ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

Section Editor: Todd H. Baron, MD

Gastric Peroral Endoscopic Myotomy for Gastroparesis

Ryan J. Law, DO
Assistant Professor
Division of Gastroenterology
University of Michigan
Ann Arbor, Michigan

G&H Can you please provide a brief overview of gastroparesis?

RL Gastroparesis is a disorder in which the stomach empties in a slower manner than usual, which prevents emptying of food contents. It has a variety of causes but most commonly occurs as a consequence of diabetes mellitus or as an adverse event following certain foregut surgeries. Moreover, a subgroup of patients may develop this condition without any obvious cause.

G&H How are severe and refractory gastroparesis defined?

RL The definitions can vary, but typically, severe gastroparesis is based on the totality of symptoms and their impact on quality of life. These can be measured and quantified by validated measurement tools such as the Gastroparesis Cardinal Symptom Index (GCSI) score. The GCSI is a symptom-based index that measures the severity of various gastrointestinal symptoms on a scale of 1 to 5, with higher scores representing more severe disease. Refractory gastroparesis generally applies to patients who have tried various forms of therapy, such as promotility agents, antiemetics, or botulinum toxin injections, without durable or sustained response.

G&H What is gastric peroral endoscopy myotomy?

RL Gastric peroral endoscopy myotomy (G-POEM) is an endoscopic procedure that is performed by creating a short submucosal tunnel in the distal stomach, often along the greater curvature of the stomach. The pylorus is subsequently identified within the submucosal tunnel and divided with an electrocautery device with a goal to minimize any resistance to food passage that may have been related to pylorospasm. G-POEM evolved from the esophageal POEM procedure used to treat achalasia, as both achalasia and gastroparesis share similar pathophysiologic mechanisms.

G&H What are the main benefits and limitations of G-POEM?

RL G-POEM is a minimally invasive procedure that can be performed safely by skilled endoscopists, minimizing the need for more invasive procedures. Overall, the procedure is well tolerated with a shorter recovery period compared with surgery. As with any procedure, there are certain risks and potential adverse events that patients should be aware of before undergoing G-POEM; however, the risk profile is acceptable.

G&H What adverse events are associated with this procedure?

RL The most common significant adverse event is intraprocedural bleeding. During the G-POEM procedure, endoscopists often encounter submucosal vessels or perforating vessels traversing the gastric muscle. The distal stomach and proximal small intestine have a very significant vascular supply with some large branching vessels that have a high risk for bleeding during the procedure.

Perforation of the mucosal flap is another risk. When there is inadvertent damage to the mucosa in an area where gastric muscle has been divided, patients are at risk for infection of the abdomen. Symptomatic accumulation of carbon dioxide in the abdomen may require decompression in certain cases.

G&H How can these adverse events be managed when they do occur?

RL Intraprocedural bleeding, which is more common than delayed bleeding, is typically managed using hemostatic forceps. The forceps are connected to an electrosurgical generator, which applies a soft current to the bleeding vessel to induce coagulation of the blood vessel.

> Most experts believe that patients who have a demonstrated benefit to botulinum toxin injection of the pylorus ... have a reasonable chance of responding to G-POEM.

Occasionally, bleeding occurs from small vessels. In those circumstances, the endoscopic submucosal knife being used for the procedure may be sufficient to gently coagulate the vessel.

A true perforation, in which both the muscle and the overlying gastric mucosa are damaged, is fairly rare. Deep damage just to the muscle layer is more common than damage to both layers and can lead to capnoperitoneum, in which carbon dioxide enters the abdomen and creates tension. Needle decompression is required to manage this complication; a 14-gauge angiocatheter, a Veress needle, or a scalpel can be used to puncture the abdomen and allow air to drain. Inadvertent mucosal damage can generally be closed with hemostatic clips at the end of the procedure.

G&H How does G-POEM compare to surgical pyloroplasty or other treatments for gastroparesis in terms of safety and efficacy?

RL There is a lack of high-quality, randomized studies comparing surgical pyloroplasty or pyloromyotomy to the peroral endoscopic approach. However, available retrospective studies and comparative cohorts suggest an equivalent efficacy and safety profile.

G&H Have any studies evaluated the clinical and technical success rates of G-POEM?

RL The majority of available studies suggest a technical success rate well above 90%. Clinical success varies depending on how it is defined. Most studies define clinical success using a specified degree of improvement in the GCSI as the primary outcome; however, other studies use gastric emptying study, a radiologic scintigraphic study, to define clinical success. The population of patients who undergo G-POEM is heterogeneous, with a variety of causes for gastroparesis as well as a range of other medical comorbidities and, often, psychosocial issues. Patients who have improvement in their gastric emptying study but experience persistent or worsened symptoms are difficult to interpret. Most experts in the field suggest that a clinical success rate greater than 65% or 70% is acceptable.

G&H In whom is G-POEM contraindicated?

RL The contraindications for G-POEM are largely the same as those for any elective endoscopic procedure. Patients who do not have a pylorus or who have had major gastrointestinal surgery that leaves them with an altered gastrointestinal tract involving the stomach are not candidates for this procedure. G-POEM is also contraindicated for patients who are pregnant or who have an uncorrectable coagulopathy. By and large, if the pylorus is accessible, then the procedure could be performed.

G&H What is the role of fluoroscopy-guided G-POEM in the treatment of refractory gastroparesis?

RL Fluoroscopy-guided G-POEM is beneficial for patients who have a gastric pacemaker. When creating the submucosal tunnel and/or performing the myotomy, endoscopists can use fluoroscopy to identify and avoid the leads for the gastric pacemaker.

G&H What are the long-term outcomes of G-POEM, and are there any predictors for success following this procedure?

RL Data on long-term outcomes and predictors are not readily available; G-POEM was first reported in 2013 and is not yet a mainstream procedure. There are ongoing multicenter studies aimed at answering these questions.

As it stands today, there are conflicting data to suggest which patients may be optimal candidates. Early studies suggested that postsurgical gastroparetics may be the best patients to undergo this procedure, whereas more recent studies propose that patients with other subtypes of gastroparesis may have better response. Most experts believe that patients who have a demonstrated benefit to botulinum toxin injection of the pylorus—even if that benefit is short lived—have a reasonable chance of responding to G-POEM. However, this belief is largely anecdotal rather than borne out of the literature.

G&H What type of follow-up is needed?

RL Patients are followed up in a variable manner based on their institution; there is no standardized plan. At my institution, patients return after 1 month to ensure that no major issues occurred postprocedure. After that, follow-up is largely dependent on how well the patient is doing clinically. Patients who do poorly may require more frequent visits to initiate additional medications or other therapies, whereas patients who have dramatic symptom improvement or complete symptom resolution likely do not need to be seen more than once or twice a year.

G&H What are the priorities of research?

RL Identifying predictors for a successful outcome and generating long-term data are of the highest priority. If we are able to determine that a certain subset of patients are unlikely to benefit from this procedure, then we can avoid unnecessary risk by pursuing an alternative intervention. Contrarily, subgroups with demonstrated benefit should be targeted. Multicenter studies on G-POEM are underway and may provide this necessary information.

Dr Law serves as a consultant for Olympus America.

Suggested Reading

Aghaie Meybodi M, Qumseya BJ, Shakoor D, et al. Efficacy and feasibility of G-POEM in management of patients with refractory gastroparesis: a systematic review and meta-analysis. *Endosc Int Open*. 2019;7(3):E322-E329.

Mekaroonkamol P, Shah R, Cai Q. Outcomes of per oral endoscopic pyloromyotomy in gastroparesis worldwide. *World J Gastroenterol*. 2019;25(8):909-922.

Mohan BP, Chandan S, Jha LK, et al. Clinical efficacy of gastric per-oral endoscopic myotomy (G-POEM) in the treatment of refractory gastroparesis and predictors of outcomes: a systematic review and meta-analysis using surgical pyloroplasty as a comparator group [published online October 3, 2019]. *Surg Endosc*. doi:10.1007/s00464-019-07135-9.

Xu J, Chen T, Elkholy S, et al. Gastric peroral endoscopic myotomy (G-POEM) as a treatment for refractory gastroparesis: long-term outcomes. *Can J Gastroenterol Hepatol*. 2018;2018:6409698.