

C A S E R E P O R T

Open abdomen in the management of complicated diaphragmatic hernia: A case report

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Abstract. Diaphragmatic hernia (DH) can be congenital or acquired. DH is a potentially life-threatening condition and the management in emergency setting remain unclear. Nonspecific symptoms can delay the diagnosis. We report a case of a 63-year-old man admitted for abdominal pain and nausea. He was successfully treated with damage control surgery. (www.actabiomedica.it)

Key words: Diaphragmatic hernia, damage control surgery, biological mesh, open abdomen, case report, emergency surgery.

Introduction

Diaphragmatic hernia (DH) can be a medical issue encountered in Emergency Department. Congenital and traumatic diaphragmatic hernia are the most common DH of emergency interest. The diagnosis and management of DH can be a problem above all in those cases, not rare, in which the onset of symptoms is subsequent to the traumatic event. In many cases the symptoms can occur even months or years after injury (1). We report a rare case of diaphragmatic hernia treated with open abdomen. Open abdomen in the treatment of diaphragmatic hernia has been poorly reported but can be a useful tool for the surgeon.

Case report

We present the case of a 63-year-old man who came to Emergency Surgery department of Parma University Hospital for abdominal pain and nausea.

The patient had undergone a left hemicolectomy for colorectal cancer 5 years earlier and then he underwent two operations for bowel obstruction during which an important adhesiolysis had been performed. In the following years he developed a median 8 cm-wide peri-umbilical laparocele. Patient's personal history didn't reveal any traumatic event. Laboratory tests did not reveal any significant alterations (WBC $10 \times 10^3/\mu\text{L}$; PCR 1.0 mg/L) and no sign of acute abdomen had been identified. Abdominal CT-Scan revealed a diaphragmatic herniation of part of the gastric fundus and an 84 mm laparocele with bowel inside (Fig. 1). Endoscopy was not performed due to the initial suspicion of a complicated laparocele. No data, neither laboratory nor radiological, posed for an ischemic suffering. In the suspicion of adhesion-based intestinal obstruction associated with hiatal hernia, the patient was conservatively treated with nasogastric tube and prokinetics.

Two days later, due to the onset of chest pain and leukocytosis (WBC $24 \times 10^3/\mu\text{L}$), a new CT-Scan



Figure 1. Sagittal and coronal CT-Scan shows a large diaphragmatic defect on the left side which allows the passage of the stomach in the absence of signs of ischemia.

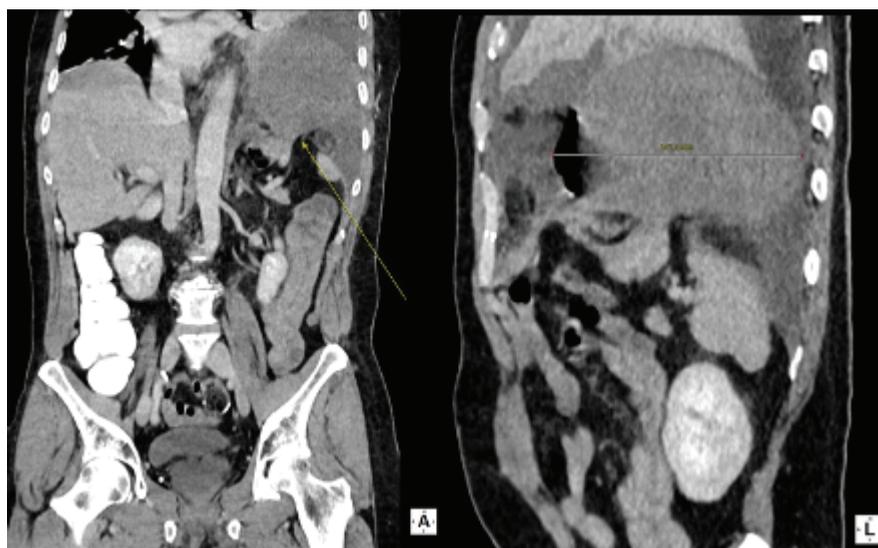


Figure 2. The forward displacement of the gastric bubble, the missing of the gastric folds and the absence of contrast enhancement in gastric's walls suggest a failure of conservative management and impose surgical treatment.

was performed and confirmed the presence of the diaphragmatic defect and gastric herniation with initial signs of ischemia (Fig. 2). The patient therefore underwent surgery with intraoperative finding of left diaphragmatic posterolateral hernia (Fig. 3) and severe signs of corpus-fundus gastric ischemia. An adhesiolysis was performed in order to reduce the stomach into

the abdomen. The diaphragmatic defect was repaired with a continuous non-absorbable primary suture.

Given the ischemia conditions, the open abdomen was performed to evaluate the gastric vascularization that could allow the restitutio in integrum of the organ (Fig. 4). Abdomen was re-explored 48 hours later with the evidence of massive gastric necrosis

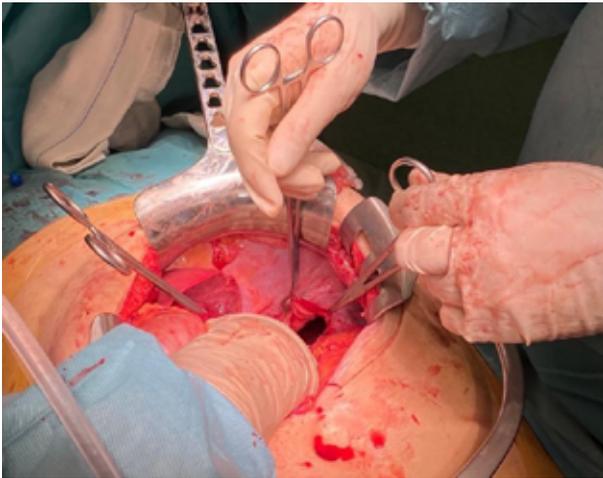


Figure 3. Intraoperative findings. Surgical exploration shows a left posterolateral diaphragmatic defect.



Figure 4. Open Abdomen. Negative pressure wound therapy was chosen for temporary abdominal closure

therefore a total gastrectomy with Roux en-Y-anastomosis and simultaneous laparocoele repair with biological mesh were performed. Recovery was complicated by the onset of pneumothorax; a thoracic drainage was placed. The patient was discharged on the 17th



Figure 5. Previous CT-Scan. The patient reports the absence of previous trauma and a CT-Scan performed 5 years earlier excludes a diaphragmatic defect related to CDH.

postoperative day. 6-months follow-up with CT-scan of the abdomen and chest did not revealed recurrence and the patients was in good health conditions.

A CT-Scan performed before the first surgery (left hemicolectomy performed 5 years earlier) does not show any diaphragmatic defect (Fig. 5) therefore this DH cannot even be considered a CDH. On the other hand, the absence of previous trauma does not include it among the TDH. An informed consent was obtained from the patient.

Discussion

The symptomatology depends on the etiology of DH. CDH often can remain asymptomatic until adulthood. DH usually are incidental findings on imaging diagnostic tests. TDH diagnosis also can be delayed depending on the type, on the side and on the energy of trauma.

Respiratory and abdominal symptoms are usually non-specific. Gastrointestinal symptoms are more

common in the left-sided DH, respiratory symptoms are predominant in right-sided DH. DH can be a life-threatening condition that must be promptly evaluated and treated. The mortality rate ranges from 1% to 28.8%. Chest x-ray usually is the first diagnostic test performed but CT-scan of the abdomen and chest is the current diagnostic gold standard due to the higher sensitivity and specificity than chest x-ray (2).

Surgery is mandatory in case of complications onset. There is no a consensus on the surgical approach, thoracic or abdominal, open or minimally invasive. Treatment depends on the diagnostic investigation's result and the surgeon's preferences and skills.

Primary DH repair with non-absorbable suture is widely described. Mesh use has been reported for larger defects to reduce the excessive tension due to the considerable loss of tissue and reinforce the suture. Biologic mesh offers a higher resistance to infections and lower risk of displacement (3). Damage Control Surgery (DCS) can be useful in unstable patient when a second look may be required (4,5,6). In our case, the re-exploration of the abdomen 48 h later helped the surgeon in recognizing the vital/non-vital areas of an ischemic organ leading him to resection.

Conclusions

There is a lack of standardization in the management of DH in emergency. Non-specific symptoms can mask DH and delay the diagnosis. Early diagnosis and promptly treatment of DH are fundamental in emergency setting. CT-scan remain the diagnostic gold standard. Surgery is the treatment of choice and is strongly influenced by the preoperative setting. DH repair with primary suture reinforced with biological mesh seems to be the better treatment option and can be performed with open or minimally invasive approach depending on the surgeon's expertise, especially in emergency setting. DCS in selected case may help surgeon in recognizing the vital/non-vital areas of an ischemic organ.

Open abdomen can improve the patient's short-term outcome and life expectancy.

Conflict of interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

Abbreviations: DH: diaphragmatic hernia; CDH: congenital diaphragmatic hernia; TDH: traumatic diaphragmatic hernia.

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