

Grade IV Hiatal Hernia Resolved Laparoscopically with Diaphragmatic Hiatal Plasty and Fundoplication

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ABSTRACT

Hiatal hernias are classified according to their anatomy into: Type I hiatal hernia, or sliding hiatal hernia, Type II (paraesophageal) hernia, Type III (mixed) and Type IV hiatal hernia is associated with a large defect in the phrenoesophageal membrane. Type IV hiatal hernia is a rare pathology with a low incidence in medical practice, but with great clinical relevance due to the risk of imminent morbidity; it is commonly repaired once identified due to concerns of acute gastric volvulus and strangulation of the stomach, although herniation and strangulation of some other intra-abdominal organ is not exempt. We present the clinical case of a patient with a grade IV hiatal hernia, incidental finding, relatively asymptomatic prior to clinical evaluation, repaired by laparoscopy; Performing reduction of the herniation of intra-abdominal organs, diaphragmatic plasty and fundoplication successfully, with a post-surgical evolution that was adequate.

KEYWORDS: Hiatal hernia, type IV, laparoscopy, fundoplication, hiatal hernia repair, diaphragmatic plasty

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INTRODUCTION

The esophageal hiatal orifice is an elliptically shaped opening in the diaphragm through which the esophagus and vagus nerves access the abdomen¹. A hiatal hernia forms when the stomach or abdominal viscera protrude from the abdominal cavity into the thoracic cavity through the hiatus²⁻³. It is postulated that esophageal acid exposure induces mucosal injury and then transmural injury can cause esophageal shortening, leading to gastroesophageal junction above the level of the hiatus³.

It is associated with impaired quality of life, caused by symptoms including dysphagia, chest pain, reflux, regurgitation and airway symptoms such as cough and dyspnea²⁻⁴. It is more frequent in the elderly patient, with higher incidence in increasing age⁴.

In 1954, Dr. Norman Barrett described the anatomical classification currently used, classifying hiatal hernias into 4 types⁵: Type I hiatal hernia, or sliding hiatal hernia is the most common type and with the greatest association with reflux disease⁶. A type II hernia (paraesophageal), type III (mixed) have elements of both type I and II hernias⁶ and

finally the most relevant to this review type IV hiatal hernia is associated with a large defect in the braesophageal membrane, which allows an intra-abdominal organ in addition to the stomach to herniate through the hiatus, commonly the colon or small intestine, but may include spleen or pancreas^{1,7}. Grade IV hiatal hernia is relevant because of its infrequent incidence in clinical practice.

CLINICAL CASE PRESENTATION

65-year-old female, with a history of hysterectomy 15 years ago, left inguinal plasty without tension 20 and 9 years ago, right inguinal plasty with tension secondary to incarcerated inguinal hernia with occlusion data 1 year ago.

During a study protocol for right inguinal hernia, a type IV hiatal hernia was found incidentally in the computed axial tomography (Figure 1). One year later, she presented gastroesophageal reflux and was protocolized for surgery, and an image of a hollow viscera with a hydroaerial level in intrathoracic position was visible (Figure 2).

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Tomography with evidence of hiatal hernia grade IV.



Figure 2. Image of hollow viscera with hydroaerial level in intrathoracic position.



Figure 3. Image inside cavity.

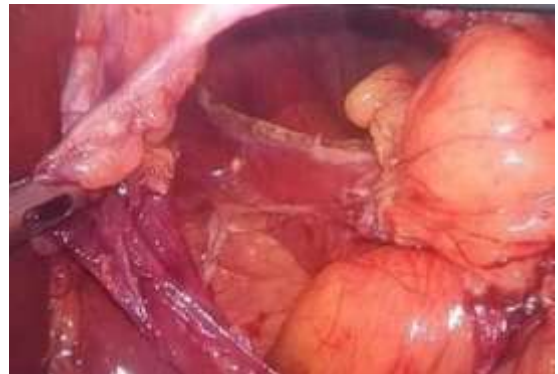


Figure 4. Image inside the cavity, presence of adhesions.



Figure 5. Hernia repair.

Surgical technique: Patient in French position, subsequent antisepsis, 5 ports are placed with Hasson technique: 10mm umbilical, 10mm left subcostal at left mid-clavicular line level, 5mm subxiphoid, 5mm right subcostal in mid-clavicular line and 5mm left subcostal in anterior axillary line; During surgery a hernial defect of 7cm in diameter was found with a sac containing the entire stomach, omentum, in addition to multiple lax and firm adhesions to the pericardium, pleura and diaphragm, with laxity of the diaphragmatic pillar (Figure 3 and 4). The stomach and omentum were tractioned towards the abdominal cavity, releasing adhesions towards thoracic structures. Subsequently, the dissection of the esophageal-brachial membrane was started, beginning on the left side of the abutment and continuing towards its anterior and right edge. Next, the closure of the hernial defect was performed in 1 plane with simple stitches using 1-0 silk, with 4 stitches in front and one behind the esophagus, and finally a total 360° fundoplication was performed with 3 stitches: 2 stomach-stomach stitches and one of them stomach-esophagus-stomach with silk 1 (Figure 5).

In the immediate postoperative period the patient presented subcutaneous emphysema on the left side of the neck, in addition to ipsilateral pneumothorax, so an endopleural tube was placed, which was maintained for 5 days. Liquid diet was started at 12 hours and progressed to soft at 36 hours, without complications. On the fifth day the endopleural tube was removed and the patient was discharged home the following day.

She has presented for 3 subsequent follow-up appointments, at which she has been referred as asymptomatic, adequately tolerating normal diet and with no reflux symptoms.

DISCUSSION

Hiatal hernias are almost never a primary diagnosis; they are usually discovered incidentally in the gastroesophageal reflux disease workup protocol, either on endoscopy, manometry or standing chest radiography. Regarding non-invasive diagnostic methods, the barium swallow is the main diagnostic modality used to determine the degree of hernia⁸.

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Type IV hiatal hernias called "giant paraesophageal hernias" are commonly repaired once identified due to concerns of acute gastric volvulus and strangulation of the stomach, in addition to correction of symptoms such as postprandial chest discomfort, dysphagia, or reflux. The surgical management of this rare condition is the focus of this review⁷.

Following Soresi's initial surgical description in 1919, several techniques have been developed for repair, including thoracotomies, laparotomies, and laparoscopic approaches. Regardless of the approach, the key components for surgical success involve esophageal mobilization of at least 2-3 cm, release of the hernia sac, tension-free closure of the hiatus, and fundoplication⁹⁻¹⁰.

Laparoscopic repair of the hernia defect with fundoplication is a demanding procedure that has become the standard therapy for symptomatic hiatal hernia^{4,9}.

Fundoplication involves complete dissection of the hiatal hernia, circumferential mobilization of the gastroesophageal junction below the hiatus, and closure of the diaphragmatic abutment or cruroplasty, followed by a 360° gastric wrap to restore muscular support in the distal esophagus^{4,11}. The anatomical rationale for fundoplication is to restore the angle of His, act as a gastropexy, reinforce the abutment plasty and thereby prevent recurrence.

Two meta-analyses in 2016 have demonstrated a benefit of mesh in reducing postoperative recurrence¹². Granderath and colleagues, performed a randomized control trial comparing simple cruroplasty after laparoscopic Nissen fundoplication versus prosthetic closure with polypropylene mesh. Esophageal erosions were reported which occur from constant movement of the esophagus against the solid edge of the mesh, with the mesh cutting into the esophagus over time. The other reported complication was the creation of a dense band of fibrosis around the implanted prosthesis, resulting in significant dysphagia⁷.

Another option for hiatal hernia repair such as the falciform ligament reinforcement technique first described by Varga in 2004 during laparoscopic cruroplasty, the rationale for its use is that the falciform ligament provides a well-vascularized pedicle of autologous tissue and is situated in an ideal location that facilitates coverage of the crural repair^{7,9}.

More recently, the use of robotic-assisted surgery in hiatal hernia repair has proven to be safe and feasible, particularly in cases of large hiatal hernias requiring complex transhiatal sac dissection and improved surgical precision, as they allow a three-dimensional view and longer articulating instruments increase anatomical accuracy¹³.

CONCLUSIONS

We present a case of grade IV hiatal hernia diagnosed incidentally by computed axial tomography in whom the hernia sac contained stomach and omentum, with lax and firm adhesions, accompanied by laxity of the abutment edges. Key components for surgical success included esophageal

mobilization, release of the hernia sac, performing tension-free hiatal closure and fundoplication.

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