A Rare Case of Bochdalek Hernia with Concomitant Para-Esophageal Hernia, Repaired Laparoscopically in an Octogenarian

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Conflict of interest: None declared

Patient: Male, 81
Final Diagnosis: Bochdalek hernia
Symptoms: Chest pain • vomiting
Medication: —
Clinical Procedure: Laparoscopic repair of both diaphragmatic hernias
Specialty: Surgery

Objective: Rare co-existence of disease or pathology
Background: A Bochdalek hernia (BH) is a rare congenital condition consisting of a posterolateral defect in the diaphragm. A para-esophageal hernia (PEH) is a rare variant of hiatus hernia. BH and PEH may present with gastric volvulus or incarceration, requiring emergency treatment. Minimally invasive surgery is the preferred treatment, particularly for elderly patients and patients with comorbidities. The occurrence of BH with concomitant PEH is a very rare event. We describe a case of an octogenarian patient with BH and concomitant PEH treated laparoscopically.

Case Report: An 81-year-old male patient, without significant comorbidities, presented with a two-month history of severe chest pain and vomiting after eating. Cardiological investigations ruled out cardiac ischemia, infarction, or other cardiovascular abnormalities. Chest and abdominal computed tomography (CT) imaging demonstrated a large diaphragmatic hernia, with the entire stomach in the left thorax. Laboratory results showed mild anemia and a low iron level. The patient underwent simultaneous laparoscopic repair of a BH and a PEH with mesh reinforcement without antireflux fundoplication. The patient's postoperative recovery was uneventful.

Conclusions: We have presented a rare case of BH with concomitant PEH in an octogenarian that was successfully treated with laparoscopic surgery. Although these two forms of hernia are a very rare association, this case report illustrates that the surgical approach should be individualized in each patient’s case to ensure a successful surgical outcome. In this case, the decision was made to suture the diaphragmatic crura and reinforce the diaphragm repair with mesh, rather than by fundoplication.

MeSH Keywords: Hernia, Diaphragmatic • Herniorrhaphy • Laparoscopy
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Authors’ Contribution: A B C D E F
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Background

A Bochdalek hernia (BH) is a rare congenital condition consisting of a posterolateral defect in the diaphragm, first described in 1848 by the Czech anatomist, Vicente Bochdalek who studied diaphragmatic hernia in newborns [1,2]. The BH occurs through a posterolateral defect in the diaphragm [3,4]. Since Bochdalek’s description of the diaphragmatic defect, for many years, no satisfactory approach to the surgical repair of BH was developed, particularly for newborn infants, who undergo respiratory compromise due to herniation of the stomach and other organs into the thorax, and the mortality rate in newborns remains high [5,6]. The first successful surgical repair of BH was performed in 1901 [7]. The incidence of BH is reported as 1 in 3,000 live births, and usually occurs on the left side in between 80–90% of cases; right-sided BH is less common because the right side of the diaphragm develops earlier than the left side in embryogenesis [8]. However, a congenital diaphragmatic hernia can go unnoticed during childhood, and individuals can reach adulthood without symptoms, but BH is rare in adults and accounts for between 0.17–6% of all diaphragmatic hernias [9].

In 1926, Akerlund was the first to describe repair of a paraesophageal hernia (PEH) [10]. The incidence of PEH is between 3.5–5% of all hiatal hernias [11,12]. Furthermore, advanced age, vertebral deformity, and concomitant diseases are common risk factors that frequently occur in patients with PEH [13]. PEH may present with sudden chest pain or abdominal pain, dysphagia, vomiting, or anemia and gastric volvulus or incarceration may occur, requiring emergency surgical treatment [13]. Patients who have PEH may be poor operative candidates, and minimally invasive surgery is the preferred treatment, particularly for elderly patients and for patients with comorbidities [14].

The occurrence of BH with concomitant PEH is a very rare event. We present a rare case of an octogenarian patient suffering from a BH with concomitant PEH who was treated laparoscopically.

Case Report

An 81-year-old man, with known significant past medical history, suffered for the previous two months from severe chest pain and vomiting after eating. He was admitted to the emergency room several times for investigation of these symptoms. On the first hospital visit, clinical findings were as follows: blood pressure, 135/76 mm Hg; pulse rate, 94/min; his body temperature, 36.3°C; and oxygen saturation, 94%. Repeated electrocardiogram (ECG) showed no ischemic changes, and serum troponin levels were less than 0.01 ng/mL on two separate occasions, excluding the possibility of an ischemic cardiac event. After feeling better, he was discharged from the emergency room.

On his second admission to the emergency room, an ischemic cardiac event was again ruled out. Laboratory tests showed a mild microcytic anemia with a hemoglobin level of 11.5 gm/dl and a serum ferric level of 25 μg/dl, normal ECG, and a chest X-ray that showed a left lung that was compressed by the presence of the stomach in the chest. Computed tomography (CT) imaging of the thorax and abdomen were performed that showed that the patient’s stomach was in the mediastinum, and a mesenteric-axial volvulus was present (Figure 1).

The patient was treated with a nasogastric tube (34 Fr), intravenous fluid, and electrolyte replacement, and was referred to our surgical institution where, without further studies, he was scheduled for surgery. Under general anesthesia in the Fowler position, with the surgeon standing between the patient’s legs, a laparoscopic approach was achieved. The stomach was reduced from the BH to the abdomen using atraumatic graspers (Figure 2). The hiatus was dissected, the hernia sac was completely reduced, and the esophagus was released from the soft adhesions in the lower mediastinum, ensuring that the lower esophagus was at least 3 cm in length in the abdominal cavity (Figure 3). The stomach was disconnected from the diaphragm by cutting the gastrophrenic ligament, ensuring the complete release of the stomach and the esophagus from the diaphragm (Figure 4). The vagus nerves were recognized and preserved.

The Bochdalek foramen was sutured in an anteroposterior direction with non-absorbable barbed sutures in a continuous fashion. The diaphragmatic crura were closed posterior to the esophagus in the same way. The repair was reinforced with a 12 cm ‘O’-shaped mesh, fastened to the diaphragm with absorbable tackers and sutures, taking special care to avoid...
damage to the pericardium (Figure 5). No antireflux proce-
dures were performed.

During the first postoperative day, an upper gastrointesti-
nal fluoroscopic examination was performed showing a good
esophageal passage of the contrast medium, the stomach in
the correct anatomical site and adequate duodenojejunal pas-
sage (Figure 6). Postoperatively, the patient made an unevent-
ful recovery, allowing liquid feeding on the first postoperative
day and advancing to soft food on the fourth day after surgery.

He was then discharged from the hospital, and medicated with
proton pump inhibitors. The patient was subsequently seen
at postoperative day 10 and one month after surgery with no
reported dysphagia, tolerating all kinds of food well and with-
out heartburn or symptoms related to reflux. The scars were
normal, and he had no pain (Figure 7).
Discussion

The aim of this case report was to emphasize the importance of early diagnosis of the potentially life-threatening condition of a diaphragmatic hernia and to demonstrate that even congenital abnormalities of the gastrointestinal tract may be asymptomatic until late in life. In this case, although a rare association of a Bochdalek hernia (BH) with a concomitant para-esophageal hernia (PEH) was present, for patients with chest pain who have normal cardiac function tests a simple chest X-ray could have made the diagnosis on the first admission to hospital, preventing a delay in treatment.

This case report was also unusual because of the combination of BH with a concomitant PEH in an octogenarian. A review of the medical literature has not found a similar previously reported case. Congenital diaphragmatic hernias are rare in adults, and most of them are diagnosed in childhood, probably because they are small without causing symptoms and without other congenital conditions [15].

Mullins and colleagues have reported an incidence of BH in adults of 0.17%, in a large series of patients that underwent CT imaging, with a mean age of 66.6 years [16]. Rodriguez and colleagues have reported that the adult incidence of the congenital form of diaphragmatic hernia of Morgagni-Larrey is also low [17].

In this case report, the patient went to the emergency room with an incarceration of the BH. Placing a nasogastric tube and evacuating the gastric content is the treatment of choice in acute cases of diaphragmatic hernia, which can achieve reduction of the stomach [18]. However, if conservative treatment does not work in the first hours, an emergency operation must be carried out, as the clinical outcome for patients who have delayed treatment is worse. In a study published by Synder and Greaney, they showed that in patients who had surgery during the first 72 hours following hospital admission, there was no mortality; after 72 hours, patient mortality rose to 50% [18].

In the management of this case, we choose the laparoscopic approach from the abdomen, as this is our normal approach and we use it routinely. While laparotomy is the most widely used surgical approach (38%), minimally invasive surgical techniques have gained popularity since their first report in 1995 [19]. Laparoscopic repair can be performed with a low complication rate (7%) and short hospital stay (4 days) [19]. In 2016, Machado demonstrated that the thoracotomy approach had twice the mortality rate when compared with laparotomy (4% and 2%, respectively) for repair of diaphragmatic hernia [20]. However, the outcomes were similar when treatment was by minimally invasive surgery, either by thoracoscopy or laparoscopy [20].

A new technological surgical development is the use of the barbed suture used to suture the diaphragm, which saves time and does not require knotting, this reducing the risk of suture failure [21,22]. The use of mesh in diaphragmatic repair remains controversial, and the concept of the use of this tension-free repair approach is not always applicable, has been shown for inguinal hernia repair [23]. Elderly patients may have thinner and weakened diaphragmatic muscle, and so the type of mesh to use is important as there are many available surgical meshes on the market, as follows: non-absorbable prosthetic; absorbable biosynthetic; and composite mesh [24].

Figure 6. Upper gastrointestinal fluoroscopy performed 24 hours after the operation. On the first postoperative day, an upper gastrointestinal fluoroscopic examination shows a good esophageal passage of the contrast medium, the stomach in place, and there is an adequate duodenjejunal passage.

Figure 7. The minimally-invasive laparoscopic surgical procedure. The minimally invasive surgery performed through five ports: one port measures 11 mm and four of the ports measure 5 mm. The patient was seen at postoperative day 10 and also at one month after surgery, with no reported symptoms related to reflux, with good healing, and no pain.
recently, it has not been possible to demonstrate pre-clinical- 
ly, or clinically, the superiority of one type of mesh over anoth- 
er [24]. As the biological meshes are costly and do not have any major advantages over the synthetic meshes, we chose to use synthetic mesh [25–27].

Another important aspect in the repair of diaphragmatic hernias is to perform antireflux fundoplication. However, patients with abnormal motility of the esophagus may suffer from dys- phagia in the early postoperative period following fundoplica- tion, and sometimes this can be irreversible [28]. Therefore, we do not use fundoplication routinely, but use it selectively, depending on the motility of the esophagus and on the pa- tient’s clinical condition before the surgery [29–31]. It is also important to decide what type of antireflux mechanism to use, whether Nissen-Rosetti, Toupet, or Dor (anterior partial fundo- duplication) [29–31].

Laparoscopic surgery offers the best treatment outcome for patients with a diaphragmatic hernia, with short convales- cence, fewer complications, and a greater patient satisfaction.

The decision of reinforcing the diaphragm repair with mesh or performing a fundoplication is a decision that the surgeon must take during the surgical procedure, since there is no uni- form concept about the need to add them to the procedure.

Conclusions

We have presented a rare case of a Bochdalek hernia (BH) and a concomitant para-esophageal hernia (PEH) in an octogenar- ian that was successfully treated with laparoscopic surgery. Although these two forms of hernia are a very rare association, this case report illustrates that the surgical approach should be individualized in each patient’s case to ensure a successful surgical outcome. In this case, the decision was made to suture the diaphragmatic crura and reinforce the diaphragm repair with mesh, rather than by fundoplication.

Conflict of interest

None.

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