



Gastric remnant volvulus following gastric sleeve conversion to Roux-en-Y gastric bypass: a case report

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Gastric remnant volvulus following Roux-en-Y gastric bypass (RYGB) surgery is rare, with only two previously reported cases. Herein, we present the first case of gastric remnant volvulus following gastric sleeve conversion to RYGB in a 32-year-old female. Management for gastric remnant volvulus has not been clearly described in the literature due to the rarity of cases; however, previously documented cases of gastric remnant volvulus following RYGB were managed with gastropexy or resection of the gastric remnant. Due to anatomical limitations, gastropexy was not an option for our patient, and the remnant stomach was resected. Although management options are still evolving, surgical intervention is likely indicated for gastric remnant volvulus that develops following RYGB. To improve patient outcomes and establish more comprehensive guidelines for this uncommon condition, further studies on the management of post-RYGB gastric remnant volvulus are warranted since gastric sleeve conversion to RYGB is becoming more prominent.

Keywords: Gastrectomy, Gastric bypass, Gastric stump, Stomach volvulus

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INTRODUCTION

Gastric volvulus is the abnormal rotation of the stomach around its transverse or longitudinal axis [1]. It is considered a surgical emergency since it may lead to gastric outlet obstruction, and more severely, strangulation, necrosis, and perforation [1]. Sleeve gastrectomy and Roux-en-Y gastric bypass (RYGB) surgery are the most common bariatric surgeries performed in the United States for an estimated 152,866 and 56,527 cases, respectively, in the year 2021 [2]. In gastric bypass procedures, the distal stomach remnant is left in place so that pepsin produced by the remnant can travel to the jejunum. During the

years 1999 to 2018, only 43 cases of gastric volvulus have been reported [1]. Gastric remnant volvulus is even more rare, and to the best of our knowledge, there are only three reported cases of gastric remnant volvulus following esophagojejunostomy [3] or RYGB [4,5]. Herein, we report the first case of gastric remnant volvulus following gastric sleeve conversion to RYGB.

CASE

A 32-year-old female presented to the emergency department (ED) with epigastric abdominal pain. She had a surgical history of sleeve gastrectomy ten years prior which was converted



Fig. 1. Computed tomography (CT) image of the abdomen/pelvis showing dilated gastric remnant in the right lower quadrant, suspicious for volvulus. This finding was not observed on CT image of the abdomen/pelvis 6 months prior. R, right; S, superior.

to RYGB 2 years before presentation, as well as a cholecystectomy 6 months prior. For months, the patient experienced intermittent abdominal pain; however, during the 3 days prior to presentation, she complained of stabbing epigastric pain, nausea, and decreased appetite. She had no complaints of vomiting or constitutional symptoms. In the ED, her vitals were stable and her abdomen was soft, non-distended, and negative for rebound tenderness or guarding. Her lab results were within the normal limits. Computed tomography (CT) of the abdomen/pelvis revealed a dilated fluid-filled structure in the right lower abdomen which appeared to be an excluded gastric remnant oriented downwards in the right lower quadrant. Findings were suspicious for volvulus of the gastric remnant with associated gastric outlet obstruction (Fig. 1).

Based on the patient's physical examination and CT findings, a diagnostic laparoscopy was performed. Inspection of the abdomen revealed the presence of a volvulized remnant stomach. The structure was folded onto itself and dilated with significant amounts of fluid. The remnant stomach was not fixed along the gastrohepatic ligament. The remnant was mobilized past the pylorus and was divided and excised. The patient was discharged the next morning in stable condition. At her 4-week follow-up, the patient was able to eat without any complaints of nausea, vomiting, or abdominal pain. The abdomen was soft and non-tender at follow-up. The incision site was healing well without signs of infection, erythema, or drainage.

DISCUSSION

Primary gastric volvulus arises due to laxity or disruption of the stomach's ligamentous attachments, whereas secondary gastric volvulus is due to disease-associated rotation of the stomach [6,7]. In 75.8% of reported cases, gastric volvulus presents secondary to other causes, with postoperative adhesions and hiatal hernia reported as the most common [6]. The mechanism of volvulus in RYGB is more likely related to the division of ligamentous attachments, which could be an adverse outcome in cases with gastric sleeve conversion to RYGB. For patients with volvulus of the Roux limb post-RYGB, manual detorsion, adhesiolysis, or reconstruction of the limb have been reported as adequate management options [8]. Management for gastric remnant volvulus has not been clearly described in the literature due to the rarity of cases; however, gastropexy or resection can be feasible options.

The stomach is fixed by four ligaments in the peritoneal cavity: gastrohepatic, gastrosplenic, gastrocolic, and gastrophrenic ligaments. In primary RYGB, the ligamentous attachments are largely preserved; however, with a prior sleeve gastrectomy, the gastrosplenic, gastrocolic, and gastrophrenic ligaments are all divided. Due to extensive gastric mobilization, the gastric sleeve converted to RYGB surgery leaves the remnant stomach with no attachments posteriorly or along the greater curvature, making it vulnerable to volvulus [3]. Additionally, the likelihood of volvulus after gastric bypass surgery increases if the patient loses a significant amount of weight, which causes excess laxity of the structures [3]. This appeared to be the case for our patient, who lost nearly 50 kg within 2 years.

Gastric volvulus can arise due to two different types of stomach rotations. Organoaxial rotation, also called type I, is characterized by the rotation of the stomach around its longitudinal axis [9]. In this type, the gastroesophageal junction and duodenum are fixed and the greater curvature of the stomach rotates anteriorly. Mesenteroaxial (MA) or type II volvulus occurs at the trans-gastric axis and is characterized by the folding of the anterior portion of the stomach upon itself [9]. In our case, since the patient had a prior RYGB, the remnant stomach had folded on itself, and the volvulus was classified as MA. A previously reported case of gastric remnant volvulus after esophagojejunostomy was also MA type [3]. Another reported case of gastric remnant volvulus post-RYGB had the stomach 'upside-down' in the lower abdomen [4].

When gastric volvulus is suspected in a patient with a bypass-naïve stomach, initial management is nasogastric tube

placement to decrease gastric pressure and emergent surgery, most often laparotomy instead of laparoscopy [1]. However, decompression is not feasible in patients who have an underlying gastric bypass anatomy. The previously documented cases of gastric remnant volvulus following RYGB without a prior gastric sleeve were managed with either gastropexy [4] or resection of the gastric remnant [5]. Our patient underwent a diagnostic laparoscopy due to high clinical suspicion and the rarity of gastric volvulus as a complication post-RYGB. Due to anatomical limitations, it was determined that gastropexy was not an option for this patient. Instead, the remnant stomach was resected. There is insufficient literature on this topic to support the recommendation of prophylactic resection of the remnant stomach during conversion surgery. While gastric remnant volvulus is a significant complication of gastric sleeve to RYGB conversion, it is essential to acknowledge that the remnant stomach has beneficial functions. In addition to delivering digestive enzymes to the small intestine, the remnant stomach also offers potential access points for future enteral nutrition and diagnostic or therapeutic interventions involving the hepatobiliary system.

Post-RYGB gastric remnant volvulus is extremely rare. We report the first case of a patient with gastric remnant volvulus following gastric sleeve conversion to RYGB. We predict that the frequency of this complication might increase in the future since conversion from sleeve gastrectomy is on the rise. Although management options are still evolving, surgical interventions such as gastropexy or resection of the remnant are likely indicated. Further research, follow-up data, and clinical experience are essential for refining and optimizing the management strategies for gastric remnant volvulus after gastric sleeve conversion to RYGB, in order to improve patient outcomes and establish more comprehensive guidelines for this uncommon condition.

Notes

Ethics statement

In our study, an approval from the Institutional Review Board was deemed unnecessary for the following reasons: This report presents a single case with no interventions or deviations from standard care protocols, posing minimal risk to the patient's welfare. The patient voluntarily consented to the publication of this case report after being informed of its purpose. Throughout the process, principles of respect for autonomy, beneficence, and non-maleficence were upheld. Confidentiality

and anonymity have been maintained in adherence to ethical standards.

Authors' contributions

Conceptualization, Formal analysis: CER

Methodology, Project administration, Visualization: MRM

Validation, Supervision: EMN

Writing—original draft: CER

Writing—review & editing: KRK

All authors read and approved the final manuscript.

Conflict of interest

All authors have no conflicts of interest to declare.

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Data availability

The data presented in this study are available upon reasonable request to the corresponding author.

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