



Gastroplasty with endoscopic myotomy for the treatment of obesity

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BACKGROUND

Endoscopic bariatric and metabolic therapies work by a variety of different mechanisms. A common target is the delay of gastric emptying (Fig. 1). Intra-gastric balloons and endoscopic sleeve gastroplasty (ESG) have both been shown to prolong gastric emptying. The original primary obesity surgery endoluminal procedure involved the placement of plications in the gastric fundus to limit accommodation, and other devices have directly targeted gastric emptying by disrupting the antral pump function of the stomach (Fig. 2).

ENDOSCOPIC METHODS

We propose a novel weight loss procedure that addresses multiple aspects of gastric motility in an attempt to delay gastric emptying. Gastroplasty with endoscopic myotomy (GEM) involves a pylorus sparing antral myotomy via a submucosal tunneling technique, a running suture (belt) in the distal gastric body, and a standard ESG in the gastric body. Together, these procedural elements are hypothesized to reduce fundal accommodation due to shortening of the stomach, disrupt mixing and breakdown of food due to the gastric body and distal belt sutures, and inhibit emptying by disruption of the antral pump from the pylorus-sparing antral myotomy (Fig. 3).

Abbreviations: ESG, endoscopic sleeve gastroplasty; GEM, gastroplasty with endoscopic myotomy.

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2468-4481

<https://doi.org/10.1016/j.vgie.2022.12.004>

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CASE PRESENTATION

A 42-year-old woman with class III obesity and inadequate weight loss with lifestyle modification and medications, including phentermine and topiramate, underwent the GEM procedure. This video (Video 1, available online at www.videogie.org) demonstrates the major steps of her procedure. The antral sparing myotomy was partial thickness extending from 5 mm proximal to the pylorus, a total of 6 cm in length, stopping 2 cm distal to the submucosal access site (Figs. 4 and 5). Seven stitches were placed in the distal belt, and ESG using a typical U-suture pattern was performed in the gastric body. Follow-up upper GI series showed a narrow gastric body with reduced motility. T_{1/2} on gastric emptying breath test went from 97.6 minutes at baseline to 216 minutes at 2 weeks after the procedure, with a normal Gastroparesis Cardinal Symptom Index score and an increase in the postprandial fullness subscale from 0.8 to 1.5. She also experienced 10.6% total weight loss at 4 weeks with a weight decrease from 236 to 211 pounds (Fig. 6).

CLINICAL IMPLICATIONS

This procedure has the potential for greater weight loss compared with traditional ESG because it also addresses other aspects of gastric motility, including the mixing and emptying of food via disruption of the antral pump and the distal belt suture. In addition, it has the potential for improved durability because the antral myotomy may have improved longevity compared with gastric remodeling derived from gastric suturing.

CONCLUSION

In this video, we demonstrated that GEM is technically feasible. The patient also experienced altered gastric motility with a significant delay in gastric emptying while maintaining a normal Gastroparesis Cardinal Symptom Index score. Long-term follow-up is underway, and further studies are warranted to clarify the safety and efficacy of this new approach.

- Gastric physiology is critical to the understanding of Endoscopic Bariatric and Metabolic Therapies (EBMTs)
- It includes three main phases
 - Storage: Fundal accommodation allows the stomach to serve as a reservoir for food
 - Mixing: churning and breakdown of food into chyme
 - Emptying: pump function of the distal body and antrum




Figure 1. Important elements of gastric physiology.

- Gastric interventions used to treat obesity work by interfering with the digestion of food and typically alter gastric motility



Primary Obesity Surgery Endoluminal (POSE) limits fundal accommodation

Intra-gastric Balloons (IGBs) limit fundal accommodation and food breakdown

Endoscopic Sleeve Gastroplasty (ESG) limits food breakdown with indirect effects on accommodation

TransPyloric Shuttle inhibits the antral pump

Figure 2. Gastric endoscopic bariatric and metabolic therapies and their proposed physiologic effects.

- Gastroplasty with Endoscopic Myotomy (GEM) is a novel procedure that affects several aspects of gastric motility in an effort to produce greater and more durable weight loss
 - Pylorus-sparing antral myotomy using a tunneling technique similar to Gastric Peroral Endoscopic Myotomy (G-POEM)
 - A running suture (belt) to separate the antrum from the body
 - Endoscopic Sleeve Gastroplasty (ESG) of the gastric body




Figure 3. Steps of gastroplasty with endoscopic myotomy.

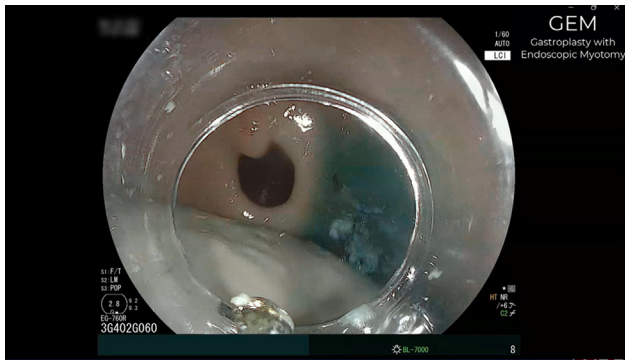


Figure 4. Gastroplasty with endoscopic myotomy submucosal tunnel terminating just proximal to the pylorus.

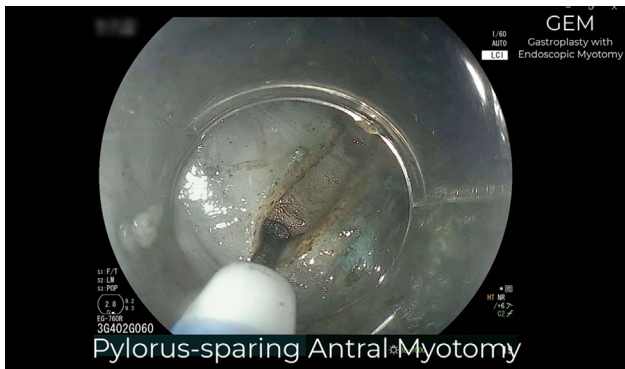


Figure 5. Long antral myotomy along the greater curvature, with pylorus preservation, to delay gastric emptying.

DISCLOSURE

Dr Jirapinyo has received research support from Apollo Endosurgery, Fractyl, and GI Dynamics; has served as a consultant for Endogastric Solutions and GI Dynamics; has received an honorarium from Obalon Therapeutics; and has received in-kind support from USGI Medical. Dr Thompson is a consultant for and received research support from Apollo Endosurgery, Boston Scientific, Fujifilm, GI Dynamics, Lumendi, Olympus, and USGI Medical; is a consultant for Medtronic and Fractyl; has received institutional research grants from Aspire Bariatrics and Erbe; is a general partner for Blue-Flame Healthcare; and is a founder, consultant, and board member for Envision Endoscopy, EnteraSense, and GI Windows. All other authors disclosed no financial relationships. This work was funded in part by National Institutes of Health grant P30 DK034854.

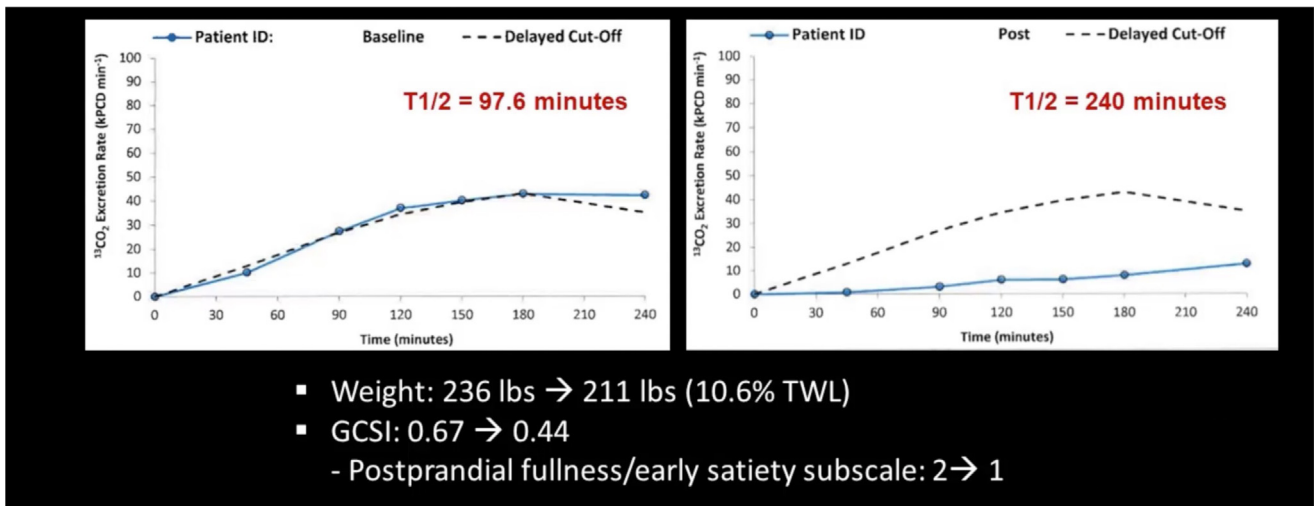


Figure 6. Results at 2 weeks showing a delay in gastric emptying T1/2 from 97.6 minutes to 240 minutes, with a stable Gastroparesis Cardinal Symptom Index (GCSI) score and only the postprandial fullness and satiety subscales being affected. TWL, total weight loss.