ADVANCES IN ENDOSCOPY

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An Overview of Endoscopic Ultrasound–Guided Gastroenteric Anastomosis

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G&H What are the indications for a gastroenteric anastomosis?

MK The main indication for a gastroenteric anastomosis is gastric outlet obstruction of either benign or malignant etiology. Other emerging indications include treatment of afferent loop syndrome and facilitation of access to the ampulla or bilioenteric anastomosis.

G&H What methods are typically used to create an anastomosis?

MK Historically, patients with a malignant gastric outlet obstruction were treated with a surgical procedure, such as a gastrojejunostomy. The surgical procedure can be either open or laparoscopic, with the latter being more common. This approach is very effective; however, patients undergoing a surgical procedure are typically end-stage or sick and are not the best candidates for an operation that is invasive and carries associated morbidities (eg, wound infection, hospital-acquired infections, gastroparesis). Thus, the treatment shifted to an endoscopic approach involving the placement of duodenal metal stents across the tumor, which is less invasive than surgery and is relatively easy and straightforward. Although the endoscopic procedure is immediately effective, patients may experience a recurrence of symptoms of gastric outlet obstruction due to tumor ingrowth or overgrowth through the stent, typically within 2 to 3 months following the procedure. To eliminate the risk of tumor ingrowth or overgrowth, endoscopists are now anastomosing the stomach to a loop of the small bowel away from the site of obstruction and downstream to the tumor. This is done under endoscopic ultrasound guidance and using a lumen-apposing metal stent. This approach replicates a surgical anastomosis while taking advantage of minimal invasiveness supplied by endoscopy.

> Balloon dilation is effective in approximately 90% to 95% of patients with benign strictures.

G&H Are there any other differences between the surgical and endoscopic procedures?

MK The main differences are the invasiveness and morbidity. Another difference relates to the size of the gastroenteric anastomosis. The surgical anastomosis is larger, at approximately 25 to 30 mm. The current lumen-apposing metal stents have a maximum diameter of 15 mm, although a stent with a 20-mm diameter is

currently undergoing review by the US Food and Drug Administration (FDA) and is expected to be commercially available this year.

G&H Which type of stent is used with the endoscopic approach?

MK A lumen-apposing metal stent is used during the endoscopic procedure to appose the lumen of the stomach to the lumen of the small bowel. In the United States, the AXIOS stent (Boston Scientific) is the only lumen-apposing metal stent approved by the FDA. The SPAXUS stent (Taewoong Medical), also appropriate for a gastroenteric anastomosis, is available in Asia.

... patients are advised to stick to a low-fiber diet for as long as the stent is in place.

G&H What is the success rate of the lumen-apposing metal stent?

MK The technical success rate with the lumen-apposing metal stent, defined as successful stent placement in the correct position, is approximately 95%. Clinical success, which is determined by the patient being able to resume an oral diet, is also seen in most of the patients who attain technical success. Of note, the risk of recurrent obstruction due to stent obstruction is significantly higher in patients who undergo duodenal stenting as opposed to lumen-apposing metal stenting.

G&H How significant is the learning curve to place a stent?

MK The placement of a lumen-apposing metal stent is more technically challenging than a duodenal stent, and it is only performed at select centers in the United States and abroad, making the procedure less widely available.

G&H Can balloon dilation be used for the treatment of gastric outlet obstruction?

MK Balloon dilation is effective in approximately 90% to 95% of patients with benign strictures. Most strictures are caused by hyperacidity, medications, or *Helicobacter pylori*, and typically resolve when dilated. In patients who are refractory to medical treatment and dilation, a stent can be placed. The main issue in this instance is that stents that are made for malignant strictures (ie, uncovered stents) are not suitable for benign strictures because they are not removable. Covered stents can be used for benign strictures but are associated with a very high risk of migration.

It should be noted that balloon dilation has no role in treating malignant obstruction; there is a 3% to 9% risk of perforating a malignant stricture, which is significant. Additionally, balloon dilation in this setting is ineffective because the tumor remains in place, and the patient only experiences relief for approximately 48 hours before symptoms return.

G&H What other adverse events are associated with the endoscopic ultrasound–guided gastroenterostomy approach?

MK The most common serious adverse event is misdeployment of the stent due to the technically challenging nature of the procedure as well as the significant learning curve. However, my colleagues and I conducted a study that showed that no misdeployment occurred after the first 5 procedures, thus emphasizing the importance of training and experience. Bleeding is a less common adverse event, although it does still occur. The risk of bleeding can be minimized with the use of Doppler ultrasound that allows endoscopists to see any intervening vessels. Another late adverse event is stent obstruction by food. Typically, it is caused by indigestible food, such as fiber. Therefore, patients are advised to stick to a low-fiber diet for as long as the stent is in place.

G&H Are there any patients in whom the endoscopic approach is contraindicated?

MK Patients should avoid undergoing this procedure if they have a contraindication to sedation, uncorrectable coagulopathy (which leads to a higher risk of bleeding), an inadequate window between the stomach and the jejunum, or large-volume ascites in the peritoneum.

G&H What kind of follow-up care is necessary?

MK The patient receives antibiotics during the procedure, and the need for antibiotics postprocedure is debatable. Most centers actually are not currently administering postprocedural antibiotics. Patients are typically admitted for observation overnight and the next day are started on a liquid diet. Once patients are able to tolerate a liquid diet, they can be sent home and advance, as tolerated, to a low-residue diet. Patients are educated

about symptoms of stent obstruction or recurrent gastric outlet obstruction (eg, increased nausea, vomiting, inability to keep food down) and are told to return if these symptoms appear.

G&H Can this procedure be repeated if necessary?

MK Yes. Typically, if the stent is obstructed by food, the clinician can just dislodge the food and clean the stent. In general, there is no risk of tissue or tumor ingrowth, and I have not had any patients who needed a stent replacement.

G&H What are the priorities of research in this field?

MK Research is needed to determine which of the various techniques available is optimal for creating an endoscopic ultrasound–guided gastroenteric anastomosis. It is also important to compare endoscopic ultrasound–guided gastroenterostomy to duodenal stenting, which is the current standard of care. Lastly, it would be beneficial to find the best way to teach this procedure and disseminate it so that it can potentially become the new standard of care at tertiary centers.

Dr Khashab serves as a consultant for Boston Scientific.

Suggested Reading

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