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Case Report

Diaphragmatic morgagni in adult: a case report

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ABSTRACT

A 70-year-old male patient with a history of systemic hypertension, gouty arthritis, and possible chronic kidney disease presented with right flank pain, nausea, and decreased appetite. Examinations revealed a right-sided incarcerated diaphragmatic hernia in the anterior region, with protrusion of adipose tissue and loops of small intestine. A laparoscopic surgery was performed, during which the herniated contents were reduced, and a hernia defect approximately 4 cm in size was found and repaired. Post-surgery, he developed complications including pulmonary thromboembolism, intestinal perforation, and fistula, which required reoperation, and progressive clinical deterioration, ultimately leading to death. This case report presents a rare instance of congenital hernia diagnosed through imaging after the onset of nonspecific clinical symptoms. It emphasizes the importance of considering this pathology among differential diagnoses of acute abdomen for prompt diagnosis and appropriate management through surgical intervention.

Keywords: Morgagni hernia, Surgical approach, Imaging diagnosis

INTRODUCTION

Diaphragmatic hernias can be congenital or acquired. Congenital hernias are rare and are usually diagnosed in the neonatal phase, classified into Bochdalek hernias and Morgagni hernias.[1] The latter originate from the costosternal triangles and result from incomplete diaphragm formation during embryogenesis, occurring primarily on the right side of the thorax.[2]

Acquired hernias, on the other hand, can be traumatic, hiatal, or iatrogenic, with traumatic cases being more common in instances of thoracic trauma.[3] Diagnosis of congenital hernias in adults is rare and usually occurs incidentally during chest imaging.[4] They may be asymptomatic or cause gastrointestinal, respiratory, and cardiac symptoms. Early diagnosis and appropriate surgical treatment are essential to prevent severe complications.[2,4] Surgical treatment is indicated, with a preference for minimally invasive approaches, such as video laparoscopy or video-assisted thoracoscopic surgery.[2,5] Hernia repair involves reducing the herniated content, closing the defect, and using a mesh for reinforcement.[2,4-6] Rapid diagnosis and appropriate treatment are crucial, especially in cases of incarceration or strangulation of the herniated content, which can lead to severe complications and death.[2,5]

CASE REPORT

A 70-year-old male patient with a history of hypertension, gouty arthritis, and undiagnosed chronic kidney disease was referred due to complaints of right flank pain for one day, associated with nausea and decreased appetite. He denied any changes in bowel

habits. The patient was hemodynamically stable, breathing comfortably in ambient air, with a distended abdomen, increased bowel sounds, and deep palpation tenderness in the mesogastric area, but without signs of peritonitis. A computed tomography (CT) scan of the abdomen revealed a right-sided incarcerated diaphragmatic hernia with protrusion of adipose tissue and loops of small intestine into the hernia sac, with a hernia collar approximately 3.2 cm in diameter, and marked distension of the proximal small intestine loops (Figure 1 A and B). Laboratory tests showed significant renal dysfunction (likely acute exacerbation of chronic kidney disease) and leukocytosis, along with elevated C-reactive protein levels.

A laparoscopic procedure was indicated and performed on September 08, of 2023. The surgery identified a right-sided diaphragmatic hernia near the hepatic falciform ligament, with incarcerated small intestine (Figure 3). The herniated content was successfully reduced. A hernia defect of approximately 4 cm in diameter was observed, without a hernia sac (Figure 3A), with the hepatic edge adherent to the lower part of the defect, which was released using a Ligasure device. Diaphragmatic defect repair and mesh application performed (Figure 3B). A slight ring-shaped hematoma was noted in the incarcerated small intestine loops, without signs of distress. Two areas of serosal damage in the small intestine were repaired with polydioxanone (PDS) suture. A right-sided thoracostomy with a pigtail catheter was performed due to pneumoperitoneum insufflation, with communication to the thoracic cavity.

The patient stayed in the ICU, exhibiting abdominal distension and worsening infection markers on the 5th postoperative day (POD). An angio CT of the chest and abdominal CT with oral contrast were performed, diagnosing a pulmonary embolism in the left main branch, signs of fistula, and presence of free fluid in the abdomen. A decision was made for reoperation and the initiation of escalated antibiotic therapy with Tazocin and Vancomycin. The patient was reoperated on August 15, 2023, revealing diffuse distension of the small intestine loops and a perforation site in the small intestine approximately 270 cm from the Treitz angle, with localized fecal peritonitis. An enterectomy of approximately 25 cm was performed using a linear stapler, with a termino-lateral anastomosis and reinforcement of the staple line.

Parenteral nutrition was initiated, oral intake was kept at zero, and anticoagulation was started via infusion pump due to the pulmonary embolism. Hemodialysis was commenced by nephrology due to progressive and significant renal dysfunction. Oral liquid diet was started on the 3rd POD of reoperation with partial acceptance. Antibiotic therapy was escalated to Amikacin and Polymyxin B due to the growth of KPC in abdominal fluid. The patient experienced a further worsening of infection markers on the 8th POD of reoperation, leading to a new abdominal CT and continued zero oral diet. The patient developed an enterostomy dehiscence and was reoperated on August 23, 2023. This included exhaustive abdominal cavity lavage, a new segmental enterectomy, and the creation of an ileostomy and mucosal fistula. Parenteral nutrition was maintained exclusively, but there was worsening of infection markers, non-functioning of the ileostomy, and worsening of organ dysfunctions, leading to death on September 1, 2023.

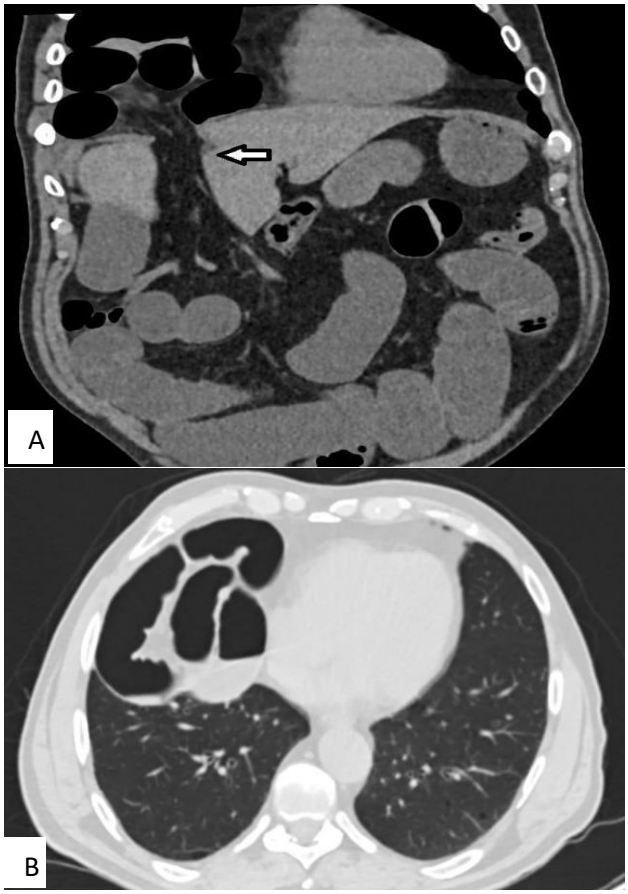

Figure 1: A) Coronal slice of a CT scan showing a right diaphragmatic hernia. B) Axial slice of a CT scan showing a right diaphragmatic hernia.

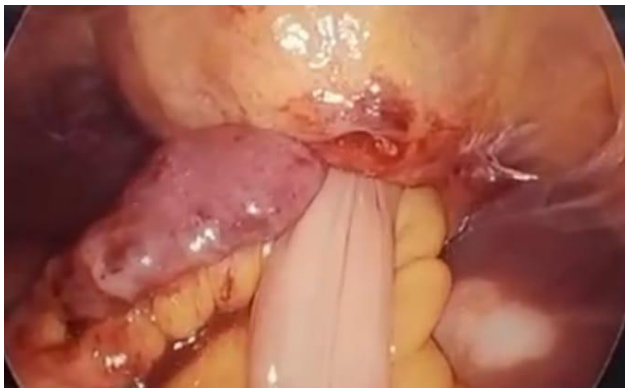

Figure 2: Intraoperative image showing the herniation of the small bowel loops.

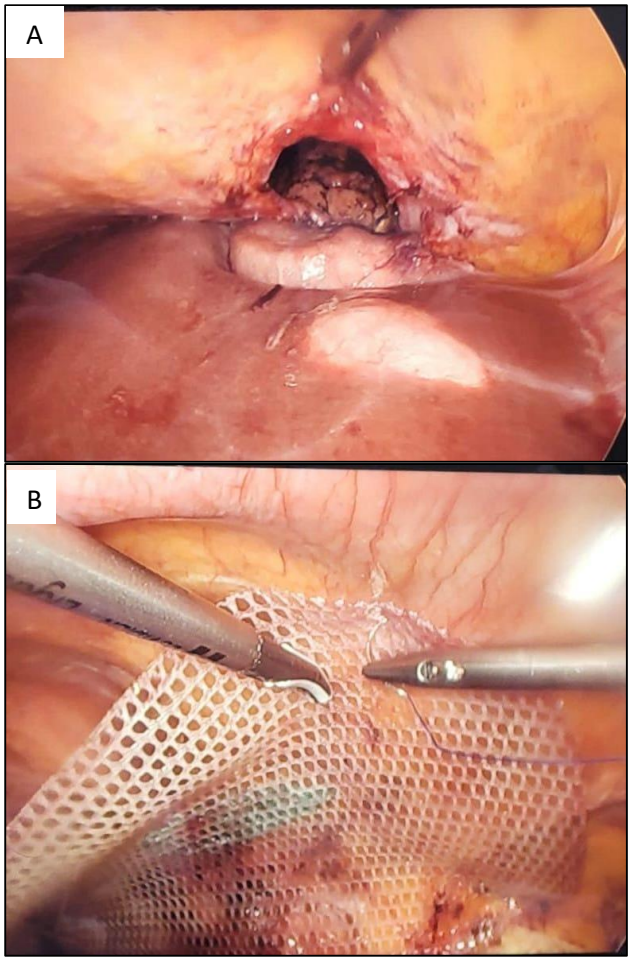

Figure 3: (A) Intraoperative image showing the diaphragmatic defect & (B) intraoperative image of the folded mesh on the diaphragmatic defect.

DISCUSSION

Diaphragmatic hernias are classified in the literature into congenital and acquired types. Congenital diaphragmatic hernias are considered rare conditions, typically diagnosed in the neonatal phase and very rarely in adulthood, where the diagnosis generally occurs incidentally through chest imaging studies.[4]

Regarding congenital hernias, they are classified based on the location of the hernia defect relative to the diaphragm. Within this classification, there are Bochdalek hernias, characterized by a posterior-lateral defect on the left side of the diaphragm, and Morgagni hernias, which are even rarer and result from incomplete diaphragm formation during embryogenesis. Morgagni hernias are anterior diaphragmatic hernias that originate from the costosternal triangles due to incomplete migration of muscle fibers to cover the triangular space between the sternum and the bilateral costal margins, known as the foramen of Morgagni.[2-4,7] Morgagni hernias account for about 2% of all congenital diaphragmatic hernias, occurring primarily on the right side of the thorax (91% of cases) compared to approximately 5% of cases on the left hemithorax.[2]

Other types of congenital hernias include diaphragmatic eventration and central hernias.[3]

Acquired diaphragmatic hernias can be classified into traumatic, hiatal, and iatrogenic types. They mainly result from chest trauma, whether blunt or penetrating. They occur in 1-5% of blunt trauma victims in automobile collisions and about 10-15% of penetrating injuries, particularly in the transition zone between the thorax and abdomen, where the diagnosis of diaphragm lacerations can be challenging and may result in large abdominal herniations in the long term.[3]

The diagnosis of congenital diaphragmatic hernias in adulthood is rare, generally presenting asymptomatically and being diagnosed incidentally through chest imaging studies.[3] In other cases, gastrointestinal symptoms may occur, such as the sensation of incomplete gastric emptying, nausea, epigastric pain, abdominal pain, and constipation. There can also be respiratory and cardiac symptoms, such as dyspnea, cough, and chest pain due to pulmonary compression.[2,4]

The contents of the hernia sac most commonly include the omentum, followed by the colon, small intestine, stomach, and liver.[3] However, more severe cases related to incarceration, strangulation of the viscera, and hemodynamic repercussions typically involve herniation of the stomach, liver, and especially the small intestine.[6]

This case describes a 70-year-old male patient who was referred due to abdominal pain, nausea, and decreased appetite, with a diagnosis of strangulated Morgagni hernia made via chest computed tomography (CT).

In symptomatic cases, the diagnosis can be complicated by the variety of nonspecific signs and symptoms and low diagnostic predictability. Incarceration and strangulation of the herniated viscera can mimic an obstructive acute abdomen. The imaging modality of choice and gold standard in these cases is chest CT for diagnosing and assessing signs of ischemic distress and other potential complications in an emergency context.[2,5]

In this case, the patient presented with nonspecific abdominal pain, and the definitive diagnosis was achieved only after imaging, which revealed dilated loops of the small intestine and signs of ischemic distress, as well as laboratory findings related to obstructive acute abdomen due to strangulation of the herniated viscera.

Rapid diagnosis and the initiation of appropriate surgical treatment are crucial in both asymptomatic and symptomatic cases. This need becomes even more critical in cases of incarceration or strangulation, which can lead to ischemia and intestinal necrosis, requiring extensive resections, sepsis, prolonged hospitalizations, and death.[2,4] The patient in this case underwent laparoscopy due to anatomical difficulties accessing the right side of the diaphragm and the possibility of reducing the

herniated contents in a less invasive manner with lower morbidity for the patient.

Due to the rarity of this condition, there are currently no widely accepted guidelines on a standard surgical technique in the literature.[2] Repair of these hernias can be performed via abdominal (laparotomy or laparoscopy) or thoracic approaches (thoracotomy or video-assisted thoracoscopic surgery-VATS).[2,4]

The abdominal approach may be preferred in situations involving bilateral hernias, suspected intra-abdominal adhesions, or signs of complications such as ischemia, necrosis, and perforation of loops, which may require resection and anastomosis, as well as to fully evaluate the abdominal cavity in cases of diagnostic uncertainty.[5,6]

In some cases, the thoracic approach (VATS) is preferred for patients with old hernias, where there is a high likelihood of significant adhesions between the hernia sac and adjacent structures. In these cases, the thoracic approach allows easier dissection of structures and lower rates of injury to thoracic structures compared to the abdominal approach. Additionally, the thoracic route provides better access to posterior defects and the right hemithorax (which can be obstructed by the liver in the abdominal approach).[6]

Currently, minimally invasive surgery via laparoscopy/thoracoscopy or, to a lesser extent, robotic surgery has become preferred over conventional approaches. The literature shows a shorter recovery time, with early return to usual activities, lower complication rates, reduced hospital stays, and lower patient morbidity.[2,5,8] Contraindications to minimally invasive approaches include hemodynamic instability and more severe cases with signs of peritoneal irritation, where laparotomy is preferred.[5]

In their literature review, Sanford et al. compiled approximately 171 cases identified in 76 articles over the past decade and found that most repairs were attempted using minimally invasive techniques, predominantly laparoscopy.

Regarding the closure of the hernia defect, there is no consensus in the literature. Generally, herniated content is reduced, with or without resection of the hernia sac, and the defect is closed. The use of mesh for reinforcement may be employed in large hernia defects and under appropriate tension, with synthetic or biological mesh depending on the case.[2,4-6] There are few cases in the literature where a flap from the falciform ligament was used to cover the hernia defect. Rau et al, Donati, and Pironi et al, utilized this technique, with results showing a reduction in the rate of adhesions between the repair and abdominal structures, as well as a decrease in the rate of erosions and intestinal fistulas. In these cases, it is important to take care to preserve the vascularization of the flap and avoid inadvertent rotation.[5, 9-11]

CONCLUSION

This report illustrates a rare case of congenital Morgagni diaphragmatic hernia with signs of ischemic distress and underscores the importance of considering this pathology in the differential diagnosis of an obstructive acute abdomen, given the nonspecific clinical presentation. Rapid diagnosis and prompt treatment are crucial, with computed tomography being the imaging modality of choice and the use of minimally invasive techniques when possible. The case highlights severe complications related to delayed diagnosis. Proper management improves clinical outcomes for this rare condition. Further studies are needed to standardize the surgical approach.

In this case, when questioned about the possibility of an acquired diaphragmatic hernia following a potential trauma 7 years prior (a fall from a wall), the patient reported not having sought medical attention at the time and described symptoms inconsistent with a traumatic diaphragmatic laceration of the size presented by this hernia. Therefore, it is considered more to be a congenital diaphragmatic hernia.

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