

Article

FECOPNEUMOTHORAX SECONDARY TO A LATE TRAUMATIC DIAPHRAGMATIC INJURY

GUSTAVO DRAGUSTINOVIS-HINOJOSA, MD 

*Department of General Surgery, Hospital Universitario Dr. José Eleuterio González,
Universidad Autónoma de Nuevo León, Monterrey, Nuevo León, México.*

JORGE A. GUTIÉRREZ-GONZÁLEZ, MD 


*Department of General Surgery, Hospital Universitario Dr. José Eleuterio González,
Universidad Autónoma de Nuevo León, Monterrey, Nuevo León, México.*

DARÍO E. MEDINA-MUÑOZ, MD 

*Department of General Surgery, Hospital Universitario Dr. José Eleuterio González,
Universidad Autónoma de Nuevo León, Monterrey, Nuevo León, México.*

LEVI E. DELGADO GARCÍA, MD 

*Department of General Surgery, Hospital Universitario Dr. José Eleuterio González,
Universidad Autónoma de Nuevo León, Monterrey, Nuevo León, México.*

GERARDO E. MUÑOZ-MALDONADO, MD 

*Department of General Surgery, Hospital Universitario Dr. José Eleuterio González,
Universidad Autónoma de Nuevo León, Monterrey, Nuevo León, México.*

Correspondence: *Gustavo Dragustinovis-Hinojosa

E-mail: gustavodragus@gmail.com

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ABSTRACT

Traumatic diaphragmatic hernias were first described by Ambroise Paré in 1579, who reported the case of an artillery captain, that presented an intestinal perforation that had caused a diaphragmatic hernia (Bhatti and Dawani, 2015). The timely diagnosis of a traumatic diaphragmatic hernia can be a challenge, which requires extensive knowledge of the kinematics of trauma, as well as clinical and radiological evidence (Petroni *et al.*, 2017). We present the case of a 60-year-old male who presented blunt abdominal trauma due to a traffic accident, causing an undetected diaphragmatic hernia in his initial evaluation; months after the incident goes to the emergency room (ER) with hemodynamic instability and septic shock. A diagnosis of complicated diaphragmatic hernia and fecopneumothorax is made, for which he undergoes surgery.

1. Introduction

Traumatic diaphragmatic hernias are defined as a displacement of the abdominal viscera within the thoracic cavity in the context of blunt or penetrating trauma. Delay in recognizing this type of injury can manifest in complications such as intestinal obstruction, perforation, or ischemia of the affected organ.

Fecopneumothorax is an unusual presentation; the symptomatology is usually ambiguous and not very specific when it manifests late, so a delay in diagnosis increases morbidity and the surgical treatment approach must be individualized.

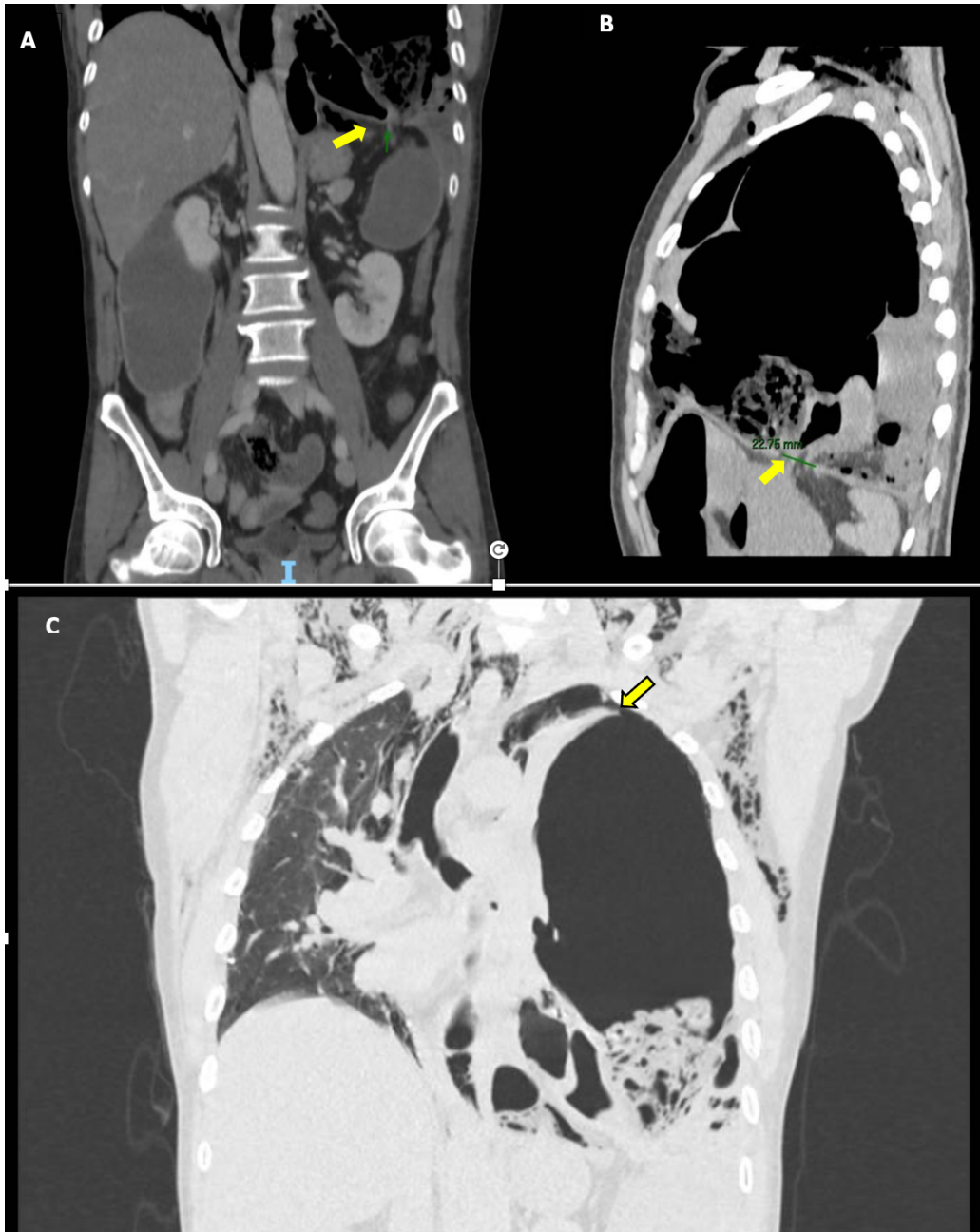
2. Clinical Case

A 60-year-old male with no relevant medical history; He refers a car accident presenting blunt abdominal trauma 9 months ago, back then, the initial assessment had rule out major injuries and was discharged from the ER. Now, he presented to the emergency department with chief complaint of generalized abdominal pain, also dyspnea at rest, vomit and constipation, with an evolution of 5 days. On our initial assessment, we found a patient with a temperature of 101.1 F°, blood pressure 60/40 mmHg, respiratory rate 30/min, and heart rate 115/min. On examination, he was lethargic, neck with subcutaneous emphysema, without jugular vein engorgement, absence of vesicular murmur in the left hemithorax, veiled heart sounds, abdomen without audible peristalsis, distended, tympanic, on palpation with muscular resistance in the four quadrants.

It was decided to perform a thoracoabdominal computerized tomography (CT), which revealed a complicated diaphragmatic hernia with a 6 cm long defect, presence of a transverse and descending colon within the left hemithorax (Fig. I); image suggestive of colonic perforation, with free fluid in the thoracic cavity, data of pneumomediastinum in addition to extensive subcutaneous emphysema in the neck and chest.

Figure I:

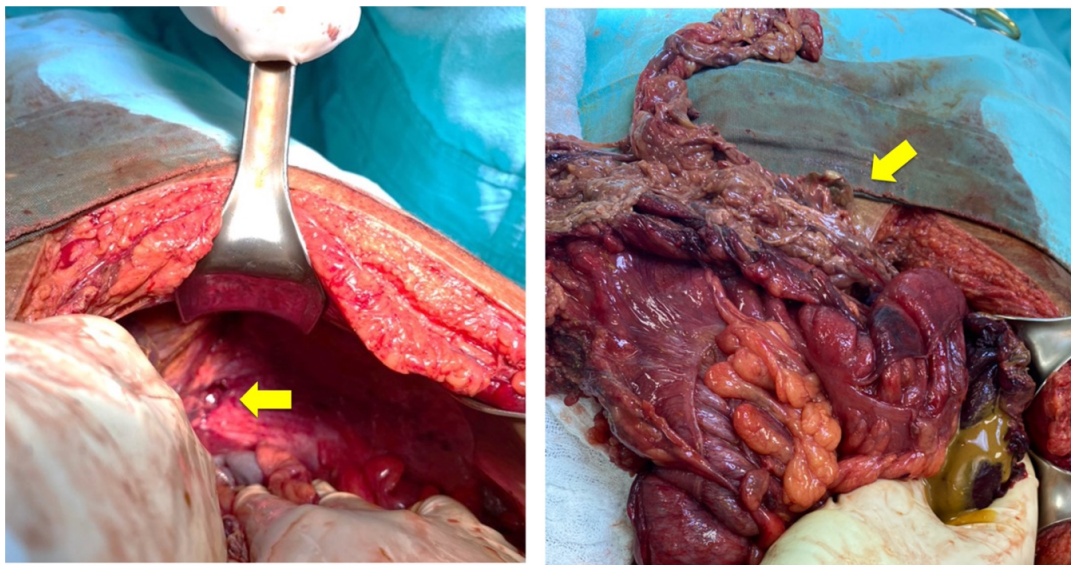
Thoracoabdominal computed tomography; Left yellow arrow shows colonic wall perforation in thorax. Right yellow arrow shows diaphragm defect.



It was decided to intervene surgically on the patient, starting with a transabdominal approach; In the operating room significant dilation of intestinal loops is found, in the posterolateral region of the left diaphragm a defect is found; hernial content is reduced towards the abdominal cavity, evidencing abundant output of fecal matter through the left hemithorax (Fig. II).

Figure II:

Clinical image: left yellow arrow indicates defect in the left posterolateral region of the diaphragm; Right yellow arrow points to hernial content removed from the chest.



Due to hemodynamic instability, a Harmann's procedure, resection of the transverse colon and ascending colon terminal colostomy was performed. Abundant lavage of the thoracic cavity through the abdominal defect, a primary closure of the diaphragmatic defect with non-absorbable suture, and placement of a left thoracostomy tube is also performed.

Patient presents data of septic shock refractory to treatment and was translated to intensive care unit (ICU) and dies within few hours after surgery.

3. Discussion

Within the pathophysiology of trauma, it must be taken into account that before its displacement in inhalation and exhalation, it is exposed up to the level of the 4th and 5th intercostal space (Petrone *et al.*, 2017). There is an intraperitoneal pressure gradient during passive inspiration which goes from +2 to +10 cm H₂O, while intrapleural pressure under normal conditions fluctuates from -5 to -10 cm H₂O; With the abrupt increase in intra-abdominal pressure, this intraperitoneal pressure can reach levels of +150 to 200 cm H₂O, which is associated with the transmission of kinetic energy towards the domes of the diaphragm, which can cause a rupture, this as a consequence, a pressure gradient which favors the passage of intra-abdominal content to the pleural space.

The delay in the diagnosis of a diaphragmatic injury can last for months or even years, generating an increase in hernia content and the development of cardiac, respiratory and gastrointestinal symptoms (Petrone *et al.*, 2017).

In the context of severe abdominal trauma, diaphragmatic rupture occurs in an estimated 1 % to 5 % approximately (Chern *et al.*, 2018; Tessely *et al.*, 2020). Late presentations of symptoms could cause an increase in morbidity and mortality even up to 25 %. Within its presentation, those on the left side are more frequent, due to the protection provided by the liver on the right side (Chern *et al.*, 2018). A short-length laceration can progress and increase in size, so any organ within the abdominal cavity

can herniate (stomach, small intestine, omentum, colon and even liver). Ischemia or necrosis of the intestine is a condition that can cause septic shock; fecopneumothorax due to perforation of the colon is a rare entity with high mortality, and very few cases have been reported to date.

The suspicion at the beginning of the presentation of the trauma has to be high to be able to identify a lesion, the chest X-ray only has a sensitivity of up to 46 % and the CT of 70-80 %. The approach for its treatment is usually the exploratory laparotomy, which allows reducing the hernial content returned to the abdominal cavity and thus the corresponding repair.

The use of mesh is not recommended in the event of a fecopneumothorax due to the risk of postoperative infection, so very few cases reported in the literature suggest the use of this type of material (Chern *et al.*, 2018; Tessely *et al.*, 2020).

In this patient we presented, it was possible to carry out the reduction of the colon, the closure of the diaphragmatic defect and the lavage of the thoracic cavity, with the placement of a thoracostomy tube; however, the recognition of the diagnosis was late and its outcome led to his death a few hours after surgery.

4. Conclusion

The index of suspicion for the early diagnosis of a traumatic diaphragmatic hernia must be high in order to identify them in time and prevent their complications. Being a very rare entity, fecopneumothorax has a high morbidity, so an established management before its presentation has not been established today; therefore, management must be individualized depending on the clinical conditions of the patient.

5. Declaration of Competing Interest

The authors report no declarations of interest.

6. Sources of Funding

No sources of funding were required.

7. Ethical Approval

No ethical approval is required.

8. Consent

Written informed consent was obtained from the patient's family for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this Journal on request.

9. Author contribution

GDH- conception of the work, drafting of manuscript, final approval and agreement for the accountability of work.

JAGG- data interpretation, revising the manuscript, final approval and agreement for the accountability of work.

DEMM- data interpretation, drafting of manuscript, final approval and agreement for the accountability of work.

LEDG- data interpretation, final approval and agreement for the accountability of work.

GEMM - data interpretation, revising the manuscript, final approval and agreement for the accountability of work.

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