Laparoscopic management of a congenital diaphragmatic hernia

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Abstract

Morgagni's diaphragmatic hernia is a congenital defect rarely occurring in adults. The diagnosis is usually made as a finding in imaging studies or, although rather infrequently, in the study of patients with symptoms such as dyspnea or retrosternal pain. Management of the symptomatic presentation is surgical and open repair has been the method most widely used. In this article, we present the case of a 42-year old male with retrosternal pain and dyspnea symptoms; the diaphragmatic hernia was diagnosed with a tomography and was treated with reduction and surgical repair using laparoscopy. (Gac Med Mex. 2014;150:457-60)

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Introduction

Morgagni's hernia is a retrosternal congenital defect located between the costal and sternal portions of the diaphragm[1]. It accounts for 3% of diaphragmatic hernias. Presentation in adults is rare, it is usually an incidental finding and, athough generally it is asymptomatic, the presence of symptoms not attributable to other diseases is an indication for surgical repair[2]. Literature states that open procedure is the most widely used repair method. Laparoscopy has modified the approach and treatment of several thoracoabdominal conditions and, therefore, this type of management has been increasingly used over the past few years. In this paper, the case of an adult patient with a symptomatic congenital diaphragmatic hernia who was treated laparoscopically with reduction of the hernial contents and surgical primary closure and placement of mesh, is presented. There were no complications and the patient evolved satisfactorily.

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Case report

Forty-two-year old patient with a history of smoking for 20 years, which was discontinued 10 years before the current condition, with no prior history of surgery or trauma. Symptoms started one year before as non-productive cough, dyspnea on moderate and heavy exertion, exercise intollerance and a foreigh body sensation in the retrosternal region. First, the patient was assessed by the cardiology department, and a catheterization and a cardiac stress test were performed, with negative results for coronary heart disease.

Due to the persistance of symptoms, chest X-ray and thoracoabdominal CT scan with transrectal contrast were performed, which revealed the presence of colon and omentum loop in the left hemithorax (Figs. 1 and 2). With these findings, an incarcerated Morgagni-type left anterior congenital diaphragmatic hernia was diagnosed, without strangulation data.

An elective laparoscopic treatment was carried out. In the French position, four 10-mm ports were placed: two subcostal bilaterally, one in the supraumbilical middle line and one more in the left flank. The presence of a left anterior 5 x 5 cm diaphragmatic hernial defect with greater omentum and transverse colon in its interior

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Figure 1. *Coronal colo-CT tomographic reconstruction where the colon loop is observed in the left hemithorax.*

Figure 2. *Sagittal colo-CT tomographic reconstruction where the colon loop is observed in the anterior mediastinum.*

was evidenced (Fig. 3). The hernial sac and its contents, which were adhered in relation to the pleura and the pericardium, were entirely reduced (Fig. 4). Subsequently, primary closure of the hernial defect was performed. A 15 x 20 cm tissue-separating mesh made of poliglecaprone, polydioxanone and polypropylene (Phisiomesh) was placed (Fig. 5). The procedure concluded with a 100-min surgical time, without perioperative complications. The patient was discharged at 24 h postoperatively, tolerating the oral route with an adequate evolution.

Discussion

Morgagni's hernia, also known as congenital retrosternal diaphragmatic hernia, was described in 1769 and represents 3% of congenital diaphragmatic hernias[2]. Embriologically, the diaphragm is fused in the

Figure 3. *Laparoscopic image of a diaphragmatic hernia with omentum and colon in its interior.*

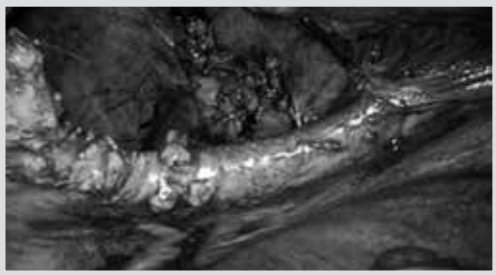

Figure 4. *Laparoscopic image of a 15 cm diaphragmatic hernia once its contents were reduced.*

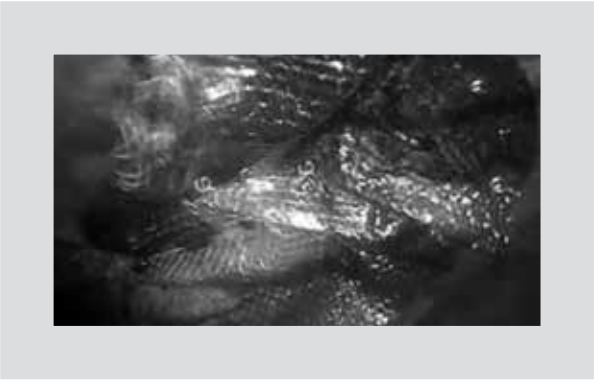

Figure 5. *Laparoscopic image of a diaphragmatic hernia repaired with the placement of a mesh fixed with metal tackers.*

cephalocaudal and dorsoventral direction, with the anterior region of this muscle being the last to be formed; any failure in this process will lead to congenital defects or weakness of the diaphragm[1]. Most Morgagni hernias occur in the right portion of the diaphragm (91%) in spite of the liver; the defect is usually larger in the cross-sectional than in the anteroposterior diameter. The hernia contents, as in the presented case, is comprised by omentum and colon in 29%, and represents the second most common presentation, only preceded by the greater omentum (31%) as single contents. Also the stomach (15%), the small intestine (11%) and the liver (4%) can be found to be herniated.

According to the literature, Morgani's hernias display symptoms only in 20-30% of the cases, which is why the diagnosis is often incidental[3,4]. Horton et al. performed a review of 298 cases where they found that, in contrast with common belief, when conducting a thorough interview with the patients, asymptomatic presentation only occurs in 29% of the cases. The most common symptoms are retrosternal pain or oppression (37%) and pulmonary symptoms (36%) that, as in the presented case, include dyspnea, cough and exercise intolerance[1]. GI symptomalology (dysphagia, gastroesophagic reflux) is the least common (4%). In asymptomatic adults, the potential risk of intestinal incarceration and obstruction is 12%[5]. When surgically-treated diaphragmatic hernias are analyzed, strangulation with clinical characteristics of intestinal obstruction only occurs in 20% of the cases. There are predisposing conditions for the development of such symptoms, including trauma, obesity, cough or chronic constipation[1,3].

Since in physical examination clinical data are often quite unspecific, the diagnosis of this condition relies on imaging studies. Although the diagnostic standard is thoracoabdominal CT, chest X-ray is the most widely used study (93%), and it is fundamental asking for a lateral projection. Abdominal CT with oral or transrectal contrast has the highest sensitivity and specificity and shows abdominal contents of the thorax with or without contrasted loop[1,2].

Elective surgical treatment is imperative once the diagnosis is made, since incarceration or strangulation of the hernial contents is likely to occur at any time. Traditionally, open approaches such as laparotomy or thoracotomy have been the most widely used. With the advent of laparoscopy, the approach has changed into a minimally invasive procedure, with lower morbidity and mortality. Horton et al., in a review of a 16-year period in literature, reported that 46 cases (17% of total cases) were managed with laparoscopy. Ninety-one percent of cases approached this way had a preoperative diagnosis, whereas in the cases managed with thoracotomy (49%), the intraoperative finding of diaphragmatic hernia was made in up to 33% of the patients. In this series, overall, the open approach was selected in 32% of the cases presenting as surgical emergency with data of intestinal obstruction. Nevertheless, there are reports on laparoscopic approaches even in intestinal obstruction situations with adequate results.

Once the hernial defect is identified and the contents are reduced, there are three ways to surgically manage the defect: primary closure, primary closure + placement of mesh, and placement of mesh without closure of the defect. Horton et al. reported that, of the cases managed with an open approach, 88-92% had a primary closure and only 14% of these had the mesh placed. Conversely, in patients undergoing laparoscopic treatment, only 29% had the primary closure performed, but the mesh was used in 69% of the cases. Regardless of the type of management, there were no recurrences. In the presented case, in addition to primary closure of the defect, a poliglecaprone, polydioxanone and polypropylene tissue-separating mesh was used. This mesh can be placed in contact with the viscera at both surfaces, which facilitates its use with laparoscopy within the cavity. There is no sufficient information establishing the best way to fix the mesh. When using the laparoscopic approach, fixation with absorbable or titanium tackers is usually chosen, which attach to the periphery of the hernial defect. A 3-5 cm margin between the edge of the mesh and the hernial defect is recommended[6]. Dapri et al. reported on three cases of diaphragmatic hernia using mesh that was fixed with helical tackers; one of the

cases got complicated with a cardiac tamponade after fixation of the mesh on the cardiac surface of the diaphragm, which required drainage and prolonged the hospital stay[3]. Finally, there is no consensus on the management of the peritoneal sac, since its resection inreases the risk of pleural lesion[4]; more information is needed in order to define this issue.

In conclusion, laparoscopic management should be currently favored when the surgeon's experience allows for it, since this approach offers great visibility of the abdominal cavity, the hernial defect and its contents. The treatment has been proven to be safe, recurrence rate is practically absent, and with the advent of tissue-separating mesh, the possibility of prosthetic materials-associated complications is minimal. Furthermore, the laparoscopic approach reduces hospital length of stay, pain and postoperative trauma.

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