Case Report

Hiatal Hernia-induced Dyspnea in a Patient with Ascites: Leveraging Point-of-care Ultrasound for Accurate Diagnosis

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Abstract

A hiatal hernia (HH) is characterized by the protrusion of the stomach or other abdominal viscera into the mediastinum. The mechanism of increased intra-abdominal pressure is typically associated with this condition. When there are additional contributing factors causing increased abdominal pressure, like ascites resulting from chronic liver disease, it can exacerbate HH symptoms, including dyspnea. The incorporation of point-of-care ultrasonography as an integral component of physical examination enables a precise and objective assessment of dyspnea offering physicians additional clues regarding the underlying etiology. We present a case of a patient who was admitted to the emergency department due to dyspnea and ascites. Through the utilization of point-of-care ultrasound, the diagnosis of an HH was made, identifying it as one of the factors contributing to the patient's shortness of breath.

Keywords: Ascites, cirrhosis, dyspnea, hiatal hernia, point-of-care ultrasound

Introduction

Thoracic ultrasonography (TUS), a component of critical care point-of-care ultrasonography (POCUS), is of importance in cirrhotic patients,[1] especially for those with ascites. Hiatal hernia (HH), the protrusion of abdominal contents into the mediastinum, results from increased intra-abdominal pressure and can be relevant in decompensated cirrhosis.[2] HH, linked to age and obesity, commonly causes GERD symptoms, but dyspnea, especially in ascitic patients, can be a result of larger hernias.[3,4] While several imaging examinations are available to evaluate causes of dyspnea, the use of ultrasound has emerged as a valuable tool. The BLUE Protocol, designed to investigate acute dyspnea, provides a direct view of lung sliding and discerns A, B, or C lung patterns.[5] With the use of POCUS, we frequently uncover findings that significantly contribute to diagnoses. However, there are instances where the diagnosis hinges solely on direct visual evidence. We present a case of a cirrhotic patient with acute dyspnea, in which POCUS enabled direct visualization of an HH, thus allowing us to consider the HH as the main cause of the patient's shortness of breath.

Case Report

A 55-year-old man with a known medical history of Child–Pugh C alcoholic chronic liver disease and gastric ulcer presented to the emergency department (ED) with persistent dyspnea at rest and increased abdominal diameter. There was no history of trauma. Chronic liver disease diagnosed 6 months before led to recurrent admissions to the ED due to ascites, with the last admission reported only 20 days before.

The physical examination revealed an arterial blood pressure of 101/67 mmHg and oxygen saturation of 96%. On inspection, a distended abdomen, with abundant collateral vessels, and no tension was present. Blood tests showed mild anemia with thrombocytopenia. Renal function was normal. The POCUS examination showed a reduction of pulmonary parenchyma

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with a B-line pattern in both lower pulmonary areas and a bilateral small pleural effusion. In the left pulmonary base, there was a mass with peristaltic movements sliding into the thoracic cavity, compatible with a diaphragmatic hernia [Figure 1a and b]. The POCUS examination of the abdomen showed moderate volume ascites, with an enlarged spleen and interposition of an intestinal loop with the diaphragm [Video 1]. Due to these findings, a computed tomography scan was performed, confirming the presence of a large HH containing part of the stomach and free fluid [Figures 2 and 3]. The HH had never been reported in previous imaging studies.

The patient's dyspnea was assumed multifactorial, resulting from their decompensated chronic liver disease, and worsened by the HH. Paracentesis was performed, but as the patient's breathlessness did not improve, the surgical team was consulted, who decided that no urgent surgical intervention was required. The patient was discharged, and a follow-up consultation was scheduled to reassess HH condition. The clinical evolution was unfavorable, and due to a lack of therapeutic compliance, surgical correction of the HH was not deemed feasible.

Discussion

POCUS represents a feasible and reliable diagnostic approach to the patient with dyspnea.[6,7] The subjectivity of the symptom, multiple overlapping clinical conditions, and comorbidities add to the difficulty in accurately diagnosing these patients; therefore, it often requires laboratory and radiological testing in addition to clinical evaluation.[2] The use of complementary diagnostic examinations might not be readily available and often they have a limited role in critically ill patients. An early diagnostic tool, for use in the ED, to diagnose and initiate targeted management is needed, which is why the use of POCUS has become a popular tool in ED. POCUS saves time while maintaining safety standards.[6,7] It has been proven that POCUS, when added to a standard diagnostic pathway, led to more correct diagnoses in patients with dyspnea than the standard diagnostic pathway alone. Therefore, the American College of Physicians recommends the use of POCUS when there is diagnostic uncertainty in patients with acute dyspnea.[7] There is increased evidence showing the importance of evaluation of the diaphragm, but this focus is currently only on trauma patients.[8]

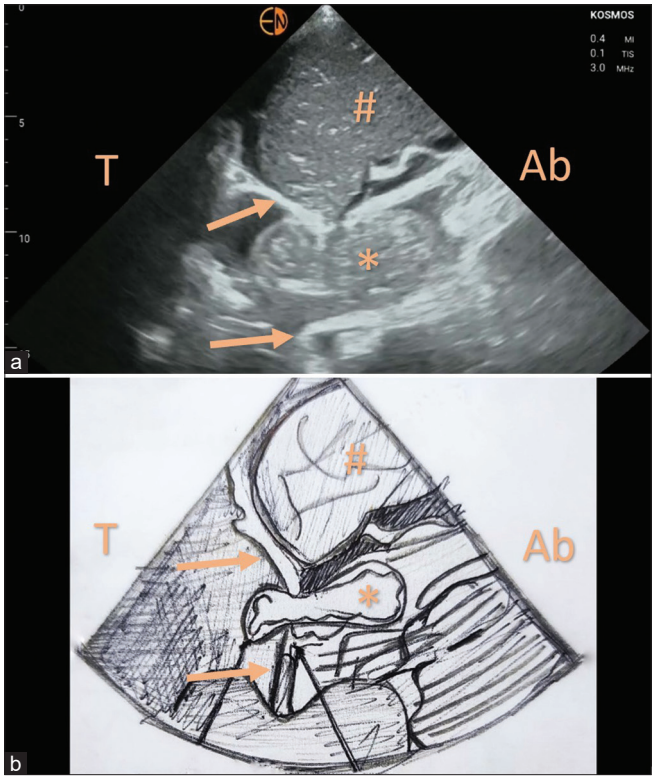

Figure 1: Point-of-care ultrasonography image obtained in a subxiphoid view (the abdominal transducer is applied to the subxiphoid area and rotated until it lies parallel to the longitudinal axis of the abdominal esophagus, orienting sound beam cephalically). (a) Real image and (b) schematic representation, created by Moura de Azevedo S. In both figures the authors highlight the hiatal hernia (orange arrows), free fluid, and stomach sliding (*), next to the liver (#). T: Thorax, Ab: Abdomen.

HH refers to the protrusion of an intra-abdominal organ into the thoracic cavity through an esophageal hiatus of the diaphragm. The symptoms are nonspecific and include heartburn, regurgitation, or epigastric pain.[3,4] It is known that patients with large HHs may have significant dyspnea, including exertional dyspnea. Dyspnea may be attributed to left atrial compression or increased pulmonary venous pressure. A wide spectrum of manifestations mimicking acute cardiovascular events may be seen, and cardiac complications such as gastropericardial fistula, pericardial effusion, and arrhythmias can occur. On transthoracic echocardiography, HH is usually seen as an extracardiac posterior mass encroaching on the left atrial cavity, mimicking a left atrial mass.[9,10]

The diagnosis of HHs is made through radiologic or endoscopic examinations.[3,5,9] In addition, transabdominal or transthoracic ultrasound examination can see the herniation site of the diaphragm and herniated abdominal organs.[11] The abdominal

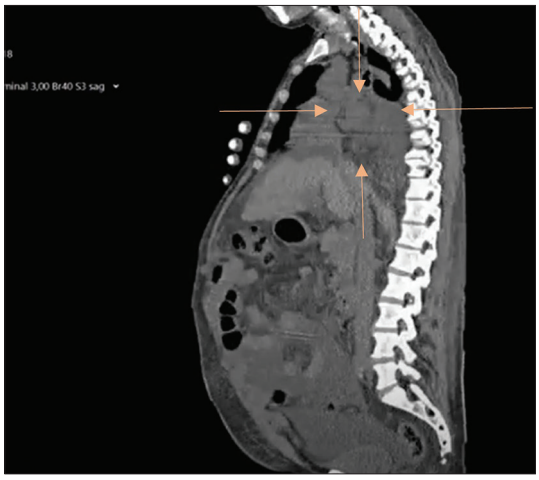

Figure 2: Computed tomography scan (coronal view) showing the protrusion of the hiatal hernia into the thorax. Orange arrows pointing to the intrathoracic diaphragmatic herniation.

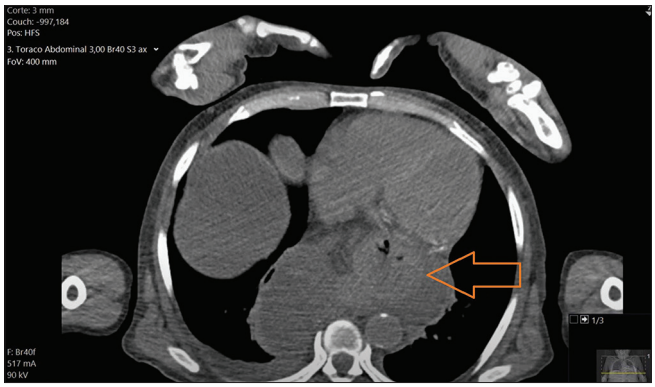

Figure 3: Computed tomography scan (axial view) showing the hiatal hernia (HH) protrusion into the thorax. Orange arrow pointing to the HH.

transducer should be placed over the subxiphoid area and oriented cranially with an angle of 30°–60°. Afterward, it should be rotated until it lies parallel to the longitudinal axis of the abdominal esophagus. We can then observe the longitudinal section of the esophagus generating a wide tubular structure passing through the diaphragmatic hiatus, which is the HH. Often, the gastroesophageal junction is not clearly depicted, with the bowel diameter typically measuring between 16.0 and 21.0 mm at the diaphragmatic hiatus, both of which present a positive predictive value for HH.[11] During a lung ultrasound examination, the HH might be mistaken for atelectatic lung, a common observation in pleural effusion cases. However, the distinction lies in its air-fluid contents and the apparent lining by the peritoneum.

In this scenario, incorporating POCUS as the fifth component of the physical examination helped reinforce the health-care professionals' clinical suspicion of nonpulmonary causes of dyspnea. The patient's dyspnea was hypothesized to be multifactorial (worsening ascites and the presence of a large HH), and a decision regarding the best treatment option was made.

Surgical treatment of cirrhotic patients is often delayed due to the higher morbidity and mortality associated with the underlying liver disease. Since our patient was hemodynamically stable with no signs of hernia incarceration or strangulation, a "wait-and-see" strategy was considered a reasonable option. During recent decades, the indications for surgical timing have changed. Nowadays, there is evidence that elective hernia repair in cirrhotic patients offers acceptable morbidity and ensures longer survival than conservative treatment due to the higher incidence of emergency surgery.[12]

Conclusions

This case highlights the importance of incorporating ultrasound as an essential component of the physical examination in patients with dyspnea. The early utilization of ultrasound can help clinicians consider alternative and less frequent causes for dyspnea, like HH, and prompt the appropriate evaluation and management. By recognizing the potential contribution of HH in this clinical scenario, clinicians can optimize patient care and ensure accurate diagnosis.

Ethics statements

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and its amendments. The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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