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RESEARCH ARTICLE

POST-TRAUMATIC RIGHT DIAPHRAGM RUPTURE: A CASE REPORT

M. Benzakour, K. Khaleq, I. Nabih, A. Erragh, R. Alharrar, K. Hattabi

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Abstract

Post-traumatic right diaphragmatic rupture is a rare lesion, often difficult to diagnose in the acute phase, but potentially fatal in case of delay. Its diagnosis is mainly based on radiological imaging, with frequent use of computed tomography (CT). We report the case of an elderly patient with respiratory distress due to a right diaphragmatic rupture with intrathoracic hernia of several abdominal organs. Therapeutic management of this type of lesion depends on the severity and associated operative risks. The patient, aged 80, presented with respiratory distress due to a right diaphragmatic rupture complicated by an intrathoracic hernia. The therapeutic option chosen was clinical monitoring with symptomatic treatment, due to the high operative risk.

Introduction:-

Right diaphragmatic rupture is a rare complication of blunt thoracoabdominal trauma. Its incidence varies from 1 to 7% depending on the study. Often initially asymptomatic, it can manifest late with respiratory or digestive complications due to an intrathoracic hernia. Diagnosis is based on imaging, particularly chest X-ray and computed tomography (CT). Treatment is generally surgical, although the approach is dictated by the patient's clinical stability. Here, we report a clinical case illustrating the diagnostic and therapeutic challenges of this pathology. (Shah et al., 2018; Murray et al., 2009).

Case presentation

An 80-year-old man with a 3-year history of paraparesis was admitted for acute respiratory distress. On physical examination, the patient presented with: Glasgow score of 15; Blood pressure of 110/60 mmHg and heart rate of 95 bpm. Polypnea with a respiratory rate of 30 cycles/min and crackles on lung auscultation.

Initial imaging included:

• Chest X-ray: A right lung opacity was identified, suggesting a diaphragmatic abnormality (see Figure 1).

Corresponding Author:- Benzakour Maria

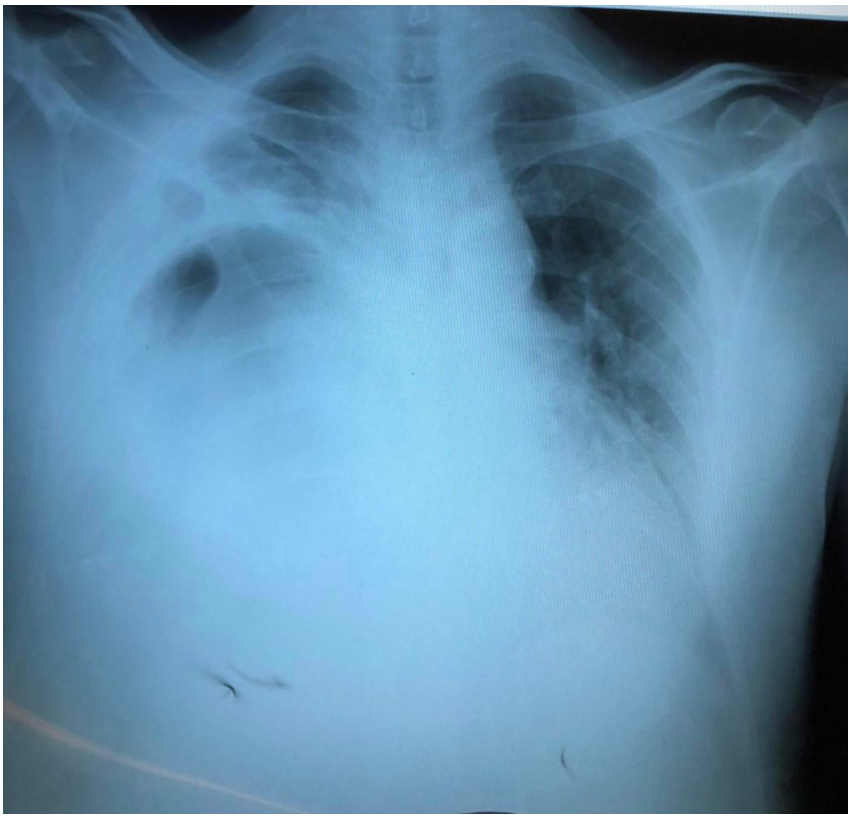

Figure 1:- Chest X-ray showing opacity in the right hemithorax with mediastinal shift to the left.

Chest CT scan:

Performed to confirm the diagnosis, it revealed: An intrathoracic hernia involving the liver, stomach and colon; Collapse of the right middle and lower lobes and mediastinal shift to the left.

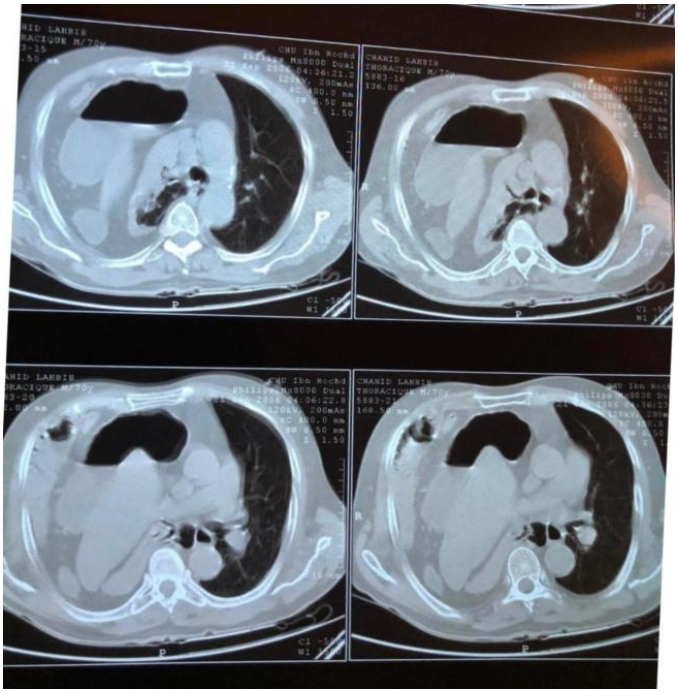

Figure 2:- Chest CT scan images showing the abdominal organs (liver, stomach, colon) herniated into the right thoracic cavity.

Digestive opacification with gastrographin:
This examination allowed:
• Visualize the stomach and colon in the thoracic cavity.
• Confirm the absence of digestive obstruction or strangulation

Figure 3:- Gastrographin opacification image.

Management consisted of hospitalization, symptomatic treatment, and strict monitoring, given the high operative risk. The patient was finally sent home with follow-up recommendations. This decision was motivated by a surgical risk deemed excessive, given his advanced age and comorbidities, in accordance with clinical recommendations for polymorbid patients (Hanna et al., 2021).

Discussion:-

Post-traumatic diaphragmatic rupture, although rare, represents a diagnostic and therapeutic emergency. Studies show that its incidence varies from 1 to 7% of closed thoracoabdominal trauma, with a predominance on the left side due to the protective effect of the liver right. However, right diaphragmatic rupture can be more difficult to diagnose in the acute phase, which often delays management and worsens the prognosis.

In our case, the clinical presentation included respiratory distress associated with a right lung opacity, suggestive but nonspecific. According to Shah et al. (2018), up to 50% of diaphragmatic ruptures are not diagnosed at the initial stage. A chest X-ray can reveal indirect signs such as abnormal elevation of the diaphragmatic dome or intrathoracic air-fluid levels, but it has a limited sensitivity, estimated between 27% and 60%.

Computed tomography (CT) is now the gold standard for confirming the diagnosis. As in our case, it allows direct visualization of the diaphragmatic defect and the herniated contents, while assessing associated complications, such

as mediastinal displacement. Studies, such as that of Murray et al. (2009), report a sensitivity of 83% and a specificity reaching 100% for CT in the diagnosis of diaphragmatic rupture.

On the other hand, more complex cases require magnetic resonance imaging (MRI) or diagnostic thoracoscopy. A study by Killeen et al. (2003) highlights the usefulness of thoracoscopy, particularly in cases of late or uncertain diagnosis.

The most common complications include lung compression, mediastinal shift, and impaired venous return, which can lead to hemodynamic instability. In our case, the patient presented with right middle and lower lobe lung collapse, associated with mediastinal repression.

Surgical treatment remains the cornerstone of management. The approach can be by thoracotomy or thoracoscopy. According to Iverson et al. (2017), thoracotomy is preferred in cases of complex right rupture with massive hernia, as in our case, while thoracoscopy is often used for diagnostic purposes or for limited repairs. However, the operative risk must be carefully assessed, especially in elderly or polymorbid patients. taking into account the patient's cardiovascular and pulmonary history. In some cases, multidisciplinary management is recommended to assess the benefits and risks of surgery (Iverson et al., 2017).

Our 80-year-old patient was managed conservatively because of a high operative risk. A study by Hanna et al. (2021) indicates that in patients over 70 years of age, the rate of postoperative complications after surgical repair exceeds 40%, with an increased risk of respiratory failure. However, in cases where the hernia causes severe cardiorespiratory repercussions, as reported by Wagner et al. (2014), immediate surgical intervention is necessary despite the risks.

Furthermore, diagnostic delays increase the risk of late complications, including strangulation of the herniated organs. Boulanger et al. (2000) reported that up to 30% of patients not initially operated on develop complications requiring emergency intervention.

In the case presented, gastrographin opacification was used as a diagnostic method to confirm the intrathoracic hernia and assess the involvement of the herniated organs (liver, stomach, colon). This technique involves administering a gastrographin-based contrast agent, often orally or enterally, to visualize the gastrointestinal tract on X-rays or CT scans.

Usefulness in the presented context:
1. Confirmation of the hernia:
Opacification allowed to locate the abdominal organs displaced in the thoracic cavity. This was essential to confirm the hernia of the stomach and colon, complementing the information obtained by CT.
2. Evaluation of digestive function:

It allows to exclude obstruction or strangulation of the herniated organs, which would require immediate surgical intervention.

The use of gastrographin in diaphragmatic ruptures is not systematic but may be indicated in cases where the initial imaging (X-ray or CT) leaves areas of uncertainty. According to Murray et al. (2009), contrast techniques are particularly useful in complex diagnoses or to evaluate complications such as intestinal strangulation.

In this particular case, gastrographin opacification complemented CT to establish a precise diagnosis, while avoiding immediate surgical intervention thanks to an assessment of risks and benefits.

Case specificity
In our observation, the right diaphragmatic hernia involved the liver, stomach, and transverse colon, a rare configuration but reported in the literature. Iverson et al. (2017) described similar cases, emphasizing the importance of early management to avoid serious complications such as gastrointestinal perforation or hepatic ischemia.

Comparing this case with data from the literature, it is clear that right diaphragmatic rupture requires increased vigilance and early diagnosis. Imaging, particularly CT, remains essential to confirm the diagnosis and guide

treatment. The therapeutic decision must be individualized, taking into account the severity of symptoms, comorbidities, and operative risks.

Conclusion:-

Post-traumatic right diaphragmatic rupture is a rare but serious injury, requiring special vigilance in patients who have suffered thoracoabdominal trauma. Diagnosis is based on imaging, with essential radiological monitoring. Although surgical treatment is often necessary, the decision should be adapted to the patient's clinical condition. Early management significantly improves the prognosis.

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