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Case Report

Esophageal Perforation during Laparoscopic Gastric Band Placement

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Esophageal perforation is a serious complication that requires prompt recognition and treatment. We present the case of a patient with lower esophageal perforation that apparently resulted from orogastric calibration-tube passage during laparoscopic placement of a gastric band. The complication was diagnosed early postoperatively, and was able to be successfully treated by laparoscopy, debanding, drainage, and parenteral nutrition.

Key words: Morbid obesity, bariatric surgery, laparoscopy, gastric banding, intubation, esophageal perforation

Introduction

Esophageal injury from intraoperative esophagogastric intubation requires prompt recognition and treatment to obviate a prolonged, difficult convalescence and potential mortality.[1] The incidence of esophageal perforation appears to have increased over the past 40 years because of greater use of esophagogastroduodenoscopy, dilatations, and even simple esophageal intubation for diagnosis or treatment.[2] A case is presented of esophageal perforation secondary to orogastric intubation during laparoscopic banding surgery.

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Case Report

A 73-year-old morbidly obese man with a history of atrial fibrillation and hypertension and a body mass index of 42 kg/m^2 underwent laparoscopic adjustable gastric banding. The peritoneal cavity was accessed through a 1-cm supraumbilical incision by the open Hasson technique, and was insufflated with CO_2 to maintain an intraabdominal pressure of 15 mmHg. Trocars were placed in the subxiphoid region and the right and left upper quadrants. The fundus was retracted distally. Identification of the angle of His and dissection were carried out with the Harmonic scalpel (Ethicon Endo-Surgery, Cincinnati, OH). The left crus of the diaphragm was identified. The pars flaccida was entered, the right crus identified, and a window created behind esophagus. The Lap-Band® (Inamed, Santa Barbara, CA) was wrapped around the gastroesophageal junction, closed, and calibrated using the 32-Fr calibrating tube (Bioenterics, Inamed) that had been advanced by the anesthesiologist with apparently minimal trauma. Three interrupted gastro-gastric 2-0 silk sutures secured the band, and the tubing was extracted through the left upper quadrant site. The access-port was attached to the tubing and fixed to the fascia with four interrupted 2-0 polypropylene sutures. Trocars were removed, and all port-sites were sutured closed and injected with local anesthetic. The patient tolerated the procedure well and was transferred to the recovery-room in stable condition.

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However, 12 hours after the procedure, the patient complained of shortness of breath, tachycardia and back pain. White count was 11,300. A leak was suspected and prompted a Gastrografin® swallow that showed a contained distal esophageal leak or possible dissection; the stomach appeared unremarkable. Diagnostic laparoscopy was indicated. The re-operation commenced similar to the initial procedure. Entrance to the peritoneal cavity revealed no signs of peritonitis. The band was found as previously implanted, and was removed. Inspection of the gastroesophageal junction and the lesser and greater curvature found no leak, using air-insufflation and methylene blue tests. Intraopertaive esophagogastroscopy did not show any perforation, but a small hematoma was seen at the gastroesophageal junction. Fluid injection and air-insufflation during esophagogastroscopy did not show a leak. A nasogastric tube was inserted, and two Blake drains were placed laparoscopically, above and below the gastroesophageal junction. The peritoneal cavity was thoroughly irrigated, all trocar sites were sutured closed, and local anesthetic was injected in all trocar sites.

Repeat Gastrografin® study the day following the re-operation showed incomplete resolution of the contained leak (Figure 1). Chest CT scan revealed an intrathoracic esophageal dissection 5 cm above the gastroesophageal junction (Figure 2), probably caused by manipulation of the calibrating tube, as the perforation site appeared to be located superior to the area of the banding surgery. The patient was kept NPO on total parenteral nutrition.

He subsequently developed fungal I.V. line sepsis that required antibiotics and prolonged hospital stay. Gastrografin® study on the 18th postoperative day found no leak. He was discharged home on a liquid diet on the 20th postoperative day.

Discussion

The incidence of esophageal injury secondary to nasogastric or orogastric tube insertion is reported to be 0.8%. Of these, 72% are iatrogenically-induced.[3] Less frequent is non-instrumental perforation, which occurs as a result of ingestion of foreign bodies or from the pressure of emesis with or without predisposing esophageal disease. Also, the esophagus may be perforated by penetrating or non-penetrating external trauma.[2] The esophageal wall can be inadvertently breached by an instrument or foreign body causing: 1) penetration of the wall; 2) splitting or rupture during excessive strain; 3) break-

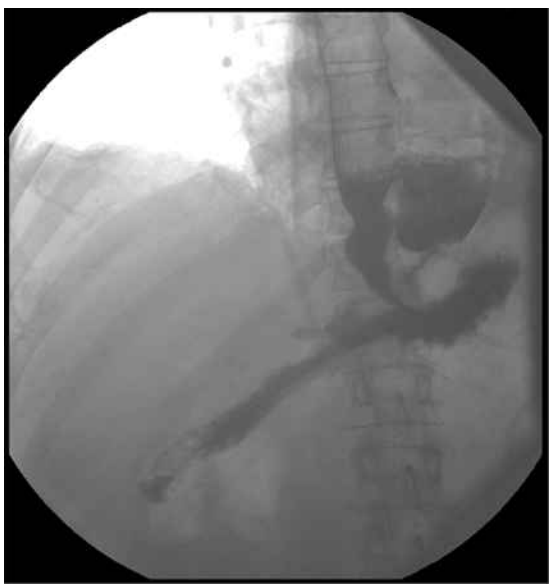

Figure 1. Gastrografin® GI series performed on first postoperative day after Lap-Band® placement. Lower esophageal perforation is confirmed. (T=tract; C=collection).

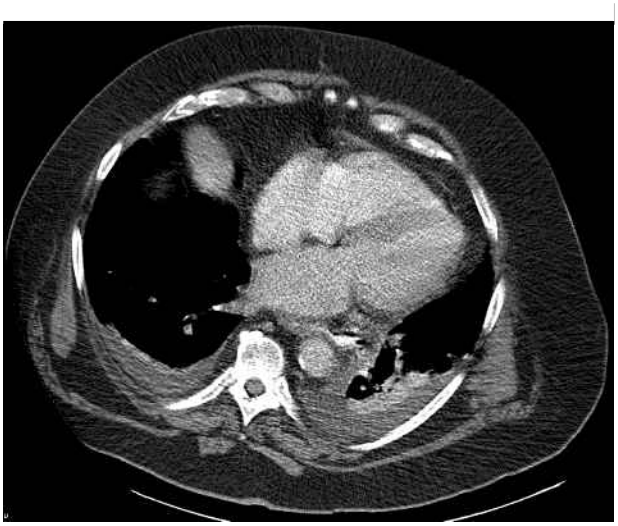

Figure 2. Perforation of the left side of the distal esophagus with a tract extending to the left with a collection. The site of the perforation is above the diaphragm approximately 5 cm proximal to the gastroesophageal junction. (Black arrow points to esophageal lumen; white arrow points to leak).

down by a localized inflammatory process resulting from mucosal tears; or 4) perforation from pressure necrosis or devascularization.[2]

The sites of normal esophageal narrowing are the most frequent sites of perforation. The esophageal introitus, the narrowest site, accounts for the highest incidence. Most iatrogenic cervical perforations occur on the posterior wall through the cricopharyngeus muscle, where the absence of longitudinal muscle and the lack of protective serosa reduces the thickness of the wall. The next common site of perforation is immediately cephalad to the point where the esophagus narrows to pass through the diaphragm.[2]

Mortality from esophageal perforation ranges from 16 to 29%,[4] with prompt surgical intervention reducing the mortality to <10%.[5] In patients with delayed diagnosis and subsequent esophageal dissection, the mortality is as high as 65%.[6]

Prompt diagnosis of esophageal perforation depends on awareness of the circumstances during which this can occur, the patient's symptoms, the presence of physical signs, and demonstrated perforation and its manifestations by radiography.[3] The three most common clinical features of esophageal perforation are pain, fever, and subcutaneous or mediastinal emphysema.[7]

Although most esophageal perforations are best treated by immediate surgical exploration, repair and drainage, this is not universal or always feasible. Non-operative treatment of esophageal perforation includes hemodynamic stabilization, broad spectrum antibiotics, gastric decompression, alternative routes of nutrition, and drainage. The decision for non-operative therapy is critical, because a delay in surgical repair for 4 to 6 hours may increase morbidity. Therefore, non-operative management must be fastidiously monitored.[8] Asymptomatic and hemodynamically stable patients with esophageal perforation may not require surgical intervention.[4] Furthermore, patients who are at high surgical risk are also considered for non-operative management.[9] Surgical therapy includes drainage alone, drainage and repair, or drainage and diversion. Although indications for surgery remain somewhat unclear, patients with pneumothorax, pneumomediastinum, sepsis, respiratory failure, and shock usually necessitate surgical intervention.[6]

The surgical approach depends on the size and location of the perforation, the degree of local tissue necrosis, and the time lapsed since the perforation.[10] A time lapse of >24 hours may result in extensive tissue necrosis and thus higher risk of complications at the time of surgery and postoperatively.[10]

Clinical verification of correct nasogastric tube placement is done by air-insufflation during auscultation of the epigastrium and by aspiration of gastrointestinal contents. In the case of esophageal perforation, x-ray is the most reliable modality to confirm correct nasogastric tube placement. With clinical suspicion of esophageal perforation, immediate chest and upright abdominal x-ray can be diagnostic in 90% of cases. A negative x-ray must be followed by a Gastrografin® swallow study. Some authors recommend barium swallow in cases of suspected perforation and negative Gastrografin® swallow, although the risk of resulting mediastinal granulomatous inflammation and fibrosis is higher.[11] When esophageal perforation is difficult to localize, CT scan may facilitate diagnosis. Esophageal perforation is diagnosed if CT shows mediastinal air, periesophageal abscess, or esophageal fistula.

In the patient presented, the laparoscopic surgical approach was chosen due to radiological as well as clinical signs and symptoms. The band was removed, because of its distal narrowing with respect to the esophageal injury. A thoracotomy was not performed because of the negative esophagogastroscopy as well as the x-ray showing a contained injury. We strongly support the practice of Gastrografin® swallow after all bariatric procedures on the first postoperative day.[12-16] The use of the calibrating balloon-tipped orogastric tube during band placement is used routinely by many groups.[15-17] However, it has a potential for esophageal injury. Since this reported case, we have discontinued using a calibrating tube, and we have had no problems associated with placement of the band. However, if the surgeon's preference is to use the calibrating tube, this should be undertaken by an anesthesiologist experienced in this maneuver. If significant esophageal trauma is suspected intraoperatively, the procedure should be aborted and the injury appropriately evaluated by air-insufflation, methylene blue or endoscopy, with immediate repair and adequate drainage.

Conclusion

Prevention of esophageal perforation involves close communication between the surgeon and anesthesiologist and safe technique. High clinical suspicion is critical for early diagnosis and prompt, individualized treatment.

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