## ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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# Current Status of Endoscopic Stenting of the Pancreatic Duct as Prophylaxis Against Post-ERCP Pancreatitis



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**G&H** How common is prophylactic stenting of the pancreatic duct to prevent the development of post–endoscopic retrograde cholangiopancreatography pancreatitis?

**MLF** The use of prophylactic stenting varies among practicing endoscopists, but prophylactic stents are almost universally used by advanced endoscopists in highrisk patients, such as those with suspected sphincter of Oddi dysfunction, those with difficult cannulation, those undergoing ampullectomy, and those undergoing pancreatic endotherapy (Figure 1). Recently, there has been an increase in the number of standard indications for using prophylactic stents to reduce the risk of post–endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis; however, penetration of these indications into practice remains variable. At our tertiary center, where many high-risk patients are treated, pancreatic stents are placed in approximately half of all ERCP patients.

## **G&H** Should pancreatic duct stenting be considered the standard of care for preventing post-ERCP pancreatitis?

**MLF** Yes, at this time, pancreatic duct stenting should be the standard of care for preventing post-ERCP pancreatitis in patients considered to be at high risk for developing this complication. Failure to place pancreatic stents has recently been the basis of malpractice lawsuits.

**G&H** Which types of stents are most effective for preventing post-ERCP pancreatitis?

**MLF** There has been much debate regarding the best configuration of stents for preventing post-ERCP pancreatitis. Some endoscopists prefer very small caliber (3 French [Fr]), long (8–12 cm), unflanged stents with a single pigtail, whereas other endoscopists prefer short (2-3 cm), straight stents of larger caliber (4 Fr or 5 Fr). At least 1 published trial has shown little difference in risk reduction between the 2 stent configurations. 3 Fr stents have the advantages of not needing a flange, having a high spontaneous passage rate, and being associated with a low risk of duct injury. However, these stents require the use of a small caliber (0.018 inch or 0.021 inch) wire passed to the tail of the pancreas around the genu, which can be challenging-and occasionally impossible-and requires substantial manipulation. Short stents require passing only a minimal length of guidewire, but they often require an inner flange in order to maintain their position and avoid too-quick spontaneous expulsion. A new type of stent is made from softer material with altogether different characteristics. At our institution, we have switched to these stents, both the short type (2-3 cm) with inner flanges and the long type (9-11 cm) without flanges. Retention and spontaneous passage rates appear to be very good, and duct abnormalities have been minimal with these types of stents.

Regardless of which type of stent is used, medium length (4–6 cm) stents are generally not recommended, as they usually push into the genu (ie, turn in the duct). Longer stents that are placed beyond the genu in normal, small ducts should be of a small caliber (3 Fr or, at most, 4 Fr if the stents are made from a soft material).



**Figure 1.** A prophylactic pancreatic stent draining clear pancreatic juice in a patient who has just undergone biliary sphincterotomy.

### **G&H** What are the most important guidelines for pancreatic stent placement?

**MLF** Most importantly, endoscopists should gain familiarity with the placement of guidewires into the pancreas as well as the placement of stents in a safe and effective manner. Procedures involving the pancreatic duct are substantially different from those involving the biliary system, with which most endoscopists are highly familiar. Pancreatic procedures require small-caliber wires, finesse, and specific expertise.

The placement of pancreatic stents to reduce the risk of post-ERCP pancreatitis is suggested in the following settings: sphincter of Oddi dysfunction (suspected or documented, regardless of manometry findings); difficult cannulation involving pancreatic instrumentation or injection; aggressive instrumentation of the pancreatic duct (eg, brush cytology); pancreatic guidewire placement during biliary cannulation; pancreatic sphincterotomy (major or minor papilla); precut sphincterotomy starting at the papillary orifice; balloon dilation of an intact biliary sphincter; prior post-ERCP pancreatitis; and endoscopic ampullectomy. The use of pancreatic stents is not suggested in lower-risk patients (those who are older or have an obstructed pancreatic duct) who are undergoing a low-risk procedure; pancreatic ducts that have not been injected with contrast material and that have undergone limited guidewire manipulation in low-risk patients; needle-knife precut or fistulotomy starting above the orifice in the absence of other risks; doubtful feasibility of successful pancreatic wire access and stent placement; and biliary therapy in patients with pancreas divisum.

**G&H** When placing a prophylactic pancreatic duct stent, how should endoscopists proceed if they have difficulty identifying or accessing the pancreatic duct orifice?

**MLF** If no contrast injection or guidewire instrumentation of the pancreatic duct has occurred, the endoscopist should reconsider how aggressive to be in locating the duct. In very high-risk patients—such as those with sphincter of Oddi dysfunction or those undergoing ampullectomy—preprocedure imaging with magnetic resonance cholangiopancreatography (MRCP) or endoscopic ultrasound (EUS) prior to ERCP is useful to outline the anatomy of the pancreatic duct. Such imaging may offer a clue as to the location of the pancreatic duct. Overall, the endoscopist must weigh the risk of manipulation against the likelihood of success and the benefit of pancreatic stenting.

## **G&H** Should a pancreatic duct stent be placed in a high-risk setting with "clean" biliary cannulation and no instrumentation of the pancreatic duct?

**MLF** In general, pancreatic stenting is not necessary in this situation. However, there are several scenarios for biliary therapy in which pancreatic duct access is highly recommended as a primary or secondary goal. These scenarios include endoscopic ampullectomy and sphincterotomy in patients with sphincter of Oddi dysfunction. In addition, in patients with pancreas divisum, there is no point accessing or stenting the tiny ventral pancreas. Pancreas divisum is present in approximately 7% of the Western population and may be apparent after careful examination of MRCP, EUS, or even coronal images on computed tomography.

**G&H** How much is the risk of post-ERCP pancreatitis reduced, even in otherwise highrisk settings, if the pancreatic duct has not been entered with a catheter or guidewire (with or without contrast injection)?

**MLF** The exact risk reduction in this scenario has not been well studied. Likely the most important settings in which to locate and stent the pancreatic duct, despite absence of intended instrumentation, include endoscopic ampullectomy and biliary sphincterotomy in sphincter of Oddi dysfunction, both situations in which thermal injury may be substantial to the pancreatic sphincter. However, it should be remembered that the risk of post-ERCP pancreatitis is fairly substantial without pancreatic injection or instrumentation at all (up to 2–3%). It is now clear that repeated pancreatic guidewire passage (such as when performed as an aid to biliary cannulation) increases the risk of pancreatitis and may be an indication for pancreatic stent placement.

## **G&H** Should nonsteroidal anti-inflammatory drugs be used instead of (or with) pancreatic stents to prevent post-ERCP pancreatitis?

**MLF** Meta-analyses, as well as a recent multicenter randomized trial conducted by Elmunzer and colleagues, have shown that rectal nonsteroidal anti-inflammatory drugs (NSAIDs) such as indomethacin reduce post-ERCP pancreatitis by approximately 50%. The study conducted by Elmunzer and colleagues included high-risk patients, of whom 80% received pancreatic stents. However, the incidence of post-ERCP pancreatitis was still 9% in patients receiving NSAIDs compared to approximately 17% in patients who did not receive NSAIDs. Although this finding represents an improvement in post-ERCP pancreatitis, 9% is still fairly high. Thus, NSAIDs are likely a useful adjunct, but they are unlikely to be a panacea, particularly in patients at high risk of post-ERCP pancreatitis, such as patients with sphincter of Oddi dysfunction or pancreatic divisum who are undergoing pancreatic instrumentation or pancreatic sphincterotomy.

#### **G&H** Do you use NSAIDs in these patients?

**MLF** Yes, my colleagues and I routinely give rectal indomethacin 100 mg to high-risk patients at the end of ERCP. However, the administration of NSAIDs has not reduced our use of pancreatic stents. Despite the use of both protective strategies, post-ERCP pancreatitis still occurs in some patients.

#### **G&H** What are the next steps for research?

**MLF** The most important issue to examine is whether NSAID monotherapy can replace the use of prophylactic pancreatic stents and, if so, in which patients. It is unlikely that pancreatic duct stenting can be eliminated in very high-risk patients who are undergoing aggressive pancreatic instrumentation or sphincterotomy. This substitution may be useful in medium-risk patients who have difficult cannulation but limited pancreatic instrumentation. A study is currently being planned to examine this issue.

#### Suggested Reading

Elmunzer BJ, Scheiman JM, Lehman GA, et al. A randomized trial of rectal indomethacin to prevent post-ERCP pancreatitis. *N Engl J Med.* 2012;366:1414-1422.

Dumonceau JM, Rigaux J, Kahaleh M, Gomez CM, Vandermeeren A, Devière J. Prophylaxis of post-ERCP pancreatitis: a practice survey. *Gastrointest Endosc*. 2010;71:934-939, 939.e1-2.

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### **G&H** What is needed before widespread adoption of this procedure can occur?

**LLS** More research is needed regarding the problem of gastroesophageal reflux disease following POEM; it may be possible to decrease this complication by changing the technique in some fashion; but this needs to be worked out. POEM is an advanced endoscopic surgery along the lines of endoscopic submucosal dissection, so practitioners will need to develop these skills before performing POEM. Although POEM is an endoscopic procedure, it is very much a surgical procedure as well. For some time, POEM should be performed under controlled circumstances in an operating room with surgical backup, and it should only be performed by doctors with experience and knowledge of achalasia.

Nevertheless, I think POEM will replace balloon dilation and laparoscopic Heller myotomy in 3 years, as POEM has comparable efficacy and costs, is painless, and allows patients to return to work in 3 days.

### **G&H** Does POEM have applications for managing other esophageal diseases?

**LLS** POEM has frequently been used to treat other primary esophageal motility disorders such as hypertensive lower esophageal sphincter and Nutcracker esophagus. It has also been used for a long myotomy to treat diffuse esophageal spasm, although its results in this setting have not been quite as good.

### **G&H** Are there any other promising treatments for achalasia currently under investigation?

**LLS** Research is currently being conducted on stem cell injections and neurotransmitter manipulations. In addition, we have been working for several years on a pacemaker for the esophagus, but this device is far from completion.

#### **Suggested Reading**

von Renteln D, Inoue H, Minami H, et al. Peroral endoscopic myotomy for the treatment of achalasia: a prospective single center study. *Am J Gastroenterol.* 2012;107:411-417.

Eleftheriadis N, Inoue H, Ikeda H, et al. Training in peroral endoscopic myotomy (POEM) for esophageal achalasia. *Ther Clin Risk Manag.* 2012;8:329-342.

Ren Z, Zhong Y, Zhou P, et al. Perioperative management and treatment for complications during and after peroral endoscopic myotomy (POEM) for esophageal achalasia (EA) (data from 119 cases). *Surg Endosc.* 2012 May 19. Epub ahead of print.