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Gastric perforation by intragastric balloon: Laparoscopic gastric wedge resection can be a strategy?

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ABSTRACT

INTRODUCTION: IGB (Intragastric Balloon) is acknowledged to be a safe and secure device, whose outcomes in terms of weight loss are widely discussed. Bariatric community has soon noted tolerance and benefit of this tool, considered a first and easy step before bariatric surgery. Nevertheless, some authors have described a series of complications that, although rare, could be life threatening and hard to manage, as a gastric perforation.

PRESENTATION OF CASE: We reported a case of a 55-year-old obese woman, undergone placement of IGB device heisting in a gastric perforation. In the same day of surgery, we performed an emergency, applying a combined endoscopic and laparoscopic approach, to remove the balloon and to close perforation by a gastric resection. Discussion. Short term outcome was satisfactory, and the patient had a successful further follow up and weight loss.

CONCLUSION: IGB is a valuable tool among bariatric procedure, nevertheless the surgeon has to consider the possible and life-threatening complications and to provide a multidisciplinary equip to face this occurrence.

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1. Introduction

IGB is worldwide considered a “bridge therapy” to bariatric surgery, improving preoperative conditions, reducing life threatening comorbidities and anesthesiologic risk in order to face a bariatric procedure. It is a temporary, reversible and endoluminal device. Scientific community agreed on advantages of IGB, as low complication rate and efficacy to achieve a satisfactory weight loss using a space occupying mechanism [1,2].

Fluid-filled balloons have been for many years adopted by worldwide surgeons, but their use was frequently associated to digestive intolerance, due maybe to their greater weight (520 g). Regarding this issue, a polyurethane and silicone air-filled balloon (Heliosphere bag) has become a valid alternative being easier to handle because of its 30 g of weight [3].

Limits of this device are self-deflation that causes migration balloon into intestinal loop or high discomfort during removal due to rigidity of the device at the pharynx [4,5].

Despite its large adoption, in literature, there is a lack of information regarding real safety of this kind of device.

The work has been reported in line with the SCARE and PROCESS criteria [6,7].

2. Case presentation

A 55-year-old woman was admitted to General and Bariatric Surgery Unit, Camilliani Hospital (Casoria) in September 2019 for intragastric balloon placement. Routine work-up examinations were performed to evaluate best bariatric option (blood chemistry, EGDS, psychological counselling, abdominal ultrasonography). BMI was 40.2 kg/m² and she had no comorbidities. She had no history of allergies or addiction to drugs or alcohol. No history of previous surgery was reported. After an accurate interview, the patient chose IGB, for concerns about major surgery.

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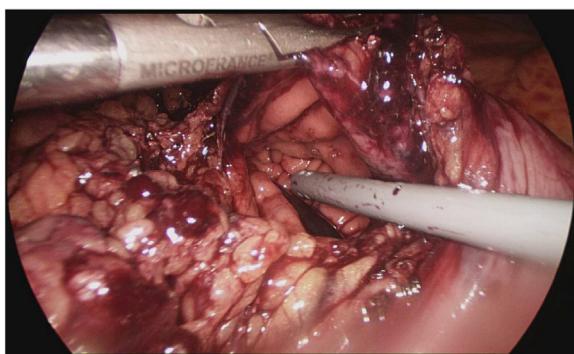


Fig. 1. Gastric perforation along lesser curvature.

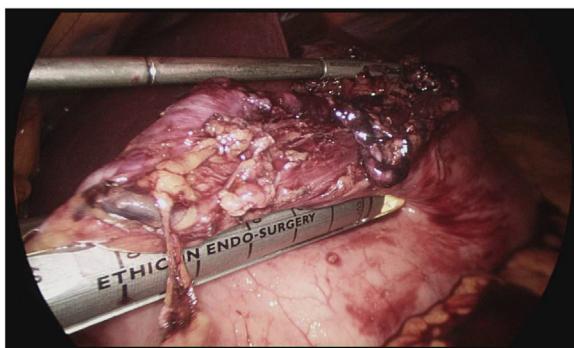


Fig. 2. Stapling of perforation using staple with a height of 3.8 mm.

An endoscopy was performed under deep sedation; then the balloon was placed and inflated with 600cc of air. During placement, no bleeding or other complications occurred.

About four hours after insertion, she referred initial epigastric pain, that subsequently shifted to whole abdomen, and nausea. On physical examination, she was conscious and vital signs were in the normal range. Abdomen was distended, painful to superficial and deep palpation, globous and peristalsis was found. Biochemical examinations showed leukocytosis (WBC: 12.000, Neu: 87%), while other laboratory tests were within the normal range.

Five hours later, we performed abdominal x-ray that showed minimum intraperitoneal free gas and the balloon located along lesser curvature, perfectly inflated. One hour late, CT scan was performed and confirmed presence of a little count of air under the diaphragm and free fluid along the stomach.

Patient accessed the operating room and an emergency procedure with cooperation between endoscopist and bariatric surgeon was performed. Laparoscopy was performed by a consultant with 8 years of specialized training. Pneumoperitoneum was reached by bladed optical access trocar (Visiport™ Plus), placed in left subcostal and abdomen inflation up to 12 mmHg of CO₂. Then four trocars were placed: two 5 mm trocars (subxiphoid, left lateral), one 10 mm trocar (right subcostal) and one 15 mm trocar (supraumbilical) [8].

Gastroscopy showed along lesser curvature the balloon, intact and completely inflated. It was then removed. After removal, endoscopy reported a gastric perforation on the lesser curve (Fig. 1). Laparoscopically, peritoneal cavity was checked, and no chyme or blood were present. No other damage was noted. After initial dissection of hepatogastric ligament, even laparoscopically, a large linear gastric perforation (about 5–6 cm) across the lesser curvature was found.

A stapling of perforation across the lesser curvature (ECHELON FLEX™ 60 mm) was performed, using staple with a height of 3.8 mm (Figs. 2 and 3). We checked the tightness of the sutures endo-

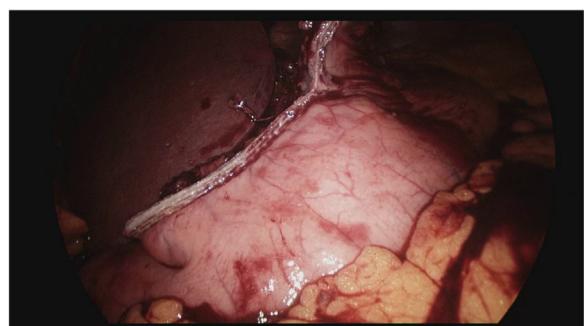


Fig. 3. Gastric wedge resection along lesser curvature.

scopically and no leaking was identified. A nasogastric tube and an abdominal drain along suture were placed.

Until third post-surgery day, intravenous saline with omeprazole (40 mg/d), ondansetron (8 mg/d) and cefazolina (1 g/d) were administered and patient was fasting. On the fourth day X-Ray with oral contrast was performed and no leaking was detected. The nasogastric tube was removed, and patient started a fluid diet shifted to a light diet on fifth day. On the seventh day after surgery, drain was removed, and patient was discharged. Follow up was uneventful and after six months BMI was 34.8 and the percentage of excess weight loss (%EWL) was 40%.

3. Discussion

IGB represents not invasive and reversible option among bariatric procedures. However, outcomes are still controversial. Several studies recently reported considerable weight regain after IGB removal at 12 months, thus a bariatric surgical revision is recommended [9–12]. On the other hand, others highlight stabilized mid-term outcomes following IGB removal.

There is a lack of trials investigating safety of IGB. Early temporary side effects, such as nausea, vomiting and gastric discomfort are largely known. Rare severe complications could occur, (bowel dislocation) may cause intestinal obstruction, or esophageal perforation. Rare severe complications, as balloon bowel dislocation, could occur causing intestinal obstruction or esophageal perforation. A well-conducted meta-analysis reported an obstruction rate of 0.8% with gastric perforation rate of 0.1% [13].

A gastric ulcer and perforation could be the consequence of a constant pressure of the balloon on gastric wall, explaining why gastric perforation is a medium- or long-term complication leading to the indication to its removal in 6 months.

However, in literature few studies reported early severe complications, as esophageal or gastric perforation, during the insertion or removal of the balloon [14]. Association between early perforation (the day after the procedure) by IGB and previous gastric surgery (i.e. sleeve gastrectomy) has been reported in literature [15,16].

To the best of our knowledge, the reported case is the first presenting an early gastric perforation after IGB in the same day of surgery, in a patient without history of previous gastric procedures. In our case, perforation has been accompanied to a mild symptomatology and a controversial imaging not correlated to the damage, probably for the unusual location of the defect. Barrichello Junior et al. noticed higher frequency of perforation on the anterior wall of stomach [17].

Despite its rare occurrence, definitive causes of early gastric perforation after IGB are still unknown. Probably, in our case, the balloon placement has provided fall of tonicity of the stomach and the impaction of balloon above the gastric incisura.

In case of perforation, many authors described a laparotomy for the device removal and the repair of the defect [18]. Supported

by an experienced endoscopist, we tried a less invasive management, by combining an endoscopic and a laparoscopic procedure. In our case, to face and solve the relevant gastric perforation a minimal gastric resection along the lesser curve was necessary. Therefore, after a tailored dissection of the Hepato-gastric ligament, we performed a stapled closure (Echelon 60 mm, Ethicon) of the perforation, avoiding clipping and continuous suture, despite other cases reported in literature widely used these techniques.

We preferred a gastric wedge resection being enough tissue to perform a stapling, to provide adequate remnant stomach and to preserve gastric function. We also wanted to ensure best weight loss possible despite this complication [19].

This kind of approach has provided a fast and uneventful recovery, with a quick return to oral eating and no complications at short and medium time. Our follow-up, also, provided for a nutritional support and anthropometric monitoring. After 6 months, patient's anthropometric outcomes were successfully improved both in terms of symptoms and weight loss, reaching an EWL% of 40% and a BMI of 34.8. This successful result is due to the restrictive mechanism of the wedge resection, combined to the determination of the patient to obtain a weight loss avoiding a new operation.

4. Conclusion

In accordance with scientific community, we consider IGB a simple and easy way to obtain a satisfactory short-term weight loss and improved conditions before bariatric surgery. Nevertheless, it could be associated to severe and life-threatening complications that should be managed by a multi-disciplinary and experienced equip.

Declaration of Competing Interest

The authors report no declarations of interest.

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Ethical approval

N/A.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

LFS: Participated substantially in conception, design and execution of the study, and in the drafting and editing of the manuscript.

SL: Participated substantially in conception, design and execution of the study, and in the drafting and editing of the manuscript.

SG: Participated substantially in conception, design and execution of the study, and in the drafting and editing of the manuscript.

GC: Revised it critically and gave final approval of the version to be published.

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