

Laparoscopic Surgical Repair of a Giant Hiatal Hernia with Prothesis: How We Do It (with Video)

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ABSTRACT

Background: Giant hiatal hernias (GHH) account for 5-10% of all hiatal hernias. Most patients are asymptomatic, while others have debilitating and persistent symptoms affecting quality of life (QoL). GHHs are usually associated with chronic digestive and gastroesophageal reflux symptoms and acute severe complications may occur. Surgical treatment is usually indicated in cases of failure of optimal medical treatment in smaller hernias, symptomatic patients with large hernias and asymptomatic patients with high risk for complications. Surgery is the treatment of choice in symptomatic GHH, and laparoscopic repair is the standard approach and mesh reinforcement of crura repair remains debatable. Hernia recurrence remains an important issue.

Surgical Technique: We present a case of a 79-year-old male with a symptomatic GHH. Patient was submitted to laparoscopic GGH repair with mesh prothesis reinforcement.

Discussion: Surgery is the only curative treatment for GHH, and laparoscopic repair, being safe and effective with low morbidity, is the standard approach for symptomatic patients. Hiatal hernia recurrences can occur and, even among experienced surgeons, they might be troublesome, especially in large hernias and obese patients. Mesh-repair techniques have been developed trying to respond to this issue. However, its use remains a source of disagreement. Controversy exists especially due to the potential mesh-related complications. A dual-sided synthetic mesh adapted to the anatomy of the diaphragmatic hiatus and its careful positioning can minimize potential complications. Further standardization of procedures and increased numbers in case series are required for drawing definitive conclusions regarding mesh reinforcement in GHH repair.

Key words: giant hiatal hernia, surgical repair, surgery, laparoscopy, mesh prothesis

INTRODUCTION

Giant hiatal hernias (GHH) account for 5-10% of all hiatal hernias and are characterized by the presence of more than one-third or, for some authors, half of the stomach in the chest cavity or a hiatus defect diameter ≥ 60 millimeters (5). Most hiatal hernias are sliding (type I) hernias, and more rarely rolling, para-

Received: 15.10.2023

Accepted: 13.12.2023

esophageal hernias (3). In most patients, hernia is mixed, with or without organoaxial volvulus of the stomach.

Most patients are asymptomatic, while others have debilitating and persistent symptoms affecting quality of life (QoL). GHHs are usually associated with chronic digestive symptoms and gastroesophageal reflux disease symptoms such as heartburn and regurgitation. Delayed gastric emptying, chest pain, early satiety, dysphagia, and anemia can be present. Acute severe complications such as bleeding, volvulus, hernia strangulation and perforation may occur (3,5).

Diagnosis is made by barium meal x-ray or upper endoscopy and decisions regarding treatment are mostly on patients' symptoms. Lifestyle changes and medications are typically recommended for initial therapy, but patients experiencing severe, refractory, or persistent symptoms are often considered for surgery, regardless of hernia type (4). Complications management might require emergent surgery.

Surgical treatment is usually indicated in cases of failure of optimal medical treatment in smaller hernias, symptomatic patients with large hernias and asymptomatic patients with high risk for complications. Surgery is the treatment of choice in symptomatic GHH and laparoscopic repair is the standard approach (5), as it is both safe and effective with a success rate of 90% after 4 years of follow-up and a mortality rate that can reach 1% (3). Also, laparoscopy allows for a reduced operative time and improved post-operative outcomes compared to open surgery (4). GHH repair should include dissection of the hernia sac from the posterior mediastinum and its resection, reduction of the herniated intra-abdominal organs with a tension-free intra-abdominal position of the distal esophagus, posterior cruroplasty (hiatus narrowing), and an antireflux procedure (fundoplication) (1).

Hernia recurrence remains an important issue. Recurrence rate after laparoscopic repair can be high ranging from 10-40% (3), especially in more voluminous hernias and obese patients (5). Many recurrences are asymptomatic. Radiological outcome is less favorable, and radiological recurrences are reported in more than 50% of patients, most are asymptomatic (1,4).

Mesh reinforcement of crura repair is debatable, with conflicting outcomes. Its use has been considered to improve outcomes as it is proposed to be effective by providing a tension-free repair (5), but no reduction in recurrence rate has been consistently reported. As such, prosthetic mesh use remains controversial, especially due to potential mesh-related complications, such as infection, local inflammation, fibrosis, mesh

migration and shrinkage, esophageal or gastric erosion, hiatus and esophageal stenosis and obstruction, fistula formation and dysphagia (4,5). Also, mesh use poses itself additional difficulties in cases in which surgical reintervention is needed, and operations performed to solve mesh-related complications are associated with higher morbidity and mortality rates (1,5). There are different types of mesh, synthetic, including heavy and light-weight polypropylene, expanded polytetrafluoroethylene (ePTFE), and biologic. Additionally, various configurations can be used (oval, square, or an A, U, or V shape) (1). It is not yet clear which type, size, and mesh placement technique would be more appropriate (5).

SURGICAL TECHNIQUE

A 79-year-old male with a medical history of overweight, arterial hypertension, hyperuricemia, and chronic gastritis. Patient complaint of early postprandial bloating, heartburn, and regurgitation, with years of evolution and recent worsening under optimal medical therapy with proton pump inhibitor.

Chest and barium meal x-ray revealed a GHH type III (76x55 mm in diameter) and gastro-esophageal reflux. MRI showed a GHH with the gastro-esophageal junction (GEJ) above the esophageal hiatus and the gastric body in retrocardiac position (89 mm in diameter). Endoscopy revealed an erythematous gastritis. Patient was proposed for laparoscopic GHH repair.

Surgery had the following key-steps:

(see *Supplementary Video 1*)

- 1) Pneumoperitoneum was established through Veress needle in Palmer's point, with a pressure set of 15 mmHg;
- 2) A 10-mm trocar was placed in the supraumbilical region through direct visualization;
- 3) Four other trocars (2 of 10-mm and 2 of 5-mm) were placed through laparoscopic control;
- 4) A GHH was identified;
- 5) Esophageal hiatus was approached and hernia was explored;
- 5) Dissection of the hernia sac and hernia reduction into the abdomen;
- 6) Mobilization of distal esophagus and repositioning of GEJ assuring an adequate length and a tension free position of the distal esophagus in the abdominal cavity;
- 7) Diaphragmatic crura defect was reduced with a non-absorbable interrupted 2.0 suture (at this point we realized that a mesh prosthesis was necessary to obtain a tension-free hernia correction);
- 8) Creation of space around the edge of the diaphragmatic hernia defect to support mesh;
- 9) Attachment of a double-face, U-shape polypropylene/ePTFE mesh prosthesis to the diaphragm with non-absorbable interrupted 2.0 suture;
- 10) Confection of a 360-degrees Nissen fundoplication;
- 10)

Hemostasis review; 11) Trocars removal and pneumoperitoneum emptying; 12) Closure of the trocar site incisions.

Post-operative period was uneventful. Chest x-ray at 1st post-operative day showed no evidence for hiatal hernia, and full lung expansion bilaterally. Patient was discharged home at day 3 after surgery. At 6 months follow-up, patient remains asymptomatic with no evidence for hernia recurrence.

DISCUSSION

Surgical repair is the only curative treatment for GHH. It has become the treatment of choice for symptomatic patients and laparoscopy, being a safe and effective approach with low morbidity, has become the standard of care. Repair includes hernia sac resection, cruroplasty and fundoplication.

Hiatal hernia recurrences can occur and, even among experienced surgeons, they might be troublesome, especially in large hernias and obese patients. Mesh-repair techniques have been developed trying to respond to this issue. However, its use remains a source of disagreement, with conflicting outcomes reported in case series and randomized trials (2). It seems promising in reducing recurrences and improving surgical outcomes. However, controversy exists especially due to possible mesh-related complications, such as infection, migration, shrinkage, and esophageal and/or gastric erosion, stenosis of the diaphragmatic hiatus with esophageal obstruction. The most important perhaps is esophageal erosion and peri-prosthesis extensive fibrosis leading esophageal stricture and stenosis causing persistent dysphagia. In this case, reoperation might be needed to remove the mesh. A dual-sided synthetic mesh adapted to the anatomy of the diaphragmatic hiatus and its careful positioning can minimize adhesions, strictures, and stenosis or intraluminal migration of the mesh avoiding future complications (3). Also, it is less expensive than biologic meshes. Regarding configuration, a circular mesh is not ideal as contraction of the mesh over time may cause GEJ constriction. A non-circular configuration mesh, as a U-shape mesh, might be more appropriate to avoid this. An adequate surgical technique for mesh placement is essential to minimize complications (4). Suturing a horseshoe-shaped mesh as an on-lay to crura repair, leaving a small gap between the mesh and the esophagus to avoid erosion and circumferential

contraction. Indications for mesh use in laparoscopic repair varies, and there is still insufficient evidence to recommend it as a standard (1,4). Further standardization of procedures and increased numbers in case series are required for drawing definitive conclusions regarding mesh reinforcement in GHH repair.

Laparoscopic GHH repair allows for a significant symptomatic improvement offering patients a good and improved QoL, with fewer episodes of regurgitation, less laryngeal symptoms, and decreased use of antacid medication, with very few cases of reported post-operative dysphagia (1, 3, 5). Laparoscopy in these cases is associated with less perioperative morbidity and shortened length of hospital stay (4). As in our case, laparoscopic GHH repair with prosthetic mesh reinforcement is a reliable procedure allowing for improved surgical outcomes and a better post-operative QoL, with a symptomatic recurrence rate of less than 5% (3, 4).

Authors' contribution

All listed contributors designed the study and did the collection and assembly of data as well as data analysis and interpretation. All authors wrote the manuscript and did its final approval.

Conflicts of interest

The authors have no conflict of interest to declare. No financial support and technical or other assistance were received.

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