

## Case Report

## Traumatic Rupture of the Right Diaphragm with Bilateral Hemothorax and Hemoperitoneum: A Case Report from the General Surgery Department of the Hôpital National Ignace Deen, CHU Conakry (Guinea)

Ansoumane Conde<sup>1\*</sup>, Mamadou Saliou Diallo<sup>1</sup>, Boubacar Barry<sup>1</sup>, Boubacar Poredaka Diallo<sup>2</sup>, Amadou Diallo<sup>1</sup>, Naby Fofana<sup>1</sup>, Sandaly Diakite<sup>1</sup>, Aboubacar Toure<sup>1</sup>

<sup>1</sup>Department of General Surgery, Ignace Deen National Hospital, CHU Conakry, Guinea

<sup>2</sup>Department of Visceral Surgery, Donka National Hospital, CHU Conakry, Guinea

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**Abstract:** We report the case of a right diaphragmatic rupture associated with bilateral hemothorax and hemoperitoneum following closed thoracoabdominal trauma in an 11-year-old adolescent. The diagnosis was made intraoperatively. Treatment consisted of a simple abdominal suture and thoracic drainage. The post-operative course was straightforward.

**Keywords:** Rupture, Diaphragm, Hemothorax, Surgery.

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## INTRODUCTION

Right diaphragmatic rupture is rare, occurring in 5-20% of all diaphragmatic lesions [1], and rarely occurs in isolation (less than 2% of cases). One in two cases is associated with hemothorax, three quarters with closed abdominal trauma, and one third with liver injury [2]. We report a case of right diaphragmatic rupture associated with bilateral hemothorax and hemoperitoneum following closed thoracoabdominal trauma. The aim of this case report was to describe our experience in the management of this condition.

## OBSERVATION

The patient was an 11-year-old adolescent from the interior of the country, with no previous history of trauma, who had been crushed by a rockfall with a thoracoabdominal point of impact. On arrival at the emergency department, 5 days after the trauma, he was conscious. He was polypneic at 38 cycles per minute, with 95% room air saturation, heart rate 124 beats/min and blood pressure 110/60 mmHg. Physical examination revealed :

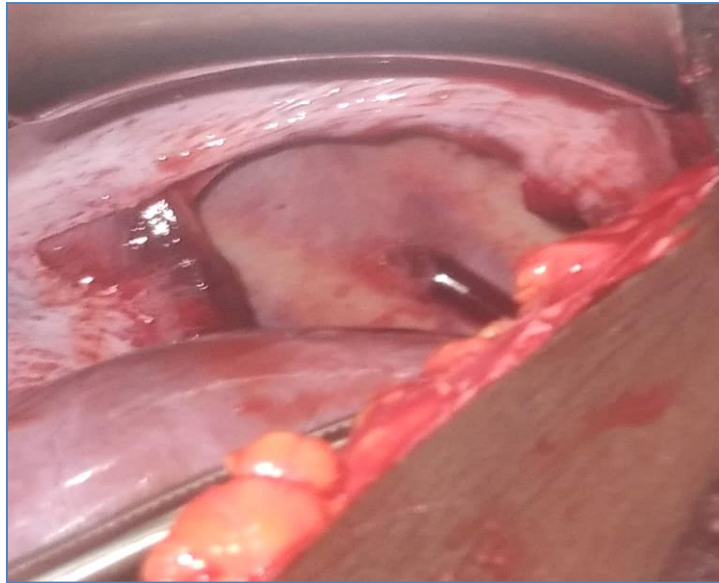
- **Thorax:** left basi-thoracic abrasion, absence of vesicular murmurs in both lung fields and hydro-aerosic sounds on auscultation.
- **Abdomen:** distension, diffuse tenderness, sloping dullness of the flanks, bulging Douglas on rectal examination, Thoracic drainage and laparotomy were indicated. The patient underwent nasogastric and urethral catheterization.

A median laparotomy was performed above and below the umbilicus, under general anaesthesia. At the coeliotomy, 1.5 l of seroma fluid was aspirated, revealing a 10 cm right diaphragmatic breach (Photo 1), a superficial non-haemorrhagic liver wound at segment VIII, multiple haematomas on the descending mesocolon, left Told's fascia, right colonic angle and retroperitoneally. We performed thoracic drainage and sutured the right diaphragmatic breach with n°1 non-absorbable braided suture (Photo 2).

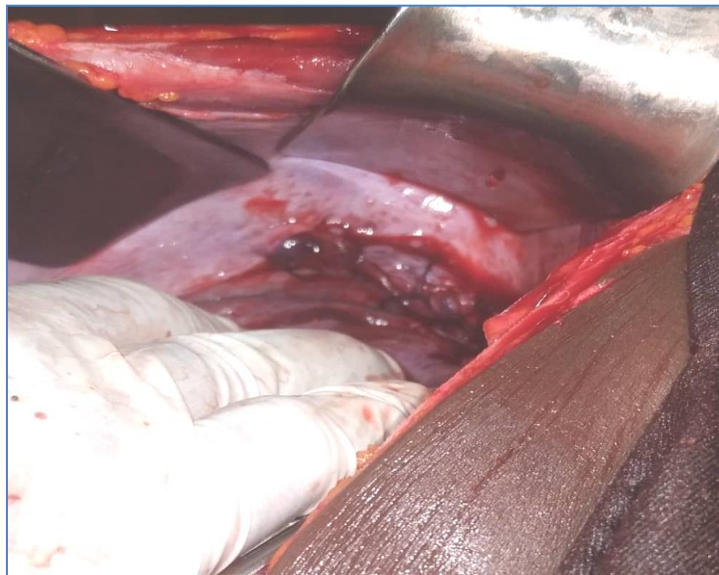
The patient was transferred to the intensive care unit, where he stayed for 3 days. He was discharged on postoperative day 11. The patient was seen again three weeks after discharge. Healing was complete, and the clinical pulmonary assessment was normal.

\*Corresponding Author: Dr Ansoumane condé

Department of General Surgery, Ignace Deen National Hospital, CHU Conakry, Guinea



**Photo 1: Intraoperative breach of the right diaphragmatic dome.**



**Photo 2: Aspect of the right diaphragmatic dome after suture.**

## DISCUSSION

Diaphragmatic rupture should always be suspected in the event of high-energy thoracic and/or abdominal trauma. The mechanism of rupture is a sudden rise in abdominal pressure, up to ten times normal, due to compressive forces [3]. Right diaphragmatic rupture is rare, occurring in 5-20% of all diaphragmatic lesions [1]. This is generally explained by the barrier role of the liver mass [4].

It rarely occurs in isolation (less than 2% of cases). It is associated with hemothorax in one case out of two, closed abdominal trauma in three quarters of cases, and liver injury in one third of cases [2]. This is the case in our study, where right diaphragmatic rupture is associated with bilateral hemothorax, hemoperitoneum and a superficial non-hemorrhagic liver wound.

Early diagnosis is difficult due to its rare incidence, non-specific clinical presentation and associated lesions that may mask its presence. Chest radiography and ultrasonography are the most common diagnostic modalities for revealing the specific signs indicative of diaphragmatic rupture, namely marked elevation of the hemi-diaphragm, intra-thoracic herniation of viscera visible by loops of bowel [5]. Occasionally, more complex diagnostic maneuvers may be performed, such as magnetic resonance imaging, scintigraphy, colonoscopy or thoracoscopy [6, 7]. In our case, diaphragmatic rupture was only detected intraoperatively.

Treatment is exclusively surgical, involving repair of the diaphragmatic breach and treatment of associated lesions [8, 9]. Depending on the associated lesions, the approach is via thoracotomy in an average of

38% of cases, laparotomy in 40% or both approaches in 20.6% of cases. For diaphragmatic ruptures on the right, the thoracic approach is preferred because of the hepatic interposition [9]. This was not the case in our study, as the diaphragmatic rupture was associated with hemoperitoneum. Small diaphragmatic lesions can be simply sutured (71.4% to 93.3%), while larger ones require a prosthesis (8.7% to 28.6%) [10]. Morbidity, of the order of 40%, is mainly pulmonary [3]. The mortality rate for diaphragm rupture is estimated at between 20% and 60% [3- 11].

## CONCLUSION

Right diaphragmatic rupture is a rare and difficult condition, but potentially serious because of associated lesions. Laparotomy has enabled good exploration of the abdominal organs and restoration of diaphragmatic continuity.

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## DISCLOSURE OF CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in the scientific writing of this work.

## DECLARATION OF INFORMED CONSENT

All authors appearing in this article share equally and agree to the publication of this article in your journal.

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