



Division of a long-term symptomatic tissue bridge for reversal of endoscopic sleeve gastroplasty

Andrew Canakis, DO,¹ Barham K. Abu Dayyeh, MD, MPH,² Andrew C. Storm, MD²

INTRODUCTION

Endoscopic sleeve gastroplasty (ESG) induces weight loss through delayed gastric emptying through gastric remodeling.¹ In the long term, this commonly manifests as tissue bridges seen on follow-up endoscopy.^{2,3} ESG's clinical efficacy, long durability for weight loss,⁴ and

minimal rate of severe adverse events⁵ have led to widespread adoption. Although "redo" ESG appears safe and effective,⁶ reversibility is not well described and is limited to the acute setting. There is a risk that cutting sutures acutely may result in microperforations that put a patient at risk for leak, perigastric fluid collection, abscess, and bleeding.⁷ For this reason, it may be advisable to avoid cutting sutures less than 2 to 3 months after ESG, instead managing any severe gastric

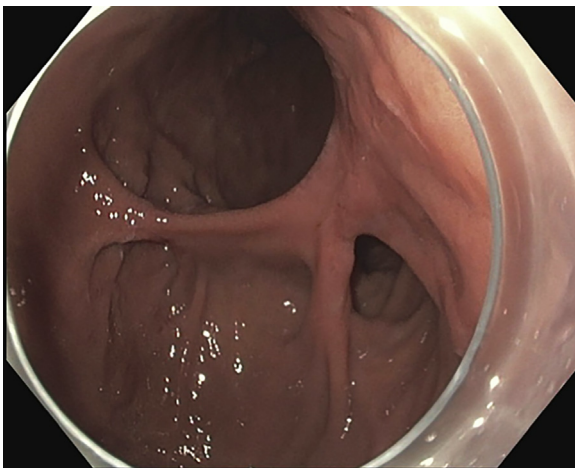


Figure 1. Tissue bridge in the distal body of the stomach causing intractable symptoms 2 years after endoscopic sleeve gastroplasty.

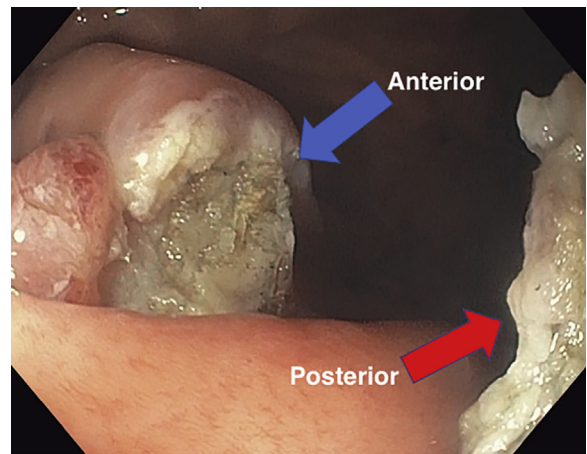


Figure 3. Two mucosal defects along the anterior and posterior gastric wall after transection of the large tissue bridge.



Figure 2. A scissor-type electrocautery knife used to dissect the symptomatic endoscopic sleeve gastroplasty tissue bridge.

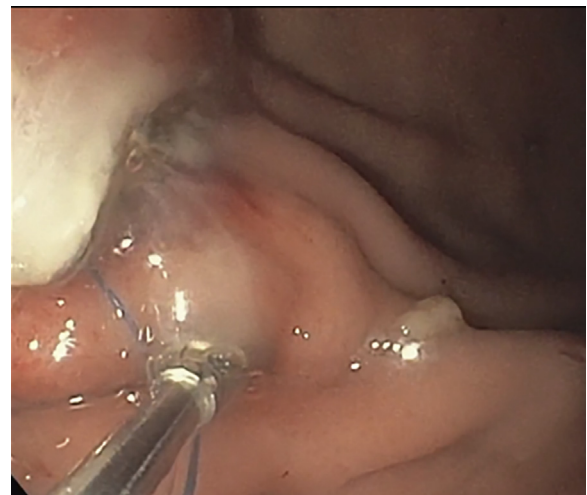


Figure 4. Use of a through-the-scope endoscopic tack-and-suture device to close the anterior wall gastric defect.

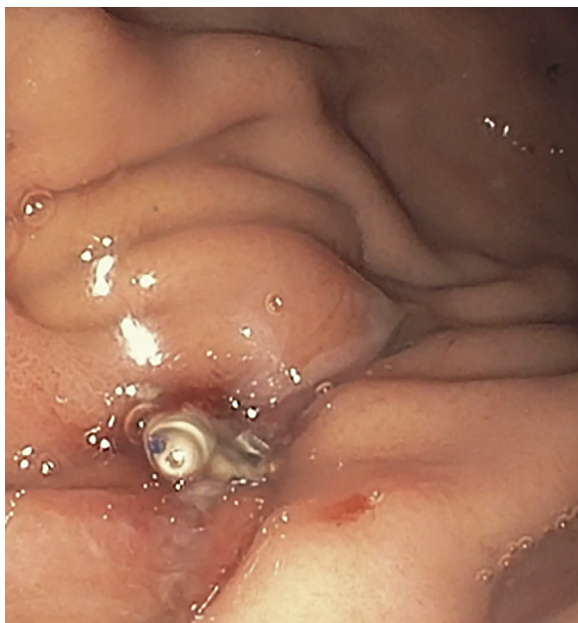


Figure 5. After tack and 3-0 polypropylene suture placement, a cinch was used to close the gastric defect and secure the construct.

outlet obstruction symptoms through hydrostatic balloon dilation of the sleeve. Beyond 3 months, we will consider removal of sutures or resection of tissue bridges post-ESG. However, there is concern for serosal tunnels within tissue bridges that, if cut, could result in gastric perforation. In this case (Video 1, available online at www.giejournal.org), we report a technique for successful ESG reversal 2 years after ESG.

CASE

A 33-year-old woman who had undergone ESG 2 years prior for morbid obesity (body mass index 42 kg/m²) complicated by insulin-dependent diabetes presented with a body mass index of 24 kg/m² and persistent symptoms of delayed gastric emptying leading to symptomatic malnutrition, including iron deficiency anemia and new osteoporosis requiring iron infusions and bisphosphonate therapy, respectively. She was referred to our center for further evaluation. After discussing the risks of bleeding and perforation versus the benefit of improving her nutritional status, and to avoid surgical intervention, she elected to proceed with endoscopic reversal.

Endoscopy (Fig. 1) was significant for a large tissue bridge in the gastric body, explaining her intractable symptoms. The stomach appeared widely patent in the retroflexion and forward views, which highlights ESG's mechanism for weight loss (ie, delayed gastric emptying, which can occur even with minimal remodeling of the distal stomach).¹⁻³ Tools for full-thickness injury closure, including over-the-scope clips and an endoscopic suturing device, were on hand in case of perforation. A scissor-type



Figure 6. Successful closure of the posterior wall gastric defect with 2 through-the-scope clips.



Figure 7. Removal of an extruded suture near the gastric antrum with a cold biopsy forceps.

knife (SB Knife Standard, Sumitomo Bakelight, Manchester, Conn, USA) was used for successful electro-surgical (ERBE EndoCut Q effect 3, Solingen, Germany) dissection of the thinnest, medial-most portion of the bridge without perforation (Figs. 2 and 3).

After the dissection, the 2 resulting ulcers were closed to prevent delayed bleeding, given the patient's symptomatic iron-deficiency anemia, as well to prevent reforming of the mucosal bridge as these tissues healed. The anterior wall defect was closed with a through-the-scope tack and suture device (X-Tack, Apollo Endosurgery, Austin, Tex, USA) and secured with a cinch (Figs. 4 and 5). Of note, the anterior wall defect could have been closed with clips; however, we estimated it would require at least 3 clips and opted for the suture device to reduce procedure-related costs. The smaller posterior wall defect was managed with 2 through-the-scope clips (Instinct, Cook, Winston Salem, NC, USA) (Fig. 6). Finally, an extruded suture was removed with biopsy forceps because it may have led to symptoms of pain (Fig. 7). The stomach thereafter appeared widely patent. With successful closure, there was no concern for perforation; as such, antibiotics were not given. In the

postanesthesia care unit, the patient had no symptoms and was able to be discharged home the same day.

At 1-week follow-up, her symptoms had improved, and she was tolerating a regular diet. Her gastroparesis cardinal symptom index daily score decreased from 4/4 to 0/4 over 2 weeks postprocedure.⁸ No delayed perforation or bleeding symptoms occurred. At 2 months, her symptoms remained in remission. Consequently, no follow-up endoscopy has been performed.

CONCLUSION

ESG rarely requires reversal for intractable symptoms of delayed gastric emptying. In the setting of significant symptoms and malnutrition, however, endoscopic reversal is feasible, and dissecting tissue bridges may lead to resolution of symptoms. It is important to counsel patients regarding the risk of perforation and bleeding, and the endoscopist should be prepared to manage these issues. In our case, dissecting the thinnest and the medial-most portion of the bridge avoided adverse events. Finally, closure of the mucosa at the resection sites may prevent delayed bleeding and re-formation of tissue bridges.

ACKNOWLEDGMENTS

This manuscript was supported by The Mayo Clinic John Berry Fellowship Grant (Dr Andrew Storm).

DISCLOSURE

Dr Abu Dayyeh is a consultant for USGI, Medtronic Boston Scientific, Hemostasis, and Endogenex; is a recipient of research support from USGI Medtronic, Boston Scientific, Apollo Endosurgery, and Endogastric Solutions; and is a speaker for Boston Scientific, Olympus, and Johnson and Johnson. Dr Storm is a consultant for Apollo Endosurgery, Enterasense, ERBE, GI Dynamics, and Olympus and has received research support from Apollo Endosurgery, Boston Scientific, and Endo-TAGSS. All other authors disclosed no financial relationships.

Abbreviation: ESG, endoscopic sleeve gastroplasty.

REFERENCES

1. Abu Dayyeh BK, Acosta A, Camilleri M, et al. Endoscopic sleeve gastroplasty alters gastric physiology and induces loss of body weight in obese individuals. *Clin Gastroenterol Hepatol* 2017;15:37-43.e1.
2. Pizzicannella M, Fiorillo C, Barberio M, et al. Endoscopic assessment of morphological and histopathological upper gastrointestinal changes after endoscopic sleeve gastroplasty. *Surg Obes Relat Dis* 2021;17:1294-301.
3. Pizzicannella M, Lapergola A, Fiorillo C, et al. Does endoscopic sleeve gastroplasty stand the test of time? Objective assessment of endoscopic ESG appearance and its relation to weight loss in a large group of consecutive patients. *Surg Endosc* 2020;34:3696-705.
4. Storm AC, Abu Dayyeh BK. Endoscopic sleeve gastroplasty for obesity: defining the risk and reward after more than 1600 procedures. *Gastrointest Endosc* 2019;89:1139-40.
5. Hedjoudje A, Abu Dayyeh BK, Cheskin LJ, et al. Efficacy and safety of endoscopic sleeve gastroplasty: a systematic review and meta-analysis. *Clin Gastroenterol Hepatol* 2020;18:1043-53.e4.
6. Lopez-Nava G, Asokkumar R, Negi A, et al. Re-suturing after primary endoscopic sleeve gastroplasty (ESG) for obesity. *Surg Endosc* 2021;35:2523-30.
7. Runge TM, Yang J, Fayad L, et al. Anatomical configuration of the stomach post-endoscopic sleeve gastroplasty (ESG)-what are the sutures doing? *Obes Surg* 2020;30:2056-60.
8. Revicki DA, Camilleri M, Kuo B, et al. Development and content validity of a gastroparesis cardinal symptom index daily diary. *Aliment Pharmacol Ther* 2009;30:670-80.

Division of Gastroenterology & Hepatology, University of Maryland School of Medicine, Baltimore, Maryland (1), Division of Gastroenterology and Hepatology, Mayo Clinic Alix School of Medicine, Rochester, Minnesota (2).

If you would like to chat with an author of this article, you may contact Dr Storm at Storm.Andrew@mayo.edu.

Copyright © 2022 American Society for Gastrointestinal Endoscopy. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.vgie.2021.10.008>