CASE REPORT

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Repair of Morgagni Hernias with large dDefect in adult using prolene mesh: a case Report

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ABSTRACT

Introduction: A diaphragmatic hernia is a rare condition. A Morgagni hernia is one of four type of diaphragmatic hernia and it's located in anterior and retrosternal location. This condition can be caused by trauma or congenital condition. The defect of Morgagni originally is small. Incidental finding during X-ray examinations performed for symptoms not related to the hernia or when symptoms develop as a result of incarceration, strangulation and visceral rupture inside the chest cavity.
Case Report: In this case, we present a 35-year-old man with a 5-year history of stomach discomfort and episodes of severe dyspnea who arrived to the emergency room, during his medical work-up we incidentally found an intrathoracic gastric bubble. A laparoscopy surgery was performed but the operator did not find any holes. We decided to perform thoracotomy; the findings were in the form of intestinal entry into the thoracic cavity without any sign of incarcerated or necrotic tissue. Then, a laparotomy was performed by digestive surgeon to returns the intestine to abdominal cavity. Thoracic surgeon was involved to close the defect, which is a large defect, for that reason we choose to use prolene mesh.
Discussion: This pathology is infrequent in adults, among this age group, there are two different clinical presentations: asymptomatic patients who are diagnosed incidentally when abdominal organs are found in the thorax in a chest CT scan, and symptomatic patients due to side effects of incarceration, strangulation, hemorrhage and visceral perforation in the chest cavity. Morgagni's defect was found to be large so it was decided to use a mesh.
Conclusion: Diaphragmatic hernias are rare among adult population, and they are usually asymptomatic, in this case we presented a symptomatic patient, diagnosed with a chest radiograph and treated surgically. The surgical approach for the resolution of this pathology is variable and it depends on the presence and severity of visceral complications. This patient, who has wide Morgagni's hernia was treat by mesh to close the defect.

Keywords: Diaphragmatic hernia; Diaphragmatic defect; Morgagni hernia.
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INTRODUCTION

Adult-onset diaphragmatic hernia is a rare condition with varying clinical manifestations. The majority of adult-onset diaphragmatic cases are associated with trauma. Blunt thoracic and abdominal traumas correlate 5% to 7% with diaphragm injury, and 3% to 15% for patients with penetrating trauma. These traumas might not be noticed when they happened, however they are often found months later while working on associated symptoms. One of the four types of diaphragmatic hernia is Morgagni type. Morgagni hernia is located posterolateral to the sternum and is caused by a defect that affects the fusion of costal arches and the pars sternalis[1]. The difference between a Morgagni hernia and other diaphragmatic hernias is the location. The other three diaphragmatic hernias are Bochdalek hernia, in which the defect is posterolateral; hiatal hernia, in which the defect is on the esophageal hiatus; and paraoesophageal hernia, in which the defect is located near the esophageal hiatus.

The defect is a Morgagni hernia is generally characterized as a small defect, located in the anterior position, often on the right side (90%), a rare number of cases (only 2% out of all CDH cases), and a low risk of prolapses. Morgagni Hernia that is found during infancy or early childhood is known to be correlated with other congenital anomalies, with incidents ranging from 34% to 50%. The most common anomalies are heart defects (25% to 60%) and trisomy 21 (15% to 71%). Because of the pericardial attachment that gives support to the left side of the diaphragm, 91% of Morgagni Hernias were found on the right side, with only 5% cases found on the left side, and 4% of cases were found bilaterally[1]. With the increase in intra-abdominal pressure that weakens the diaphragm, the defect could widen. Morgagni hernias tend not to be very symptomatic because hypoplasia of the lungs rarely occurs, resulting in delays in the diagnosis of this defect. In symptomatic patients, upper gastrointestinal pain, including retrosternal pain or chest pain that gets relieved as patients stand up, shortness of breath, bloated stomach, digestive issues, or stomach cramps can be found[1].

Morgagni hernias are most often made up by the colon (54% to 72%) or omentum (65). However, they can also be made up by the small intestine, the stomach, and the liver. Definitive diagnosis can be done with a radiograph that includes an anterior-posterior and a lateral chest radiograph. Just a chest rontgen can establish the diagnosis about 71% when the intestine is seen in the chest. Further imaging, such as a computerized tomography (CT) scan and a barium enema, can be used to make sure of the diagnosis[2].

Fast diagnosis and surgical repair are recommended by the majority of authorities. In general, diaphragmatic hernias can be corrected with laparotomy, thoracotomy, or both procedures[3,4]. Possible complications resulting from Morgagni hernias are caused by post-surgery complications. Some of the possible complications are wound infections, incision hernias or port site, stitch abscess, and bowel obstruction.

The recurrence rate of Morgagni Hernias is reported to be around 2% to 42%, although many studies reported the absence of recurrence 10 years after surgery[5]. We will then report an adult-onset diaphragmatic hernia case with dyspepsia as the initial symptom that is later successfully corrected with an exploratory laparotomy. Operative approach and diaphragmatic defect closure will be explained[6].

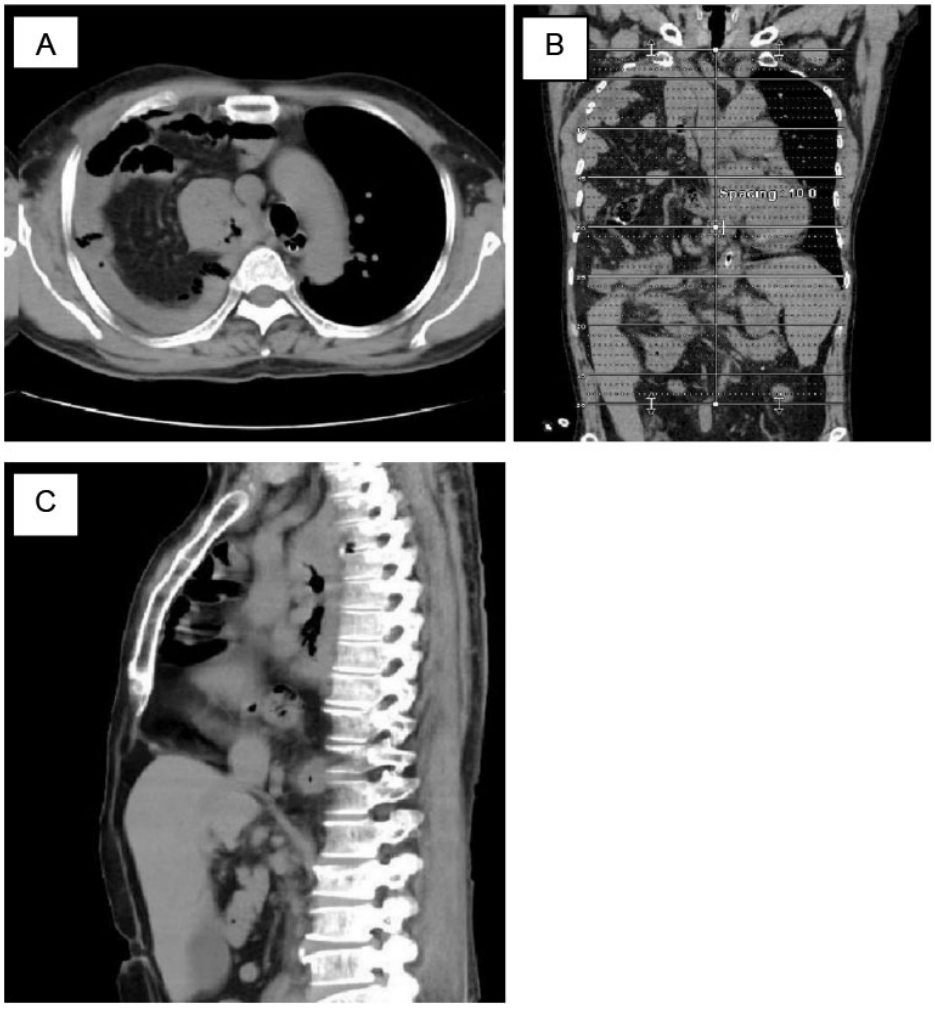

Figure 1. (A) Transverse section of thoracoabdominal CT shows right hemi-diaphragmatic hernia defect with intrathoracic stomach. (B) Longitudinal section of thoracoabdominal CT shows stomach protrusion to the height of the heart through diaphragm defect, an increase in perigastric fat inside the abdominal cavity, and esophageal dilatation. (C) Lateral section of thoracoabdominal CT shows elevation of right hemi-diaphragm, with intrathoracic stomach pressuring the right lung.

CASE PRESENTATION

A 35-year-old man complains of a 5-year episode of stomach discomfort and severe dyspnea without a definite cause, and was brought to the emergency room with acute and severe chest pain on the right side. The pain was felt intermittently, spread to the ipsilateral dorsal side, accompanied by nausea, vomiting, and inability to defecate.

The vital signs are as follows: blood pressure 100/60, heart rate 120 beats per minute, respiratory rate 25 times per minute, and body temperature of 37^0C. The patient is clinically dehydrated with decreasing chest expansion and breathing sounds on the right side. The patient complains of some mild epigastric pain.

Laboratory examination results show leukocytosis, an increase in lactate and lactate dehydrogenase, normal heart enzymes, and type 1 respiratory failure. Computerized tomography then (Figure 1) showed a right hemidiaphragm defect with a stomach hernia into the thorax. Initially, laparoscopy was performed. However, a focal lesion was not found; therefore, thoracotomy was decided to be performed in order to reach the lesion (Figure 2). Thoracotomy was performed by cardiovascular thoracic surgery, and a small intestine hernia into the chest cavity was found. The small intestine was intact without signs of necrosis or incarceration. The operator then tried to put the intestine back into the abdominal cavity with an exploratory laparotomy. The defect on the anterior side was considerably wider, unlike the common Morgagni defect effect which lies on the smaller side. Adhesiolysis, strangulation, or necrotic intestinal tissue were not found. The diaphragmatic hernia was then closed by thoraco-vascular surgery using Prolene mesh that was located in the chest cavity.

DISCUSSION

In our case, chest X-ray with an air-fluid level inside the right chest cavity increased our suspicion of Diaphragmatic Hernia (DH), and further diagnosis was confirmed with a CT scan and contrast. Our patient's diaphragm defect was located on the apex of the right diaphragm, known as a Morgagni hernia. This case might be a delayed manifestation of occult diaphragmatic injury. In adults,

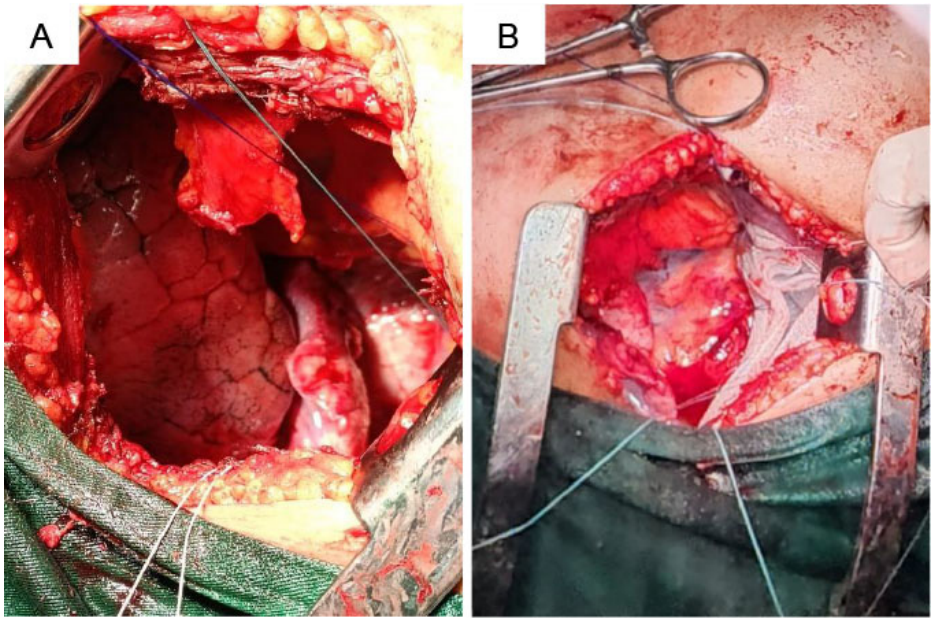

Figure 2. (A) Open laparotomy showing stomach hernia, some small intestine, and omentum through the diaphragm defect. (B) Laparotomy shows the liver covers the diaphragmagic hernia defect and we had to perform chest thoracotomy and laparotomy to reach the lesion.

this defect rarely happens; lungs, in most cases, develop normally and rarely cause any symptoms. In this age group, there are two peculiar clinical images: Incidental findings during X-ray examination that are performed for symptoms that are not correlated with hernias or when the symptoms develop as a result of incarceration, strangulation, and visceral rupture inside the chest cavity. The symptoms vary according to the affected organs: digestive symptoms include intermittent stomach pain, vomiting, and dysphagia, while respiratory symptoms include chest pain and dyspnea. The death rate is over 80%. Fast diagnosis and surgical correction are recommended by most authority[4,6].

Imaging modalities commonly used are chest X-ray and CT scan. Other imaging modalities include upper gastrointestinal contrast study, magnetic resonance imaging, and laparoscopy, in which all of those would give differing results. CT scan sensitivity that has been reported to diagnose diaphragmatic hernias ranges from 33% to 73%[4].

Traditionally, DH is corrected with open methods as first proposed by Riolfi in 1886[2]. Laparoscopy was used to identify traumatic diaphragm injuries by Adam Thwaite in 1984. Thoracoscopy could be preferred for hernias with fibrosis and severe pleural adhesion. Debates about whether synthetic mesh or primary closure gives the safest and most long-lasting repair for hernia have yet to be decided. Laparotomy is performed to evacuate the trapped intestine and return it to the abdominal cavity. The diaphragmatic hernia sac is closed with mesh. The hernia sac is big enough after reduction; sac ligation followed by excision has to be performed to reduce fluid retention. Synthetic mesh is chosen for a big diaphragmatic defect, such as in our case. Gore-Tex Dual Mesh was used because of its dual surface characteristic. The fascia side will induce tissue growth and lead to better tissue fixation. On the other side, the peritoneum has a smooth visceral surface, and low porosity minimizes visceral adhesion. The benefit of using open laparotomy is to avoid tension pneumothorax because the laparoscopy procedure for a DH patient with pleuroperitoneal communication. Patient's ventilation could become difficult, and this could not be corrected by increasing intrapleural pressure with PEEP, which would induce tension pneumothorax. Conversion to open surgery is mandatory when ventilation difficulty is found[3,7].

CONCLUSION

Adult-onset diaphragmatic hernia is a rare condition that has to be diagnosed right away and surgically handled. This condition could be associated with trauma. Blunt thoracic and abdominal trauma have a correlation of up to 7% with diaphragmatic trauma, and 3% to 5% for patients with penetrating injury. Surgical approach for these pathological resolutions varies and depends on the location and severity of the visceral complications. Morgagni hernia is characterized as a small defect; however, in our case, the defect on the hernia foramen was found to be considerably large. Therefore, it gave a wide opportunity for abdominal organs to rise up into the thoracic cavity and cause manifestations for the patient. We used Prolene mesh jarring to accomplish defect closure.

DISCLOSURES

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The authors declare that no funding was received for this research.

Conflict of Interest

The author(s) declare that there is no conflict of interest.

Author Contribution

RDD: Conceptualization of the study, methodological design, intellectual content, literature research, clinical studies, data acquisition, manuscript preparation, manuscript editor, and guarantor. While PKH: Conceptualization of the study, methodological design, intellectual content, doing clinical studies, data analysis, manuscript editing, and manuscript review. All authors prepare the manuscript and agree for this final version of manuscript to be submitted to this journal.

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