EUS-Guided Drainage in the Pancreatobiliary Disease

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Introduction

Endoscopic ultrasound (EUS) was developed as a diagnostic modality but rapidly gained a role for a variety of therapeutic applications. Endoscopic ultrasonography (EUS)-guided cholangio pancreatic drainage has been reported as an alternative to surgery or percutaneous transhepatic cholangiography if endoscopic retrograde cholangiopancreatography (ERCP) is unsuccessful. Its concept includes EUS-guided access into a dilated biliary tree or main pancreatic duct, creation of a transenteric fistula deployment of a stent across the fistula or the ampulla after a rendezvous-type procedure. EUS-guided cholangio-drainage may be performed in a transhepatic or extrahepatic fashion, whereas EUS-guided pancreatic drainage can be antegrade or retrograde. Their respective efficacy can be measured by resolution of biliary obstruction or pain improvement in case of pancreatic drainage. The current literature shows that ECPD has an acceptable success and complication rate and might be considered as first-line therapy in centers offering expertise in EUS and ERCP.

EUS-guided Pancreatic Drainage

1. EUS-guided drainage of pancreatic pseudocysts

Pancreatic pseudocysts (PPC) are reported to complicate between 10% and 20% of patients with acute and chronic pancreatitis. Most of these pseudocysts are asymptomatic and do not require treatment. Spontaneous regression of PPCs is reported to occur in 7% to 60% of patients. For PPCs complicating chronic pancreatitis, drainage is indicated to relieve symptoms associated with a space-occupying mass, including neighboring organ compression. The traditional endoscopic approach to transmural drainage of pseudocysts relies on the presence of an intraluminal bulge and/or accurate cross-sectional imaging techniques to detect the location of the pseudocyst and determine the distance between the pseudocyst and gastric wall. Despite this information, avoidance of interposed vasculature can be challenging.

A second randomized study was published in 2009 and came to a different conclusion, suggesting that EUS-guided PPC drainage is equivalent to EGD, and should be performed in nonbulging PPCs. The rate of technical success of the drainage was higher for EUS (94%) than for EGD (72%; P =0.03). Complications developed in 7% of the EUS group and in 10% of the EGD group (P = 0.67). During short-term follow-up, PPC resolution was achieved in 97% (28/29) in the EUS group and in 91% (19/21) in the EGD group (P = 0.56). Long-term results analyzed on a per-protocol basis showed no significant difference in clinical outcomes between EUD (89%) and conventional transmural drainage (86%). Recently, a large study on EUS-guided PPC drainage showed a low rate of complications. Of 148 patients who underwent EUS, perforation was encountered at the site of transmural stenting in 2 (1.3%) patients with a PPC in the uncinate. Other complications included bleeding in 1 (0.67%), stent migration in 1 (0.67%), and infection in 4 (2.7%) patients. Bleeding occurred in a patient with underlying acquired factor VIII inhibitors. Whereas 2 patients who devel-
oped postprocedural infection and 1 with stent migration were managed endoscopically, both perforations required surgery.

It is now becoming apparent that WOPN was erroneously misclassified as pseudocysts and inadequately treated with transgastric stenting alone. Endoscopic necrosectomy was advocated as a definitive treatment in patients with WOPN, but this procedure have high mortality and morbidity. EUS facilitate the creation of multiple internal conduits for better drainage of necrotic debris in patients with WOPN.3

In summary, EUS-guided PPC drainage improves the safety of PPC endoscopic drainage and increases the number of patients suitable for this procedure by avoiding percutaneous and surgical drainage, which are associated with higher morbidity and mortality. Therefore, the EUS-guided procedure seems to be the best and safest technique for transmural endoscopic pseudocyst drainage, and should be considered the first-choice option.

2. EUS-guided pancreaticogastrostomy

The pain associated with chronic pancreatitis is caused, at least in part, by ductal hypertension. Both surgical and endoscopic treatments can relieve pain by improving ductal drainage. The development of interventional EUS has provided better access to the region of the pancreas. The main indications are stenosis of pancreaticojejunostomy or pancreaticogastrostomy after Whipple resection that induces recurrent acute pancreatitis, main pancreatic duct stenosis caused by chronic pancreatitis, and post-acute pancreatitis or post-pancreatic trauma after failure of ERCP. EUS-guided pancreaticogastrostomy (EPC) or bulbostomy (EPB) offers an alternative to surgery.

The results of the 3 series of patients published thus far are much too preliminary in nature to recommend wider use of EPG, which in any case should be restricted to tertiary centers specializing in biliopancreatic therapy.4–6 Although pain relief can be accomplished in up to 70% of cases, the complication rate is still high, around 15%, including bleeding, pancreatic collection, and perforation. EUS-guided pancreatic drainage offers an alternative to surgery, and the best results in the 3 series published were shown for this indication. On the other hand, surgery should be considered as the salvage treatment of chronic pancreatitis after failure of the endoscopic route.

EUS-guided Biliary Drainage

1. EUS-guided gallbladder drainage

EUS-guided gallbladder drainage (EGBD) is much more complex than percutaneous gallbladder drainage, and has been reported in less than 100 patients, predominantly from Korea and Japan. Novel technology and recent evidence has emerged that may result in rapid dissemination of EGBD. Endoscopic drainage of the gallbladder is sometimes chosen as an alternative to percutaneous cholecystostomy in high surgical risk patients with cholecystitis. Endoscopic gallbladder drainage can be performed retrogradely at ERCP by plastic stent insertion or ENBD catheter through the cystic duct.7 Alternatively, it can be performed by transmural placement of plastic or metal stents following EUS-guided access. gallbladder is punctured from the distal antrum or the duodenum, resulting in choledochogastrectomy or cholecystoduodenostomy, respectively,8 in the same way as in EUS guided pseudocyst drainage.

A randomized controlled trial comparing EGBD and percutaneous transhepatic gallbladder drainage has been reported from Korea.9 Technical and clinical success rates were close to 100% in both treatment arms. There were no differences in the incidence of complications. A proprietary novel lumen-apposing metal stent (LAMS) Axios® (X-Lumena, Mountain View, CA, USA) has successfully been tested in experimental and clinical settings.10,11 The goals of the Axios® LAMS are to provide larger caliber for drainage than plastic pig-tail stents and to minimize the risk of leakage.
2. EUS-guided bile duct drainage

EUS-guided cholangiography has evolved as a technique for gaining access to the bile ducts in patients where conventional ERCP has failed or was not possible due to altered surgical anatomy. Due to the close proximity to the gastrointestinal tract, the left intrahepatic ducts, common bile duct, and main pancreatic duct are well visualized with EUS and can be accessed with either a transgastric or transduodenal approach. As a general rule, three EUS-guided approaches have been used to decompress the biliary system: choledochoduodenostomy (EUS-CD), hepaticogastrostomy (EUS-HG), and EUS-guided rendezvous through accessing either the left intrahepatic ducts or common bile duct with conversion to conventional ERCP.

Safety and efficacy remain to be indisputably proven, despite claims by ESCP enthusiasts. High success rates around 90 % and low complication rates around 10 % have consistently been reported recently from expert centers. But early experience from high-volume centers is more sobering, with complication rates above 30 %. A multicenter study reported a success rate of 67 % with 23 % complications (including 3 % mortality) during the learning phase of EUS guided cholangiography. In this study, authors from 19 centers submitted data on all attempted cases, whether failed or successful. This study represents the best available evidence to counter publication bias on this subject, and it raises the issue of the need for and the definition of adequate training. Complications included bile leak, minor bleeding, and self-limited pneumoperitoneum. Overall, the success rate was 91 percent with a complication rate of 17 percent and only one major complication (bile leak, 4 percent).

EUS-guided Abscess Drainage

Abdominal and pelvic abscesses have traditionally been drained by percutaneous techniques or surgery. While surgical drainage is associated with considerable morbidity and mortality, percutaneous techniques are associated with the need for multiple interventions, increased length of hospital stay, and an indwelling external catheter for prolonged periods. Endoscopic ultrasound (EUS) is a minimally invasive but highly effective technique that enables internal drainage of the abscess (liver, intra-abdominal lesion). Although data are limited, evidence supporting its clinical efficacy is increasing rapidly.

Conclusions

EUS-guided cholangiopancreatography with drainage and abscess drainage is technically feasible and relatively safe in the hands of experienced interventional endoscopists skilled in both ERCP and EUS. This technique offers a potential alternative to surgery in patients in whom conventional ERCP is unsuccessful or not possible. However, the risk of complications including biliary peritonitis, pancreatitis, bleeding, perforation, and stent migration needs to be evaluated in larger numbers of patients with longer follow-up to determine the true potential for this approach. Currently, this procedure should be reserved for tertiary centers with highly skilled endoscopists using a multidisciplinary approach (ie, pancreatic surgeons, interventional radiologists) to these challenging cases.

References