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Acute abdomen in a patient with paraesophageal hernia, resulting in acute compromised respiratory function: A case report



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ABSTRACT

INTRODUCTION: We present a case of acute abdomen, causing increased intra-abdominal pressure, leading to further herniation of an existing paraesophageal hernia, and consequently acute compromised respiratory function. This acute respiratory complication to a paraesophageal hernia has not previously been reported.

PRESENTATION OF CASE: We present a case of a 75-year-old female who was acutely admitted with stridor. The patient was known to have a paraesophageal hernia monitored using watchful waiting, and dyspnoea. The patient's condition deteriorated, leading to intubation. Diagnostic imaging revealed a paraesophageal hernia pressing onto the trachea as well as appendicitis and ileus. Surgery confirmed perforated appendicitis, peritonitis, and ileus causing high intra-abdominal pressure, resulting in further herniation of the paraesophageal hernia as a cause for acute compromised respiratory function. Appendectomy and gastropexy were performed. The patient was later discharged to rehabilitation.

DISCUSSION: Patients with pulmonary symptoms caused by a paraesophageal hernia, especially patients with sizeable hernias, could potentially be in greater risk of severe airway affection if complicated by acute abdomen. These patients could benefit from elective hernia repair, rather than watchful waiting, as it would eliminate pulmonary symptoms and prevent similar cases. Patients monitored using watchful waiting should be informed that acute abdomen could cause acute compromised respiratory function.

CONCLUSION: Any case of acute abdomen causing high intra-abdominal pressure could potentially cause further herniation of an existing paraesophageal hernia, resulting in acute compromised respiratory function. In patients known to have a paraesophageal hernia, similar cases should be suspected if the patient presents with acute breathing difficulties.

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1. Introduction

A paraesophageal hernia occurs when part of the gastric fundus herniates through the esophageal hiatus and lies alongside the esophagus [1]. Paraesophageal hernias comprise 5% of all hiatal hernias and are more common in the elderly [1,2]. The cause of hiatal hernias is related to increased intra-abdominal pressure, causing a transdiaphragmatic pressure gradient at the gastroesophageal junction. This results in weakening of the phrenoesophageal membrane and widening of the esophageal hiatus [3]. Most patients with a paraesophageal hernia are believed to be asymptomatic. Symptoms can be caused by obstruction, gastroesophageal reflux disease, bleeding, and iron deficiency anaemia. Other non-specific symptoms associated with paraesophageal hernias are postprandial fullness, chest pain, and breathing difficulties [2,3]. Patients

with paraesophageal hernias can also present acutely with gastric volvulus and incarceration, which requires immediate surgical intervention [2,3]. Currently, asymptomatic or minimally symptomatic paraesophageal hernias are monitored using watchful waiting, and only symptomatic hernias are recommended for elective hernia repair [2].

To our knowledge, we report the first case of acute abdomen causing high intra-abdominal pressure, resulting in further herniation of an existing paraesophageal hernia, causing the hernia to press onto the trachea, consequently leading to acute compromised respiratory function.

It is well known that perforated appendicitis can cause peritonitis and ileus [4]. This, and other acute abdominal syndromes such as intestinal perforation, acute pancreatitis or trauma, frequently led to high intra-abdominal pressure [5]. In this case, peritonitis and ileus were the reason for the increased intra-abdominal pressure, but any case of acute abdomen leading to high intra-abdominal pressure could potentially cause cases like this.

It is also known that paraesophageal hernias can cause pulmonary symptoms [2]. However, this case shows that a case of acute

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Fig. 1. Thoracoabdominal CT scan showing ileus and appendicitis.

abdomen possibly can cause acute exacerbation of pulmonary symptoms associated with a paraesophageal hernia, resulting in acute compromised respiratory function.

2. Case report

A 75-year-old Caucasian female with a history of depression, atrial fibrillation, dilated cardiomyopathy, a paraesophageal hernia currently monitored using watchful waiting, and dyspnoea was acutely admitted to the emergency department with stridor. The patient was unresponsive to verbal stimulation. Initial physical examination revealed no signs of symptoms from other organ systems, including the abdomen. Blood investigation showed C-reactive protein 223, white blood cell count 16.7, haemoglobin 7.8 mmol/L. The initial blood gas analysis showed pH 7.15, pCO₂ 10.4, pO₂ 12.2 and lactate 2.6. The mixed acidosis might have been due to the respiratory and metabolic nature of the patient's disease.

After receiving Continuous Positive Airway Pressure (CPAP), the patient became responsive to verbal stimulation. However, the patient still had severe respiratory difficulties and was directly transferred to the intensive care unit to continue CPAP treatment. Suspecting obstructed airways, a chest X-ray was taken. It showed pneumonia, cardiac hypertrophy, a paraesophageal hernia, and a displaced trachea.

The following morning, a Computerized Tomography (CT) scan of the thorax was done in order to clarify the circumstances around the trachea. It confirmed a sizeable paraesophageal hernia pressing onto the trachea, compromising respiratory function. Suspecting the paraesophageal hernia being the reason for the patient's respiratory difficulties, Department of Gastrointestinal Surgery became responsible for further surgical treatment.

Later that day, the patient's condition deteriorated with severe stridor, and an endotracheal tube was inserted.

The next morning, it was decided to operate acutely. In the meantime, the CT scan of the thorax had raised suspicion of ileus, because it showed dilated small bowel segments with air-fluid levels. A thoracoabdominal CT scan was done prior to surgery in order to clarify this. It revealed appendicitis and ileus (Fig. 1) and confirmed the thoracic findings of the earlier CT scan (Fig. 2).

Suspecting an abdominal cause for the patient's symptoms, a diagnostic laparoscopy was performed. It confirmed the suspicion that perforated appendicitis with secondary diffuse peritonitis and ileus had caused high intra-abdominal pressure, resulting in further herniation of the paraesophageal hernia. This made the paraesophageal hernia press onto the trachea, resulting in acute compromised respiratory function. Conversion to explorative laparotomy was necessary due to limited space in the abdominal cavity, which was filled by dilated small bowel segments. Appendectomy and gastropexy ad modum Borema was performed.

Postoperatively, the patient had a 6-day stay in the intensive care unit, to be respiratory stabilized and extubated. The following postoperative course was uneventful. The patient was discharged on the 12th postoperative day and transferred to rehabilitation (Table 1).

3. Discussion

This case reports an acute complication to a paraesophageal hernia requiring emergency surgery, which, to our knowledge, is not previously reported. The hypothesis is that perforated appendicitis caused secondary diffuse peritonitis and ileus. This condition led to increased intra-abdominal pressure. The increased pressure caused a greater amount of stomach to herniate into the thorax, thereby causing an expansion of the existing paraesophageal hernia. This expansion resulted in compression of the trachea, and consequently acute compromised respiratory function.

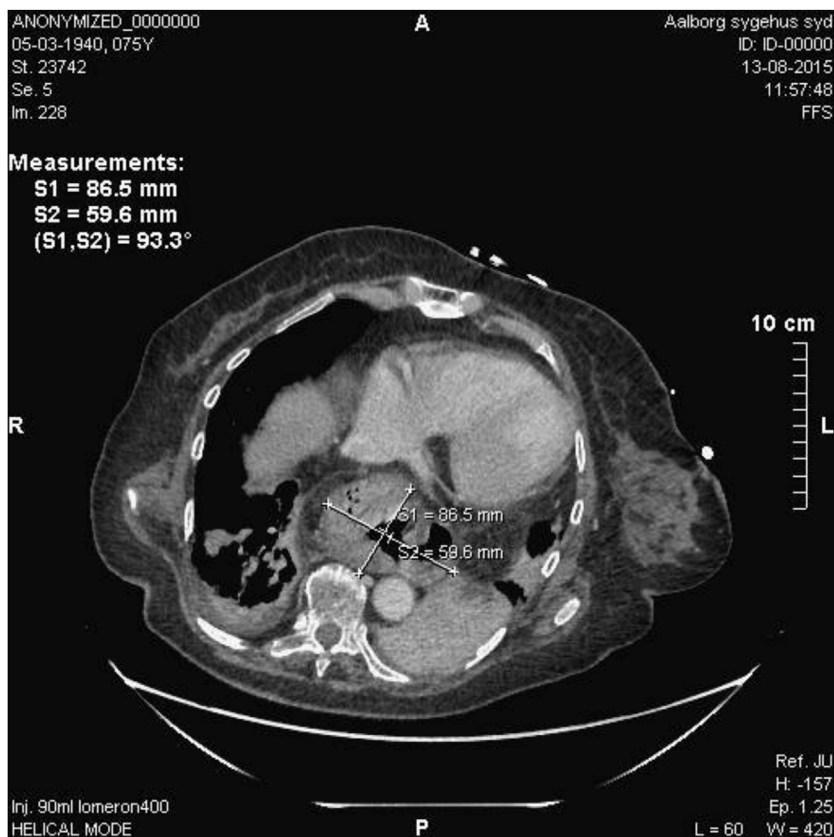


Fig. 2. Thoracoabdominal CT scan showing a paraesophageal hernia measuring 8.7 × 6 cm.

Table 1
Timeline showing the course of events from admission, throughout diagnosing and surgical intervention until discharge.

Timeline
Day 1:
<ul style="list-style-type: none"> The patient was acutely admitted with stridor. Directly transferred to the intensive care unit for CPAP treatment. Suspicion of obstructed airways. Chest X-ray showed pneumonia, a paraesophageal hernia, and a displaced trachea.
Day 2:
<ul style="list-style-type: none"> CT scan of the thorax showed a sizeable paraesophageal hernia pressing onto the trachea. Patient's condition deteriorated and an endotracheal tube was inserted.
Day 3:
<ul style="list-style-type: none"> CT scan of the thorax raised suspicion of ileus. Thoracoabdominal CT scan showed appendicitis and ileus. Surgery confirmed perforated appendicitis with secondary diffuse peritonitis and ileus, resulting in further herniation of the paraesophageal hernia as a cause for acute compromised respiratory function. Postoperatively, the patient was admitted to the intensive care unit.
Day 8:
<ul style="list-style-type: none"> The patient was extubated.
Day 9:
<ul style="list-style-type: none"> The patient was transferred from the intensive care unit to the gastrointestinal ward.
Day 15:
<ul style="list-style-type: none"> The patient was discharged to rehabilitation.

Other rare acute complications, such as perforated gastric ulcer associated with a paraesophageal hernia causing peritonitis [6] and

perforated duodenal ulcer associated with incarcerated hiatal hernia [7], have been described as other possible acute complications to hiatal hernias.

This case differs because the outcome was a pulmonary complication as opposed to a gastrointestinal complication, and the site of origin leading to the complication was not associated with the hernia.

Traditionally, patients with paraesophageal hernias underwent elective hernia repair to avoid acute complications and the significant morbidity and mortality of emergent repair [2,8]. Stylopoulos et al. [8] showed a lower mortality rate than expected of 5.4% in emergent repair and a mortality rate of elective hernia repair of 1.38%. Additionally, the study showed a 1.16% probability per year of developing acute symptoms requiring emergency surgery using watchful waiting. These findings suggested that patients with asymptomatic or minimally symptomatic hernias should be monitored using watchful waiting [8]. Currently only symptomatic paraesophageal hernias are recommended for elective hernia repair [2]. Pulmonary symptoms and iron deficiency anaemia, caused by a paraesophageal hernia, tend to improve with repair, and should not be overlooked [9,10].

The mechanism of pulmonary impairment in paraesophageal hernias likely involves reduction in thoracic volume as well as the stomach being drawn into the chest during inspiration by negative intrapleural pressure [9]. Patients with pulmonary symptoms, due to a paraesophageal hernia already pressing onto the airways, could potentially be considered in greater risk of developing severe airway affection if complicated by acute abdomen. In patients who had pulmonary function tests before and after repair of a giant paraesophageal hernia, pulmonary function tests improved most in patients with the greatest amount of intrathoracic stomach [9]. This indicates that sizeable paraesophageal hernias could poten-

tially also be a risk factor for developing the complication presented in this case.

The presented case provides another reason for treating patients with pulmonary symptoms caused by a paraesophageal hernia, especially patients with sizeable hernias, with elective hernia repair rather than watchful waiting. It will not only correct pulmonary symptoms, but also prevent cases like this. Generally, patients with paraesophageal hernias, who are monitored using watchful waiting, should be informed about the possibility that a case of acute abdomen potentially could cause further herniation and acute compromised respiratory function.

Gastrointestinal symptoms caused by paraesophageal hernias are the main focus when assessing indications for repair [2], while pulmonary symptoms associated with paraesophageal hernias are often not assessed [9]. The main reason for this is that the elderly often have comorbidities possibly contributing to dyspnoea, and the majority of physicians do not relate chronic respiratory symptoms to the presence of a paraesophageal hernia [9]. Therefore, pulmonary symptoms are often assumed to arise from other comorbidities [2,9]. In this case the patient was monitored using watchful waiting because her pulmonary symptoms were assumed to arise from cardio-pulmonary comorbidities rather than the paraesophageal hernia.

Evaluation of patients with paraesophageal hernias, using questionnaires including respiratory symptoms, could contribute to identifying patients with pulmonary symptoms caused by a paraesophageal hernia [2], and thus could help to identify patients who could benefit from elective hernia repair. This case emphasizes the importance of evaluating respiratory symptoms as indication for repair.

It is noteworthy that the patient had no abdominal complains upon initial examination, and only the thoracoabdominal CT scan revealed abdominal pathology. For patients known to have a paraesophageal hernia, who present with acute respiratory difficulties, it can therefore be recommended to initiate the management with a thoracoabdominal CT scan. Diagnostic laparoscopy will confirm the diagnosis.

4. Conclusion

Any case of acute abdomen causing high intra-abdominal pressure could potentially cause further herniation of a paraesophageal hernia, causing pressure onto the trachea, resulting in acute compromised respiratory function. This should be considered regarding all patients known to have a paraesophageal hernia if they present with acute respiratory difficulties, both in presence and absence of abdominal symptoms. Previous pulmonary symptoms can increase the suspicion, and so can simultaneous presence of a sizeable hernia. If cases like this are suspected, management should be initiated with a thoracoabdominal CT scan and diagnostic laparoscopy will confirm the diagnosis.

Patient consent

Obtained.

Scare criteria

This work has been reported in line with the SCARE criteria [11].

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Conflicts of interest

None.

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Ethical approval

As this is a case report, no ethical approval was necessary.

Consent

Written informed consent was obtained from the patient 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.

Author contribution

Both authors contributed to conception of the project, data collection, writing the manuscript and proof readings.

Guarantor

Mira Mekhael, Medical Student, Research Substitute.
Dr. Alaa El-Hussuna, Consultant Surgeon.

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