issue of *Gastrointestinal Endoscopy* by Arvanitakis et al.⁸ showed that, in patients with chronic or acute pancreatitis with rupture of the main pancreatic duct, the stents placed into the PPs or the pancreatic collection should not be removed. The group of patients in which the stents were removed developed another pancreatic collection much more difficult to manage endoscopically. This study is the first randomized study that can definitively answer this question: "How many times do you leave the stents in place?" Regarding the use of straight stent or double pigtailed, there are no data in the literature. Cahen et al.⁵ reported, in their study, that the majority of major complications might have been prevented by using pigtail instead of straight stents.

WHAT IS THE ROLE OF EUS?

The ideal approach for PP puncture combines endoscopy with real-time EUS by using an interventional echoendoscope. Several investigators described the use of EUS longitudinal scanners for guidance of transmural punctures and drainage procedures. By using this technique, puncture of cysts under direct endosonographic control is possible, even when there is no bulging of the gastric or duodenal wall and also in patients with portal hypertension. This improves the safety of PP puncture and increases the number of patients amenable for endoscopic transmural drainage. Further, EUS-guided drainage reduces the risk of complications, eg, bleeding, by using color Doppler to access vessels between the GI wall and the cyst.

Our experience suggests that this technique allows more accurate drainage of the cysts, with a lower risk of perforation and bleeding. With regard to hemorrhage, it should be emphasized that color Doppler and power Doppler assessment rules out the risk of vascular perforation during puncture, but the risk of hemorrhage from decompression

of a vascular lesion of the cyst still remains. Giovannini et al⁹ performed EUS-guided drainages of a PP or a pancreatic abscess (PA) in 35 patients, with a mean cavity size of 7.8 cm. EUS-guided drainage was successful in 31 of 35 patients (88.5%); only 4 patients with PA underwent surgery. No major complication occurred. One patient developed a pneumoperitoneum, which was managed medically, and no bleeding occurred. One recurrence of the 15 PPs and 2 relapses of the 18 PA were observed, with a mean follow-up of 27 months (6-48 months). A trial of complete PP aspiration with continuous drainage may be an option in some patients (eg, portal hypertension). Sriram et al¹⁰ reported their experience on 8 patients with PP and portal hypertension. All patients were found to have successful resolution of the cyst at follow-up 6 weeks later. This approach provides definitive treatment of the cyst in about 30% to 40% of cases. More recently, Kahaleh et al¹¹ retrospectively compared the results of EUS-guided PP drainage versus endoscopic transmural treatment. A total of 99 consecutive patients underwent endoscopic PP management according to this predetermined treatment algorithm: patients with bulging lesions without obvious portal hypertension underwent endoscopic transmural drainage (n = 53); all others underwent EUS-guided drainage (n = 46). There were no significant differences between the 2 groups regarding short-term success (93% vs 94%) or long-term success (84% vs 91%). Complications occurred in 19% of EUS-guided treatment versus 18% with the endoscopic transmural technique. All complications but one could be managed conservatively. No clear differences in efficacy or safety were observed between conventional and EUS-guided cystenterostomy.

ENDOSCOPIC NECROSECTOMY: A NEW ALTERNATIVE FOR INFECTED PANCREATIC NECROSIS?

Open pancreatic necrosectomy is the standard treatment for infected pancreatic necrosis, but it is associated with significant morbidity, mortality, and a prolonged hospital stay. Endoscopic therapy has the potential to offer a safer and more effective alternative treatment modality. Few studies have been reported, and 2 recent papers showed promising results. Charnley et al¹² retrospectively analyzed the success of endoscopic necrosectomy as the primary treatment in selected patients with localized infected pancreatic necrosis. After the necrosis cavity was accessed by EUS, a large orifice was created, and necrotic debris was removed by using endoscopic accessories under radiologic control. Thirteen patients underwent attempted endoscopic necrosectomy. Necrosis was successfully treated endoscopically in 12 patients and required a mean of 4 endoscopic interventions (range, 1-10); 1 patient required open surgery, 2 underwent additional percutaneous necrosectomy, and 1 required laparoscopic drainage. Seewald et al¹³

published a retrospective study of the outcome of 13 consecutive patients with pancreatic necrosis and PA. The treatment included synchronous EUS-guided multiple transmural and/or transpapillary drainage procedures followed by balloon dilation of the cystogastrostoma or the cystoduodenostoma, daily endoscopic necrosectomy and saline solution lavage, and sealing of pancreatic fistula by using N-butyl-2-cyanoacrylate. Pancreatic necrosis and PAs were successfully drained in 13 patients, thus avoiding emergency surgery as an initial treatment. Surgery was avoided in 9 patients. Complications included minor bleeding after balloon dilation and necrosectomy in 4 cases, which were self-limited or controlled endoscopically. Such an aggressive endoscopic approach shows promising results and expands the potential for endoscopic treatment in patients with pancreatic necrosis and/or PA.

CONCLUSION

An endoscopic approach is the first-line therapy for PPs and other pancreatic collections. Endoscopic transmural drainage is the best technique for bulging PPs, whereas EUS-guided drainage is required for nonbulging pancreatic collections and in patients with portal hypertension. Stents must be left in place in patients with chronic pancreatitis or acute pancreatitis with disruption of the pancreatic duct. But, further randomized studies will be necessary to find the optimal endoscopic technique.

DISCLOSURE

The author has no conflicts of interest to disclose.

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