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## Should Gastric Sleeve Be Fixed? Torsion of Gastric Sleeve After Laparoscopic Sleeve Gastrectomy

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### Abstract

The stomach is normally positioned and fixed by ligamentous attachments to the spleen, liver, and diaphragm. Due to this rapid growth, new complications are sure to be noticed. Once SG has been performed, GV is no longer a valid term to be used when the remaining stomach, twists, folds, or turns, because the attachments have been disrupted and make the sleeve susceptible to this problem. Therefore, we believe that gastric torsion (GT) is a better term after SG or any gastric procedure that detaches the stomach from its natural points of fixation. GT after SG is a rare complication. To our knowledge, there are only 7 cases reported in the literature. Here, we expand on these reports by presenting a patient diagnosed with GT after SG and their subsequent management.

**Keywords:** Sleeve Gastrectomy Gastric Torsion.

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### Introduction

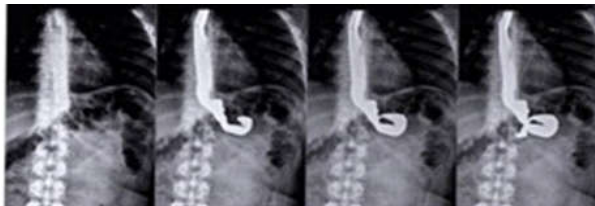
The stomach is normally positioned and fixed by ligamentous attachments to the spleen, liver, and diaphragm. Gastric volvulus (GV) occurs primarily when the stomach suffers torsion on itself due to the laxity or elongation of these attachments and secondary to fixation at a specific point such as adhesions, tumors, or diaphragmatic and hiatal hernias. GV may be mesenteroaxial (when the stomach suffers torsion on its short axis), organoaxial (when the stomach suffers torsion along its long axis), and mixed (Mesenteroaxial and Organoaxial) [1]. Positioned between gastric bypass and adjustable gastric banding due to its safety and good results, sleeve gastrectomy (SG) is well established as a treatment for morbid obesity [2]. The most common complications related to SG are leaks (0.7%), abscesses (0.7%), hemorrhages (0.7%), and strictures (0.7%) [3]. Furthermore, its mortality rate (0.5%) is quite low [4]. SG popularity worldwide has grown significantly among bariatric/metabolic

procedures and now encompasses 27.8% of procedures performed in the past 8 years [5]. Due to this rapid growth, new complications are sure to be noticed. Once SG has been performed, GV is no longer a valid term to be used when the remaining stomach “twists, folds, or turns,” because the attachments have been disrupted and make the sleeve susceptible to this problem. Therefore, we believe that gastric torsion (GT) is a better term after SG or any gastric procedure that detaches the stomach from its natural points of fixation. GT after SG is a rare complication. To our knowledge, there are only 7 cases reported in the literature. Here, we expand on these reports by presenting a patient diagnosed with GT after SG and their subsequent management.

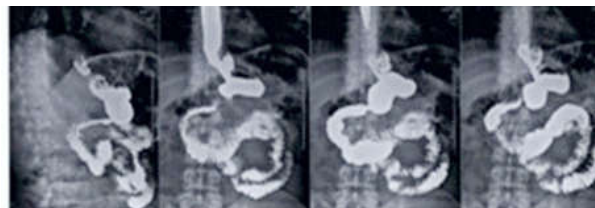
### Case Report

A 33-year-old man, with initial BMI of 54.08 kg/m<sup>2</sup> and comorbidities including hypertension, dyslipidemia, and gastroesophageal reflux disease,

underwent SG. His recovery was uneventful. He subsequently presented with dysphagia, dyspepsia and recurrent vomiting one month after the SG. Barium meal finding suggestive of torsion of the proximal part of the stomach resulting in loop formation and mild dilation of the distal esophagus and mild gastroesophageal reflux with delay of the contrast passage to duodenum due to loop formation, no significant stenosis seen. Endoscopy findings demonstrated that the SG had no stricture, but an anticlockwise twist of the distal sleeve was noted which was nonobstructive. The decision was made to proceed for diagnostic laparoscopy, which revealed organoaxial GT secondary to adhesions between the sleeve's staple line and the liver, falciform ligament, and retroperitoneum (Figure 1). Alaparoscopic lysis of adhesion was performed; the stomach was untwisted and clockwise rotated and returned to the normal anatomic position. Intraoperative upper GI endoscopy was done to confirm torsion, after untwisting the anterior wall of sleeve fixed to the greater omentum and gastrocolic ligament and fascia over the pancreas in lesser sac to maintaining correct sleeve orientation with non absorbable prolene 1-0, to prevent retwist. Surgical duration was 30 minutes. Patient had an uneventful recovery and he started tolerating liquids almost immediately.



**Fig. 1a,b:** Gastrograffin Swallow showing torsion of the proximal part of the stomach resulting in loop formation and mild dilation of the distal esophagus and mild gastroesophageal reflux with delay of the contrast passage to duodenum due to loop formation, no significant stenosis seen



**Fig. 2a:** UGI endoscopy shows fundal dilatation & twisting rather than obstruction of stomach body



**Fig. 2b:** After correction of volvulus by anchoring of the antral region

## Discussion

GV can be present as an acute abdominal emergency or a chronic cause of abdominal pain. Borchardt triad for diagnosing acute GV consists of unproductive retching, epigastric pain, and inability to pass a nasogastric tube [8]. Despite the fact that an upper endoscopy may show twisting of the gastric fold, it may not be prudent to rely on such a procedure if a gastric ischemia is suspected [1]. GV may be chronic if the rotation is minimal and there is no vascular compromise. Symptoms usually consist of mild intermittent upper abdominal pain, early satiety, bloating, and belching. Ischemia might be a complication, which can lead to gastric necrosis and, if untreated, shock and death [9]. The stomach is strongly fixed proximally at the cardiac and distally by the retroperitoneal fixations of the duodenum. Supporting these 2 points, the gastrophrenic, gastrosplenic, gastrocolic, and gastrohepatic ligaments hold the stomach in place in order to prevent GV [10]. Even the agenesis of gastrocolic ligament only has been related with acute primarily GV with partial gastric necrosis [11].

During the SG creation, the gastrophrenic, gastrocolic, gastrosplenic, and the posterior gastric attachments are divided [12,13]. So the probability of twisting, turning, or folding is more likely to occur. In some cases during SG, the surgeon may observe a tendency of the new tubular stomach to form a coil shape that may cause obstructive symptoms. In order to prevent this coiling/twisting, some surgeons have recommended that fixation to the greater omentum to the stomach will keep it in the correct position [14].

In our patients, the endoscopy was a very valuable tool for the establishment of GT. The intraoperative, consistent finding was organoaxial torsion, secondary to the development of adhesions between the sleeve's staple line and the surrounding structures. This was due to lack of the normal gastric attachments, therefore, enabling the torsion (or twist, turn, fold). Therefore, we recommend the treatment to be according to the patient's clinical status, such as in our case who had a long history of vomiting and anorexia after the first LSG and low BMI 28.7kg/m<sup>2</sup>.

## References

1. Jeyarajah DR, Harford WV Jr. Abdominal hernias and gastric volvulus. In: Feldman M, Friedman LS,

- Brandt, LJ, eds. *Sleisenger and Fordtran's Gastrointestinal and Liver Disease*. Vol. 1. 9th ed. New York, NY: Saunders; 2010:383–385.
2. Hutter MM, Schirmer BD, Jones DB, et al. First report from the American College of Surgeons Bariatric Surgery Center Network: laparoscopic sleeve gastrectomy has morbidity and effectiveness positioned between the band and the bypass. *Ann Surg*. 2011; 245(3):410–422.
  3. Lalor PF, Tucker ON, Szomstein S, Rosenthal RJ. Complications after laparoscopic sleeve gastrectomy. *Surg Obes Relat Dis*. 2008; 4(1):33–38.
  4. Frezza EE, Reddy S, Gee LL, Watchel MS. Complications after sleeve gastrectomy for morbid obesity. *Obes Surg*. 2009; 19(6):684–687.
  5. Buchwald H, Oien DM. Metabolic/bariatric surgery worldwide 2011. *Obes Surg*. 2013; 23(4):427–436.
  6. Del Castillo De´jardin D, Sabench Pereferer F, Herna´ndez Gonza´lez M, Blanco Blasco S, Cabrera Vilanova A. Gastric volvulus after sleeve gastrectomy for morbid obesity. *Surgery*. 2013; 153(3):431–433.
  7. Nassif PA, Valadaˆo JA, Malafaia O, Torres OJ, Garcia RF, Klostemann FC. Technical modification for sleeve gastrectomy. *Arq Bras Cir Dig*. 2013; 26 Suppl 1:74 –78.
  8. Ajao OG. Gastric volvulus: a case report and review of the literature. *J Natl Med Assoc*. 1980; 72(5): 520–522.
  9. Hess J, Lowell M. Esophagus, stomach, and duodenum. In: Marx J, Hockberger R, Walls R, eds. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. Vol. 1. 8th ed. New York, NY: Saunders; 2014:1180–1181.
  10. Smith RJ. Volvulus of the stomach. *J Natl Med Assoc*. 1983; 75(4):393–397.
  11. Mazzei C, Palatucci V, Pollio A, della Corte M, Lombardi D. Partial gastric necrosis due to acute gastric volvulus secondary to agenesis of the gastrocolic ligament. *Int J Colorectal Dis*. 2013; 28(9):1315–1316.
  12. Akkary E, Duffy A, Bell R. Deciphering the sleeve: technique, indications, efficacy, and safety of the sleeve gastrectomy. *Obes Surg*. 2008;18(10): 1323–1329.
  13. Romero RJ, Kosanovic R, Rabaza JR, et al. Robotic sleeve gastrectomy: experience of 134 cases and comparison with a systematic review of the laparoscopic approach. *Obes Surg*. 2013; 23(11): 1743–1752.
  14. Santoro S. Technical aspects in sleeve gastrectomy. *Obes Surg*. 2007; 17(11):1534–1535.
  15. Bellorin O, Lieb J, Szomstein S, Rosenthal RJ. Laparoscopic conversion of sleeve gastrectomy to Roux-en-Y gastric bypass for acute gastric outlet obstruction after laparoscopic sleeve gastrectomy for morbid obesity. *Surg Obes Relat Dis*. 2010; 6(5):566–568.
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