

## CASE REPORT

# Right post-traumatic diaphragmatic hernia with liver and intestinal dislocation

C. Sala<sup>1,\*</sup>, M. Bonaldi<sup>1</sup>, P. Mariani<sup>2</sup>, F. Tagliabue<sup>2</sup>, and L. Novellino<sup>2</sup>

<sup>1</sup>General Surgery Post-Graduation School, University of Milan, Milano, Italy and <sup>2</sup>Unit of General Surgery, Department of Minimally Invasive and General Surgery, Azienda Ospedaliera Bolognini, Seriate, Bergamo, Italy

\*Correspondence address. General Surgery Post-Graduation School, University of Milan, via F. Sforza 35-20100, Milano, Italy.  
Fax: +39 0353063553; E-mail: corrado.sala86@gmail.com

## Abstract

Right diaphragmatic hernia is an uncommon injury following abdominal trauma. A case of delayed right post-traumatic diaphragmatic hernia is presented. The patient referred us with wheezing and cough since 1 month. A chest-abdominal computed tomography scan demonstrated a large diaphragmatic defect with liver and intestinal dislocation. The patient underwent surgical intervention with diaphragmatic repair. No complications were observed during admission and follow-up is actually negative for recurrence.

## INTRODUCTION

Diaphragmatic hernia is a rare consequence of thoraco-abdominal trauma. The abdominal organ herniation through the right diaphragm is even rarer due to the liver protective function [1].

The high morbidity and mortality of this condition require early diagnosis and rapid treatment. The case reported concerns about a patient suffering from massive delayed right diaphragmatic hernia with right liver and bowel dislocation.

## CASE PRESENTATION

A 41-year-old patient was referred to our Emergency Department with complaints of wheezing and cough since 1 month. During a previous admission, a diagnosis of right basal pneumonia was done.

His medical history was significant for motorcycle accident ~20 years before involving and bladder rupture. Thoracic examination revealed decreased breathing sound and bowel sound in the right lower hemithorax.

A chest X-ray revealed right basal consolidation with inhomogenous opacity at the medium and lower chest area.

A computed tomography (CT) scan demonstrated massive right diaphragmatic hernia with dislocation of the liver that appeared overturned ~180°, transverse and ascending colon and part of small bowel (Fig. 1).

He was then admitted to the surgery department for a laparoscopic exploration that confirmed the radiological finding of inveterate right diaphragmatic hernia with an 8 cm defect. Because of the impossibility to reduce the liver in abdomen, due to the thoracic adhesions, a right anterolateral thoracotomy was then performed. The liver was uneventfully reinstated and colon and small bowel were replaced in anatomical position. The defect was repaired by dual mesh patch (15 × 25 cm). The postoperative course was uneventful. Postoperative oxygen saturation was normal and a chest X-ray was performed before discharge and revealed complete re-expansion of the lung. The patient was discharged on the ninth postoperative day. The follow-up is negative for signs of recurrence after 2 years.

Received: November 8, 2016. Revised: November 28, 2016. Accepted: March 8, 2017

Published by Oxford University Press and JSCR Publishing Ltd. All rights reserved. © The Author 2017.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact [journals.permissions@oup.com](mailto:journals.permissions@oup.com)



**Figure 1:** Thorax and abdominal CT showing the dislocation of right upper abdominal viscera

## DISCUSSION

The diaphragmatic hernia is the herniation of abdominal organs into the chest through a diaphragmatic defect. These can be congenital or acquired [2].

Acquired diaphragmatic hernia occurs, in most of the cases, as a result of blunt or penetrating thoraco-abdominal trauma. The likelihood of occurrence of diaphragmatic hernia may be ~5% following high impact trauma [3]. Left hemidiaphragmatic hernia is more common because liver exerts a protective function against the herniation of the viscera [1].

Herniation of the abdominal organs may be completely asymptomatic; due to this reason, ~66% of diaphragmatic rupture are not recognized at the time of trauma. The chest negative pressure causes the gradual migration of abdominal contents leading to the onset of symptoms [4]. We can classify this clinical condition in two types: Type I (early) and Type II (delayed). Dislocation of abdominal organs is more common in Type II hernia [1].

Clinical presentation includes gastrointestinal symptoms (abdominal pain, nausea, vomiting and sub-occlusion), respiratory (dyspnea, orthopnea and chest pain) or cardiocirculatory (hemodynamic compromise) [1–4].

The initial diagnostic tool is chest or abdominal X-ray but CT scan is the best modality to assess the extent of dislocation, the size of diaphragmatic defect and the belt-like constriction of abdominal contents, referred to as the ‘collar sign’ [3].

Surgery is always necessary for the treatment; the approach could be laparotomic/thoracotomic or minimal invasive. In our case, minimally invasive approach was used as a diagnostic tool in order to evaluate the diaphragmatic defect and choose the best approach (thoracotomic or laparotomic). In delayed case, diagnosis may be a compulsory thoraco-abdominal approach in order to lyse adhesions between abdominal organs and thoracic structure [2]. Defects >25 cm<sup>2</sup> may require prosthetic repair [4].

## CONCLUSION

Diagnosis of diaphragmatic hernia should always be considered in patient with chest or abdominal trauma because the mortality rate can reach 31% in the first 24 hours following the trauma. It should also be considered many years after trauma in case of onset of typical symptoms [5].

## CONFLICT OF INTEREST STATEMENT

None declared.

## REFERENCES

1. Peker Y, Tatar F, Kahya MC, Cin N, Derici H, Reyhan E. Dislocation of three segments of the liver due to hernia of the right diaphragm. *Hernia* 2007;11:63–5.
2. Katukuri GR, Madireddi J, Agarwal S, Karren H, Devasia T. Delayed diagnosis of left-sided diaphragmatic hernia in an elderly adult with no history of trauma. *J Clin Diagn Res* 2016; 10:PD04–PD05.
3. Wardi G, Lasoff D, Cobb A, Hayden S. Traumatic diaphragmatic hernia. *J Emerg Med* 2014;46:80–2.
4. Thoman DS, Hui T, Phillips EH. Laparoscopic diaphragmatic hernia repair. *Surg Endosc* 2002;16:1345–9.
5. Rubens de Nadai T, Paiva Lopes JC, Inaco Cirino CC, Godinho M, Rodrigues AJ, Scarpellini S. Diaphragmatic hernia repair more than four years after severe trauma: four case reports. *Int J Surg Case Rep* 2015;14:72–6.