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## The rupture of the diaphragm: Case report

### Diyafram rüptürü: Olgu sunumu

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#### Abstract

Diaphragmatic ruptures represent a rare but potentially serious clinical entity that is often integrated into polytrauma. We report a case of left diaphragmatic rupture, discovered twenty days after an accident on the public highway. For the diagnosis, it is necessary to insist on the body scan, whose sensitivity is undoubtedly less than that of other more specific examinations, but which is easily interpretable and accessible in most emergency centers. The order of surgical management is taken at clinical examination, and before the existence of an abdominal emergency.

**Keywords:** Diaphragmatic rupture, Body scans

#### Öz

Diyafragma rüptürleri, sıklıkla politravmaya entegre olan nadir fakat potansiyel olarak ciddi bir klinik durumu temsil eder. Karayolu üzerinde meydana gelen bir kazadan yirmi gün sonra ortaya çıkan bir sol diyafragma rüptürü vakasını sunduk. Teşhis için, vücudun taramasında ısrar etmek gerekir; hassasiyeti diğer özel muayene tekniklerinden daha azdır, ancak çoğu acil merkezde kolayca yorumlanabilir ve erişilebilirdir. Cerrahi tedavi sırası, klinik muayenede ve bir abdominal acil durum varlığına göre önceye alınır.

**Anahtar kelimeler:** Diyafragma rüptürü, Vücut taraması

#### Introduction

Diaphragmatic ruptures represent a classic entity in thoracoabdominal trauma. Traumatic ruptures of the diaphragm are rare and represent 6% of the injuries observed during a public road accident. They are the witness of violent trauma and most often occur on the left dome (85 to 90%) [1]. They are potentially severe with a high incidence of associated life-threatening injuries. They pose a diagnostic problem which is carried out in more than half of the cases intraoperatively. We report one case of left diaphragmatic rupture, diagnosed twenty days after a highway accident.

#### Case presentation

Patient aged 68 years asthmatic under ventoline on request admitted to emergency for dyspnea twenty days after road accident with thoracoabdominal impact point. A radiothorax shows a hydro-aeric level on the left with the mediastinum on the right. An abdominal thoraco-scan objectively performed a post-traumatic left diaphragmatic hernia with hernia of the stomach, left colic angle, proximal part of the descending colon, part of the transverse colon, some Greek coves and mesentery (Figure 1 and 2). Patient operated in urgency by conventional way with exploration allowing to confirm the diagnosis of the left diaphragmatic rupture. The reintegration of the handles with a stomach was very adherent to the posterior thoracic wall. Its release puts in evidence a perforation with fibrous banks (Figure 3 and 4). We performed the closing of diaphragmatic breche by separate stitches to silk 2 as well as the sutures of the gastric wound by separate stitches that vicryl 3/0 after revival of the banks. A thoracic drain and an abdominal drain were left in place. The postoperative was uneventful.

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Figure 1: Thorax scan of the patient



Figure 2: Computed tomography scan of the patient



Figure 3: Intraoperative view

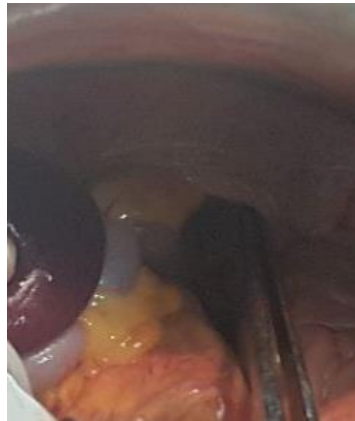


Figure 4: Intraoperative view

## Discussion

Diaphragmatic ruptures represent a rare but potentially serious clinical entity that is often integrated into polytrauma. They are present in 0.2 to 7% of patients admitted for chest and/or abdominal contusion [2]. The rupture concerns the left dome in 60 to 75% of cases, and the right dome in 23 to 40% of cases as in our case. Despite liver protection, straight lesions are not exceptional. They are probably undervalued. Straight fractures are often associated with serious injuries resulting in the death of the injured before admission.

Isolated ruptures of the diaphragm are rare and often diagnosed late, especially if the lesion sits to the right. Bilateral ruptures are exceptional and occur in less than 2% of cases [3-4]. The dimensions of these ruptures are variable but in most cases greater than 10 cm 90% of the ruptures are secondary to highway accidents. Clinical diagnosis of diaphragmatic rupture is difficult due to the lack of symptomatology. Only 30 to 50% of the injured are diagnosed preoperatively. 20% to 40% of diaphragm ruptures are discovered during a laparotomy performed for another lesion.

For Lenriot et al. shock and respiratory distress dominate the clinical picture. However, these signs are non-specific and the diaphragmatic rupture may go completely unnoticed in the initial stage. The means of diagnosis are multiple: Chest X-rays, systematic in all polytraumatized patients, can reveal an elevation of the dome with mediastinum reflux, can affirm diagnosis by showing digestive elements or the path of the nasogastric tube in the thorax, but its sensitivity is low. This examination also has the advantage of suspecting a lesion of the aortic isthmus in front of an enlargement of the mediastinum. Transthoracic ultrasound can confirm the diagnosis by visualizing the intrathoracic herniated organs [5].

The thoracoabdominal CT scan made it possible to suspect this diagnosis in our observations. This examination, available as an emergency in most centres, allows a complete lesion examination.

The MRI allows a good evaluation of the thoracoabdominal region and represents an excellent means of diagnosis which makes it possible to visualize more clearly both the diaphragmatic defect and the herniated organs in the thorax. The diaphragm appears as a hypo-intense band, between on the one hand the hyperintense mediastinal fat and on the other hand the relatively hyperintense abdominal viscera [6,7].

Thoracoscopy is proposed by some authors but requires anesthesia and may ignore a peripheral rupture[1]. It can only be conceived on a stable injured person, having a priori an isolated lesion. It would reduce late diagnosis. Indeed, despite these imaging methods, early diagnosis is not always made, and rupture is sometimes recognized only after the 7th day (50% of cases). 10% to 20% of ruptures are undiagnosed in the acute phase. An unknown rupture may occur very late, up to 50 years after the trauma, either during imaging for another reason, or during epigastric or non-specific chest pain [6]. Any diagnosed diaphragmatic rupture must be surgically repaired as soon as possible to avoid strangulation of the ascended viscera in the thorax whose prognosis is pejorative [8]. Treatment as soon as possible is desirable to avoid complications. The emergency approach is the medial laparotomy allowing a complete lesional assessment and the treatment of associated visceral lesions. Diaphragmatic repair is easy outside peripheral desinsertions.

Diaphragmatic rupture may be addressed by laparotomy or thoracotomy, depending on the surgeon's experience and the presence or absence of associated chest and/or abdominal lesions. Laparoscopy and thoracoscopy are now frequently used, both for diagnostic and therapeutic purposes.

In conclusion, diaphragmatic rupture is a rare complication of thoracoabdominal trauma, whose diagnosis remains difficult despite the various means of investigation available. Surgical repair should be undertaken as soon as possible to avoid progression to life-threatening complications.

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