Gastroesophageal reflux disease (GERD) has a reported incidence of between 10% and 20% in Western populations with an even higher incidence in populations with obesity [1]. The vast majority of patients are managed medically with surgical intervention undertaken in those with recalcitrant GERD. Populations with obesity and recalcitrant GERD who are interested in weight loss surgery have historically undergone laparoscopic Roux-en-Y gastric bypass (LRYGB). De Goot et al. [2], in their 2009 meta-analysis, demonstrated improvement in GERD in people with obesity after LRYGB. However, since the Center for Medicare and Medicaid Services decision to permit contractors to make coverage decisions on an individual basis in 2011, laparoscopic sleeve gastrectomy (LSG) has become increasingly popular. In 2018, LSG made up nearly 70% of the primary bariatric procedures performed in the United States [3]. These higher volumes have focused attention on the difficult problem of GERD after LSG. The following factors are thought to play a role: decreased lower esophageal pressure, disruption of the Angle of His, postoperative hiatal hernia, and delayed gastric emptying [4–6].

GERD after LSG is treated similarly to GERD in the absence of prior weight loss surgery. Most patients are managed successfully with lifestyle modifications and medical therapy. Recalcitrant GERD after LSG historically mandates conversion to LRYGB. Recently, magnetic sphincter augmentation (MSA) has been proposed as a less morbid alternative for the relief of GERD after LSG [7–9].
mesh from her prior ventral hernia repairs was encountered with adherent omentum. The pars flacida was entered and the stomach and esophagus mobilized off the right and left crus of the diaphragm. A small hiatal hernia was encountered, which was diminutive in size compared with the preoperative computed tomography scan. Minimal mediastinal dissection was required to obtain 4 cm of intra-abdominal esophagus. Intraoperative esophagogastroduodenoscopy confirmed adequate mobilization and reduction of the hernia. Before cruroplasty, a window was established between the esophagus and the posterior vagus nerve to allow for deployment of the MSA device. The right and left cura were approximated with 0-silk sutures. MSA sizing was performed and size 14 MSA device deployed (Fig. 1C).

The patient was discharged home from the postanesthesia care unit on a regular diet and pantoprazole 40 mg once a day. She was additionally instructed to swallow soft food every hour while awake. Proton pump inhibitor was tapered to every other day for a week and discontinued thereafter. One month postoperatively, the patient denied symptoms of GERD and tolerated a stage IV diet without further need of proton pump inhibitors. One year after MSA her Reflux Symptom Index Evaluation and GERD–health related quality of life scores were 21 and 14, respectively. She remains satisfied with her postoperative outcome. Her weight at 1 year after MSA was 70.9 kg. In the 2 years after LSG the patient’s body mass index decreased from 48.18 to 29.6 kg/m², achieving a total excess weight loss of 68.9% and total weight loss of 44.8 kg.

**Discussion**

MSA was approved for the treatment of GERD by the Food and Drug Administration in 2012. The initial indications for MSA deployment include (1) clinical evidence of GERD and normal esophageal motility, (2) no hiatal hernia or small hiatal hernia <3 cm, (3) no prior foregut surgery, and (4) body mass index <35 [7]. However, since the report of MSA device deployment for GERD after LSG in 2015 by Hawasli et al. [8–11], there have been multiple case reports and series of successful MSA after bariatric surgery [7].

In our patient, there was no evidence of neofundus or dilation of the surgically altered stomach that would account for her GERD symptoms. These findings combined with normal esophageal motility pointed toward transient lower esophageal sphincter relaxation as the most likely etiology of her symptoms. The small hiatal hernia may also have played a role. A systematic review and meta-analysis performed from 2005 to 2014 evaluating the relationship between LSG and GERD found that additional trials needed to be conducted to further establish the effects of hiatal hernia on GERD [12]. As such, it is unclear whether hiatal hernia repair alone would have sufficiently reduced her postoperative GERD.

Concurrent hiatal hernia repair and magnetic sphincter augmentation were performed in our patient. This combined approach has been used in both the postSG and primary GERD patient populations [7–11,13]. The aim of MSA is to support the barrier function of the lower esophageal sphincter [14]. This technology serves as an alternative to fundoplication in the primary GERD patient. In the postSG patient with recalcitrant GERD and hiatal hernia fundoplication is not an option, due to its surgical absence. MSA combined with hiatal hernia repair is a thought-provoking alternative to fundoplication with hiatal hernia repair in the postSG patient. Deployment of the MSA device without hiatal hernia repair is also an interesting proposition.
Currently, this approach has not been implemented in the treatment of recalcitrant GERD after LSG. Additional trials will need to be performed to compare the efficacy of isolated MSA with hiatal hernia repair in the treatment of recalcitrant postSG GERD.

Conversion to LRYGB in the setting of significant adhesions is associated with high morbidity. MSA can be considered in the management of refractory GERD after LSG in patients with normal esophageal motility. The procedure is relatively uncomplicated and appears to be safe with little variation in technique between postSG patients and those having MSA for primary GERD symptoms. While more studies are required to determine the efficacy of MSA after SG, it appears to be a promising alternative to conversion to RYGB in select patients with recalcitrant GERD after SG.

Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

Supplementary materials

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References