

Management of the Difficult Hiatal Hernia



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KEYWORDS

• Paraesophageal hernia • Mesh • Gastroplasty • Fundoplication

KEY POINTS

- Repair of the hernias requires assessment of the esophageal length and crural tension.
- Shortened esophageal length can be address with aggressive esophageal mobilization, but may require a lengthening procedure.
- Mesh reinforcement of the hiatus can result in short term benefit, but may not improve long term outcomes.

A hiatal hernia refers to the herniation of an intra-abdominal organ or organs into the thoracic cavity through the space between the left and right crus of the diaphragm. The vast majority of hiatal hernias are referred to as type I or sliding hernias. In this situation, weakness of the phrenoesophageal ligament allows herniation of the gastroesophageal junction into the thoracic cavity thereby bringing the cardia of the stomach above the diaphragmatic hiatus. A type II hiatal hernia is a paraesophageal hernia in which the gastroesophageal junction is fixed and another portion of the stomach herniates through the diaphragmatic hiatus into the chest alongside the esophagus. A type III hernia is a combination of type I and II whereby both the gastroesophageal junction and another portion of the stomach have herniated through the diaphragmatic hiatus. A type IV hiatal hernia indicates that an intra-abdominal organ in addition to the stomach has herniated through the hiatus, commonly the colon or the small bowel but may include the spleen or pancreas.

Type I or sliding hiatal hernias are becoming increasingly common, likely due to the increasing incidence of obesity; however, they usually require

operative intervention only if they become symptomatic, as in conjunction with an antireflux procedure. Type II-IV hiatal hernias are commonly repaired once identified because of the concern for acute gastric volvulus and catastrophic strangulation of the stomach,^{1,2} in addition to symptom correction, such as postprandial chest discomfort, dysphagia, or reflux. Acute presentations can lead to the need for emergency detorsion and a well-documented increased morbidity and mortality compared with elective laparoscopic repair. It is estimated that the risk of serious complication due to the presence of a paraesophageal hiatal hernia is approximately 1% per year.³ Type III-IV together have been referred to as “giant paraesophageal hernias,” whereby at least 30% of the stomach is contained within the thoracic cavity,⁴ and the surgical management of this clinical situation is the focus of this review.

SURGICAL TREATMENT OF HIATAL HERNIAS

The history of operative repair of hiatal hernias begins in the early twentieth century, when open abdominal laparotomy incisions were used to

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gain access to the esophageal hiatus. At that time, the openings in the diaphragmatic hiatus were closed directly around the organs that naturally passed through, namely the esophagus.⁵ During the second half of the twentieth century, the focus transitioned to procedures performed through the thoracic cavity whereby the hernia sac could be reduced into the abdomen, the diaphragmatic opening could be narrowed under direct vision, and extensive mobilization of the esophagus could be performed. The subsequent development of the fundoplication and the ability to treat reflux disease by wrapping the stomach around the distal esophagus led to the broad incorporation of a fundoplication as an integral portion of repair of a paraesophageal hernia.⁵

The advent of minimally invasive surgery has dramatically increased the number of reflux and hiatal hernia operations being performed. Laparoscopy provides improved visualization of the hiatus, dissection of the esophagus and the hernia sac can be performed well up into the mediastinum under direct vision, and is associated with a significantly shorter length of stay, less need of a nasogastric tube in place, less postoperative pain, and decreased morbidity compared with open repairs.⁶ However laparoscopic repairs have higher reported recurrence rates. In one highly quoted study out of the University of Southern California, the rate of radiologic recurrences following laparoscopic suture cruroplasty repair for paraesophageal hernias was 42%.⁷ Possible reasons include decreased adhesion generation following laparoscopy, less meticulous mediastinal dissection of the hernia sac, and less tactile feedback and recognition of crural closures under tension. As longer-term follow-up is available, it has also been demonstrated that the prevalence of hernia recurrence increases over time with greater long-term follow-up.^{8,9}

RISK FACTOR FOR RECURRENCE

Some of the factors that contribute to the recurrence of hiatal hernias after repair include the dynamic nature of the esophageal hiatus, with continuous movement secondary to respiratory excursion, esophageal peristalsis, and cardiac activity, and the pressure gradient between the peritoneum and the thorax that is heightened during coughing or sneezing.^{6,10} Any repair to a hernia defect in the hiatus is subject to 2 forms of tension. Axial tension is generated due to displacement of the gastroesophageal junction into the mediastinum. This displacement could be in response to an intrinsically shortened esophagus due to longitudinal collagen contraction resulting from

scarring and fibrosis secondary to repeated exposure of the distal esophagus to gastric contents.^{4,11,12} With each swallow, the esophagus shortens and applies a constant force against the hiatal opening.¹³ Radial tension is due to the chronic dilation of the hiatal opening and the force required to bring the edges of the crura back together. The crural pillars are also usually quite thin in large hernias and made of attenuated muscle fibers and not fascia that can lead to sutures pulling through when tied under tension.^{6,10}

To address these 2 forms of tension, the surgical repair of hiatal hernias via a laparoscopic approach has some well-accepted tenets. These include thorough preoperative testing, meticulous atraumatic technique, routine division of the short gastric vessels, complete reduction and resection of the hernia sac, circumferential dissection of the esophagus up into the mediastinum to provide a 2-cm to 3-cm length of tension-free intra-abdominal esophagus, careful preservation of the vagus nerves, maintenance of the peritoneal lining covering the crura, posterior primary crural closure over a bougie, and an associated gastric fundoplication.^{4,6,11,12,14–18} Preoperative planning includes a barium esophagram, upper endoscopy, and esophageal manometry, and for all patients with a significant component of gastroesophageal reflux, a pH probe.¹⁶ The lack of complete reduction of the hernia sac from the mediastinum is associated with increased frequency of postoperative seroma formation and increased risk of recurrence of the hernia.^{1,16} The addition of the fundoplication addresses the gastroesophageal reflux symptoms that most patients with giant paraesophageal hernias present with and theoretically helps to anchor the gastroesophageal junction below the level of the diaphragm.¹ Posterior suture cruroplasty is the preferred method of crural closure; however, occasional anterior sutures may be required to close the crural defect without inducing undue angulation of the esophagus as it passes through the hiatus.^{13,16} In rare circumstances in which the preoperative manometry demonstrates a severe esophageal motility disorder, more than 90% of failed peristalsis, then a partial fundoplication may be favored to decrease the risk of postoperative dysphagia.¹⁶ The addition of a fundoplication, although useful as an antireflux procedure, has not been proven to reduce the rate of reherniation following laparoscopic hernia repair.¹⁹

PERMANENT MESH

The advent of synthetic mesh and popularization of tension-free repair for inguinal and ventral

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