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# Esophageal perforation during laparoscopic adjustable gastric band: conversion to open sleeve gastrectomy and endoscopic stent placement

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SUMMARY: Esophageal perforation during laparoscopic adjustable gastric band: conversion to open sleeve gastrectomy and endoscopic stent placement.

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Laparoscopic adjustable gastric band (LAGB) is one of the most popular bariatric surgical procedures both in Europe and United States, because it is considered to be a safe and effective way of treating morbid obesity. This minimally invasive frequently employed bariatric procedure has many reported complications, but only a few cases of esophageal perforation have been reported. We present a case of iatrogenic esophageal perforation in an 18-year-old patient occurring during attempt to place an adjustable gastric band laparoscopically, which was diagnosed intraoperatively. Conversion to open sleeve gastrectomy with primary suturing of the perforation and drainage were performed. On the early postoperative period leak from the intra-abdominal part of the esophagus was diagnosed and treated with endoscopic placement of a self-expandable metal stent.

After 2-years of follow-up the patient continues to have no sequelae from the perforation or symptoms of dysphagia, while Excess Weight Loss is 74%.

KEY WORDS: Laparoscopic gastric banding - Esophageal perforation - Esophageal stent.

## Background

Obesity has become a major health (1) and socioeconomic (2, 3) issue and its incidence is increasing rapidly in developed countries. This global epidemic affects not only the adult, but also the pediatric population with more than 40 million children under the age of five being overweight in 2011, according to the World Health Organization (WHO) (4).

Over the last few decades the number of bariatric surgical procedures has dramatically increased. Laparoscopic adjustable gastric band (LAGB) is becoming one of the most common procedures for morbid obesity both in the United States and Europe.

Even this minimally invasive frequently employed bariatric procedure has many reported complications. These can be identified either as minor ones (port leak, port displacement, minor port infection or pouch dilatation) or major, even life-threatening ones (band slip or ero-

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sion, severe band infection, intra-abdominal abscess or hemorrhage) (5, 6).

Many reports in the English literature are available on distal esophageal perforation during LAGB, but none was diagnosed intraoperatively. To the best of our knowledge, this is the first case reported of management with conversion of LAGB to open sleeve gastrectomy, and postoperative endoscopic esophageal stent placement.

#### Case report

An 18-year-old adolescent male with past medical history of diabetes mellitus and arthritis was admitted to our hospital due to morbid obesity. His Body Mass Index (BMI) was calculated to 45.1 kg/m<sup>2</sup> (weight: 143 kg, height: 1.78 m). He had been trying unsuccessfully to lose weight with conservative methods from the age of 14. He decided to be treated with LAGB after long discussion with the surgical team, and he, absolutely, precluded the selection of Roux-en-Y Gastric Bypass (RYGB).

During the operation, the mobilization of the intraabdominal part of the esophagus was laborious and there was a suspicion of esophageal perforation. Methylene blue test was positive, but the site of perforation could

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not be recognized. Conversion to open surgery was decided and an upper midline laparotomy was made. A 10 mm long perforation of the posterior esophageal wall was revealed and primary closure was performed suturing the mucosa and the muscle in separate layers. Then, a typical sleeve gastrectomy was performed, fulfilling the primary indication of the operation, and one closed silicone suction drain was placed.

The early postoperative period was uncomplicated and the patient was kept nill per os, while the nasogastric tube was not removed. On day 7 the patient experienced fever up to 38°C and dyspnea. At clinical examination severe pain was exacerbated during palpation of the epigastrium without signs of peritonism. Basic laboratory tests revealed severe leukocytosis (white blood cell count was  $23000 \times 10^3$ / L) with 93% neutrophils, normal hematocrit and elevated drain amylase level (839) IU/L). A computed tomography (CT) scan of the abdomen and chest with oral gastrografin was performed, which revealed air in the soft tissue around the intra-abdominal esophagus and exoluminal linear presence of gastrografin, without any fluid collections, present of abscess or pleural effusions (Figure 1). The patient was immediately transferred to endoscopy department. Upper endoscopy confirmed the esophageal perforation, and a self-expandable metal stent was inserted into the esophageal site of perforation. The post-endoscopy period was uncomplicated and the patient was in good clinical condition without fever. Parenteral antibiotic regimen against both aerobic and anaerobic bacteria (metronidazole and second-generation cephalosporin) was induced for three days, and leukocytosis gradually subsided. The patient had an uneventful recovery and started liquids per os on day 3. The suction drain was removed on day 5, and the patient was discharged on day 7. The stent was removed endoscopically eight weeks later. After 2years of follow-up the patient continues to have no sequelae from the perforation or symptoms of dysphagia. He weights 91 kg and his BMI is 28.7 kg/m<sup>2</sup> (Excess Weight Loss 74%).

## Discussion

Morbid obesity is associated with numerous medical problems, such as diabetes mellitus, dyslipidemia, hypertension, obstructive sleep apnea, depression, metabolic syndrome or even a shortened life expectancy (7).





Morbid obesity surgical management remains a more effective approach to achieving clinically important weight loss than conservative management (8). Since 1991, there are certain indications regarding the surgical management according to National Institute of Health Consensus Conference recommendations (9).

One of the most popular bariatric surgery procedures is LAGB. It has the advantages of restrictive surgery that is less invasive than other obesity procedures, because the abdomen is not actually opened. It can be totally reversed and constantly adjusted. With this combination, mortality is reduced as well as morbidity (10, 11).

Esophageal perforation is a rare but extremely severe complication after LAGB for morbid obesity. There have been reported only a few cases, which were, usually, related with the intraoperative use of esophageal tube insertion or caused by erosion of the band into the esophagus (12, 13).

The clinical manifestation varies and is related to the part of the esophagus that perforates. Especially, perforation of the abdominal esophagus presents with abdominal guarding and rigidity, fever and pleural signs (14, 15).

As it is difficult to obtain an accurate diagnosis based only on clinical presentation and basic laboratory studies, various diagnostic radiologic modalities have been proposed. Posteroanterior and lateral plain chest radiograph can provide indirect signs of esophageal perforation, such as pleural effusion, pneumomediastinum or pneumothorax. Fluoroscopic esophagography with ingestion of water-soluble contrast medium can, also, be diagnostic. Many investigators consider CT scan with *per os* contrast as the gold standard for such diagnosis, while upper endoscopy can be useful in a patient with high suspicious of esophageal perforation and negative radiologic studies (15, 16). Finally, drain amylase levels are an adjunct in detection of leak from esophagus (17).

The management of esophagus perforations is controversial, and it depends on site and size of perforation, patient's clinical condition and possible diagnostic delay (18). Patients who receive treatment within 24 hours of the onset of symptoms have a higher survival rate. Surgical intervention includes debridement and suturing of the perforation when contamination is minimal, as well as aggressive drainage, diversion of the esophagus and enterostomy for enteral feeding. On the other hand, conservative management refers to resuscitation, parenteral feeding and antibiotics (19, 20). Currently, several studies describe the value of endoscopic treatment with the use of metallic clips or stent placement (21).

Treatment of esophageal erosion after gastric banding ranges from laparoscopic to open exploration, applying the same principles as for any esophageal perforation. There is still controversy regarding whether a complicated LAGB should be managed with conversion to laparoscopic sleeve gastrectomy (LSG) or Roux-en-Y gastric bypass (LRYGB) even in cases of esophageal perforation. Most bariatric surgeons do not consider converting a failed restrictive procedure such as LAGB to another restrictive procedure such as LSG to be a good strategy (22). On the other hand, Foletto et al. state at revisional LSG can be considered a good second-line surgical procedure for complicated LAGB (23). Furthermore, the possibility of postponing the bariatric procedure has been extensively discussed in the literature. In principle, if the perforation is diagnosed intraoperatively, the management of both anterior and posterior gastric and esophageal tears could be followed by completing the bariatric procedure (24), but there are surgeons who do not think that is preferable (25).

In our patient we chose to convert to open surgery in order to identify the suspicious perforation of the abdominal esophagus. We avoided placing gastric band due to possible septic local status, and we treated the perforation with suturing and drainage. We decided not to postpone the bariatric procedure, because of the very early recognition of the esophagus tear. We chose a restrictive technique (sleeve gastrectomy) rather than gastric bypass, mainly because of the following reasons: RYGB is a technically demanding operation; it is followed by higher risk of postoperative complications and higher mortality and morbidity (25, 26); gastrojejunal anastomosis would be carried out in a contaminated surgical field, with high risk of anastomotic insufficiency; we respected patient's personal preference (he had precluded RYGB). Postoperative we kept the patient nill per os, while tight monitoring of vital signs, clinical condition and drain output were performed. Unfortunately, on day 7 leak from the esophagus was diagnosed, and, immediately, we placed endoscopically a self-expandable metal stent.

We present an alternative management of iatrogenic esophageal perforation occurring during attempt to place an adjustable gastric band laparoscopically, based on conversion to sleeve gastrectomy and finally management of esophageal perforation with postoperative endoscopic intervention.

## Conclusions

- The perforation of the intra-abdominal esophagus is, maybe, the most serious complication of laparoscopic adjustable gastric band.
- When it is recognized perioperative, primary suturing of the perforation and drainage can be used, but postoperative tight monitoring of the patient is crucial. Conversion to gastric by-pass has the disadvantages of a technically demanding operation with higher morbidity and mortality rates, especially when it is performed in a contaminated surgical field. Management with another restrictive procedure, such

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as sleeve gastrectomy, with postoperative endoscopic esophageal stent placement, is a promising treatment alternative, especially in patients who preclude RYGB as an alternative bariatric surgical intervention.

LAGB must be used only under certain strict indications for the treatment of morbid obesity, because it can be associated with severe complications.

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#### Disclosure

*Authors' contributions:* GP: wrote the paper; KV: conception and design; GK: drafting of the manuscript; PA: final approval of the version published. *Competing interests:* the Authors declare that they have

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