

Laparoscopic diaphragmatic hernia repair. A case report

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Case Report

General Surgery



Background: Diaphragmatic hernias (DH) are a relatively rare pathology in adults, and it is important to perform an adequate diagnosis and treatment. It concerns a 55-year-old patient who underwent postoperative laparoscopic diaphragmatic hernia surgery, with a history of esophageal cancer plus esophagectomy and gastric ascent. Diaphragmatic hernias are a pathological entity that is difficult to diagnose and uncommon, especially in adulthood; however, in this case, the diagnostic and therapeutic approach is presented in a tertiary level hospital.

Keywords: Diaphragmatic hernia, laparoscopic surgery.

The presence of a weak spot in an area of the diaphragm can allow abdominal contents to herniate into the chest. Diaphragmatic Hernia can occur at the esophageal hiatus, known as hiatal hernia; near the esophageal hiatus, as paraesophageal hernia; posterolaterally known as Bochdalek hernia (BH); or at the paraesternal level, known as paraesternal hernia, as well as retrocondrosternal, retrocostoxiphoid, retrosternal, subcostal, substernal, or subcostosternal. (1)

The diaphragm is composed of myotendinous bands that separate the thoracic cavity from the abdominal cavity. Due to embryological development, there are regions with a greater tendency to rupture, and depending on the mechanism of injury, the diaphragm will tear at specific anatomical locations. (2) Its etiology can be acquired or congenital. Up to 7% of patients suffering from closed thoracoabdominal trauma present with post-traumatic diaphragmatic tear, preferably on the left side. In late-presenting hernias (in adulthood or old age), increased intra-abdominal pressure and thoracic depression are significant factors in hernia formation. Thus, in obese patients or those with kyphoscoliotic deviation experiencing repeated episodes that increase abdominal pressure, such as vomiting or coughing, they may act on regions of lesser diaphragmatic resistance (congenital substrate). (1,2)

In the last decade, minimally invasive surgery has shown significant advancements in surgical techniques, availability of new instruments, and experience in minimally invasive procedures, which has improved procedure safety and reduced morbidity and mortality.

Numerous studies have been conducted in the follow-up of benign pathologies suitable for minimally invasive surgery, such as gastroesophageal reflux

disease, hiatal hernia, esophageal diverticula, and achalasia. (2,3)

This article presents the case of a 55-year-old adult patient with a left post-surgical diaphragmatic hernia (distal esophagectomy and gastric pull-up due to esophageal cancer performed five years prior to their current condition), treated via laparoscopy at Hospital Ángeles Acoxpa, where hernia reduction with adhesiolysis using Guardix, suturing of two defects (one 2x3 cm paraesophageal and another 2x2 cm), and mesh placement were performed.

Case report

Male, 55 years old, originally from Mexico City, with a history of distal esophagectomy and gastric pull-up in 2009 for Esophageal Cancer, with adjuvant therapy consisting of 4 cycles of chemotherapy and 2 of radiotherapy.

The patient was admitted to the emergency department presenting with intense pain predominantly in the epigastric region for 12 hours, without reporting bleeding, nausea, vomiting, and syncope that caused intolerance to oral intake. The patient mentioned having experienced this pain repeatedly in the last month prior to the consultation, managing the symptoms with the administration of an antispasmodic (hyoscine butylbromide) and a proton pump inhibitor (omeprazole); however, this time there was no improvement, so he came to the emergency department where a study protocol was initiated, requesting labs that were reported as normal.

On relevant physical examination, peristaltic sounds were auscultated in the left hemithorax with metallic sounds. The abdomen was soft, flat, depressible, and painful on superficial and deep palpation in the epigastrium and both hypochondria, with radiation to both flanks, with generalized



Figure 1. Axial cut of thoracoabdominal CT scan showing abdominal contents in the left hemithorax.

dullness, and no presence of peristalsis, so imaging studies were decided. (Figure 1)

A chest X-ray was performed, reporting a radiolucent image in the left hemithorax correlating with ectopic abdominal contents, with radiopacity of the ipsilateral lung parenchyma, as well as a thoracoabdominal CT scan reporting intestinal pneumonitis and a diaphragmatic defect with elevation of intestinal loops, of both large and small intestines in the left hemithorax, with a risk of mesenteric thrombosis, with adequate intestinal transit ruling out intestinal leakage (Figure 2). With this data, a diagnosis of diaphragmatic hernia was made, and repair via laparoscopic surgery was scheduled.

During his hospital stay prior to surgery, the patient continued to have oral intolerance, so an esophagogastroduodenal series (Figure 3) was performed, reporting postoperative changes due to esophagogastroanastomosis with gastric elevation, signs of partial stenosis of the proximal third of the esophagus at the anastomotic junction with the stomach, with adequate passage of the contrast



Figure 2. Axial reconstruction. Left diaphragmatic hernia with elevation of a segment of the transverse colon showing signs of wall ischemia and edema due to mesenteric congestion.



Figure 3. Esophagogastroduodenal series reporting partial stenosis of the proximal third of the esophagus.

medium and delayed gastric emptying. Likewise, a panendoscopy was performed, reporting a short esophagus of approximately 8 cm in length with probable metaplasia at the anastomosis, glycogenic acanthosis, and postoperative gastric and duodenal changes. Due to poor oral tolerance, total parenteral nutrition (TPN) was initiated. He was evaluated by Thoracic Surgery, who, together with our service, decided on laparoscopic repair of the diaphragmatic hernia defect via the abdominal route and placement of a mesh, with the possibility of performing a left thoracotomy if necessary.

Once the patient was stabilized and after seven days of parenteral nutritional support, surgery was scheduled. Adhesiolysis of parieto-epiploic and parieto-colic adhesions was performed. Two diaphragmatic defects were found, one paraesophageal of approximately 2 x 3 cm and another of

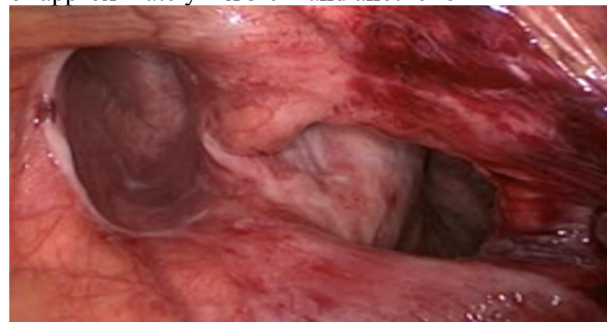


Figure 4. Hernia defects. The paraesophageal defect (left) is 2x3 cm, and the second defect (right) is 2x2 cm.

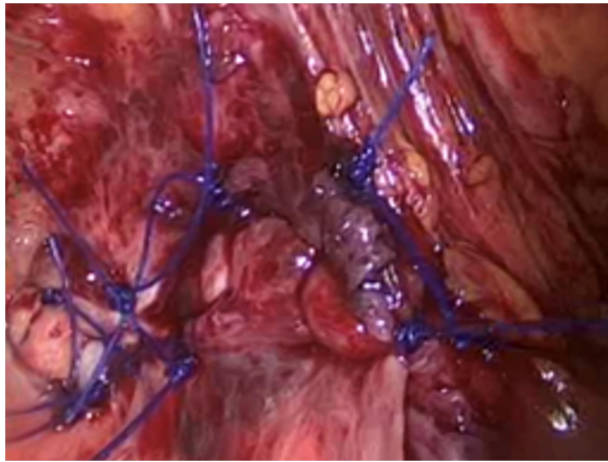


Figure 5. Closure of both hernia defects with simple polypropylene sutures.

approximately 2 x 2 cm in the thorax (Figure 4). The edges of these defects were dissected, brought together with simple polypropylene sutures, and a Physiomesh® mesh of 8 cm in diameter was placed (Figure 5). It was fixed with Absorbatack and polypropylene sutures (Figure 6). Additionally, a left endopleural tube was placed, and the next day, a mixed diet of liquids and parenteral nutrition was started. After 12 hours, respiratory exercises with an incentive spirometer were initiated, achieving an elevation of 600 cc with good tolerance. A follow-up chest X-ray was taken, showing no abnormalities (Figure 7). The patient was discharged twelve days after admission, with adequate clinical improvement.

Discussion

Diaphragmatic hernias are defined as the passage of abdominal contents into the thoracic cavity through a defect in the diaphragm. They are classified

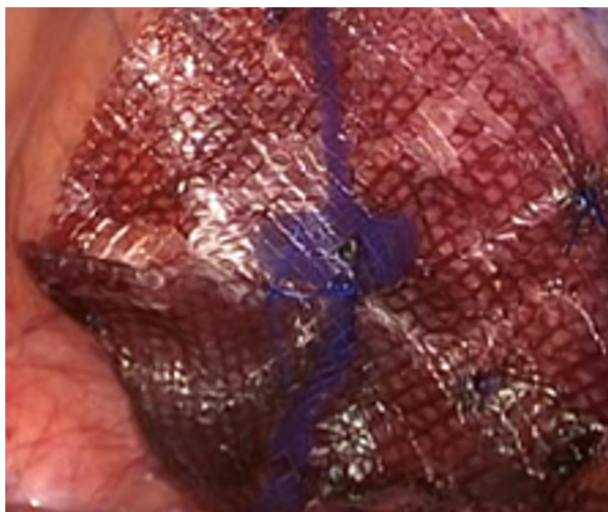


Figure 6. Placement of an 8 cm. diameter Physiomesh.



Figure 7. Chest x-ray after surgery demonstrating the correction of the diaphragmatic hernia.

according to their etiology: sliding hiatal or paraesophageal, congenital (Bochdalek or Morgagni), and acquired (traumatic). (1, 4)

Diaphragmatic hernia in adults, whether congenital or traumatic, is an uncommon but potentially serious condition. Complicated diaphragmatic hernias can be life-threatening. There are no established clinical guidelines for their management, and most data come from retrospective series from single institutions. (5,6)

Approximately 69% of diaphragmatic hernias are left-sided, 24% are right-sided, and 15% are bilateral. The initial diagnosis of diaphragmatic injuries is difficult, with late diagnosis occurring in 10-61% of medically managed cases. (2,7,8).

Chest and abdominal CT scans are the standard for diagnosis. (6). Bochdalek hernia is a congenital defect of the posterolateral region of the diaphragm due to failure to close during embryogenesis. They are located in 80-90% of cases on the left side, and the defect is usually about 2 cm, located just above the adrenal gland. Between 100-150 reports in adults can be found in the world literature. The presence of symptomatic Bochdalek hernias in adults is exceptionally rare. The incidence of asymptomatic cases is estimated to vary between 1 in 2,000-7,000 in autopsy studies. (9)

The goals of treatment include reducing the abdominal contents and repairing the diaphragmatic defect. Transthoracic repair is the choice for right-sided hernias; however, there is controversy over the management of left-sided hernias; some authors support the abdominal approach, as it has greater advantages for recognizing and treating malrotations. (3,10)

Laparoscopy has been shown to be a safe and viable technique for repairing DH in both elective and emergency situations, reducing hospital stays. However, due to the scarcity of data, the low incidence of this condition, and the different forms of presentation, there is no clearly superior surgical approach; the choice usually depends on the surgeon's preference. (5) In this case, a suitable laparoscopic approach was shown, demonstrating a good outcome from using this approach.

Primary repair is the technique most frequently used in emergency surgeries. The use of meshes in emergency situations is avoided due to the risk of infections. Regarding this last point, the use of biological meshes in the context of contaminated sites is debatable. If using a mesh, a flap of several centimeters from the hole to the edge of the mesh should be left, as in ventral hernias. (5,11)

In this case, we performed dissection of the edges, bringing them together and placing an 8 cm diameter Physiomesh, fixed with Absorbatack and polypropylene sutures.

In our patient, the evolution was satisfactory both intraoperatively and postoperatively. Most diaphragmatic hernias are asymptomatic and are incidental findings in imaging studies performed for other reasons. They may present as pulmonary discomfort, and more frequently, nonspecific abdominal discomfort, with acute presentation being rare as a consequence of complications such as intestinal obstruction, strangulation ischemia, or perforation. (5,8,12)

The treatment of diaphragmatic hernias is surgical. The approach can be through laparotomy, thoracotomy, or combined, depending on the presence or absence of complications. In the case of chronic hernias, the thoracic approach is better due to the development of adhesions between the herniated contents and the intrathoracic organs; however, in our clinical case, despite being a chronic and postoperative hernia, the correction of the defects and the placement of the mesh could be performed. Small diaphragmatic defects can be corrected with primary suture, but larger or irregular defects use synthetic material meshes. Regarding this last point, evidence shows that in the short term, the use of meshes has benefits over primary suture closure (11,13). In our case, both procedures were performed, both the closure of the two defects and the placement of the mesh.

In summary, diaphragmatic hernias are a rare condition in adults, presenting mainly with nonspecific digestive symptoms. Laparoscopic repair is a safe and effective option for scheduled surgeries and should be the first choice for these patients. In emergency cases, it is essential to assess hemodynamic stability and concurrent injuries to decide if laparoscopy is an appropriate treatment method.

Conclusion

Diaphragmatic hernias represent a true clinical and surgical challenge. Whether in cases of congenital or traumatic diaphragmatic hernias, a high index of suspicion and the appropriate use of diagnostic imaging are required to resolve the problem during the same hospitalization to avoid long-term complications, which can be catastrophic. Morgagni hernia is an uncommon pathological entity with a very low incidence, making timely detection difficult; however, prompt diagnosis and surgical treatment provide excellent results. The current trend is to use minimally invasive surgical techniques such as laparoscopy, which results in shorter hospital stays for the patient, less pain, and excellent outcomes.

Conflicts of interests

There is no conflict of interest in this case.

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