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Amylase in an Unusual Place – A Roundabout Diagnosis of Esophageal Rupture

Amilase em um lugar incomum: uma rodada sobre diagnóstico de ruptura esofágica

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Abstract

When presented a patient with a new pleural effusion, Light's Criteria are applied to determine whether the fluid is transudative or exudative following a thoracentesis. This leads to the underlying etiology of the effusion in 75% of cases. However, occasionally Lights Criteria present a mixed picture, thereby requiring us to expand testing and broaden our differential diagnosis of the effusion as is needed in the case below. Case: A 66-year-old male presented with a complaint of chest pain, cough, and malaise. He experienced violent post-operative vomiting and back pain. He was diagnosed weeks later with a loculated pleural effusion found to be an empyema requiring drainage. The exudate drained required more advanced testing, thus leading to our finding of an extremely high amylase level in the exudate. The case report reviews the details and timeline of how an empyema was diagnosed in this patient, and how it was found to be secondary to a post-emetic esophageal perforation. Discussion/Conclusion: Post-emetic spontaneous esophageal rupture is a serious diagnosis. Oral flora and digestive enzyme migration into a sterile space (para-mediastinum and pleural space) can give rise to major complications. Rapid diagnosis and surgical repair should be made high priority. Esophageal perforations carry a high complication rate and mortality, therefore a patient presenting with chest pain following bouts of vomiting and new cough +/- an abnormal chest x-ray should prompt consideration for esophageal perforation.

Keywords: Empyema; Esophageal perforation; Pleural effusion; Amylase; Post-emetic

Resumo

Quando apresentado um paciente com uma nova efusão pleural, *Light's criteria* são utilizados para determinar se o fluído é transudativo exsudativa ou na sequência de um toracentese. Isto leva a etiologia subjacente da efusão em 75% dos casos. No entanto, ocasionalmente *Light's criteria* apresenta um quadro misto, obrigando-nos, assim, a expandir os testes e ampliar o nosso diagnóstico diferencial do derrame, como é necessário no caso abaixo. Caso: Um homem de 66 anos de idade apresentou-se com queixa de dor no peito, tosse e mal-estar. Ele teve violentas crises de vômito pós-operatório e dor nas costas. Ele foi diagnos-

ticado semanas mais tarde com um derrame pleural loculado, um empiema com necessidade de drenagem. O exsudato drenado necessitou testagens mais avançadas, levando assim a nossa constatação de um nível extremamente elevado de amilase no exsudado. O relato dos detalhes do caso analisa como um empiema foi diagnosticado neste paciente, e como ele foi encontrado para ser secundária a uma perfuração esofágica pós-emético. Discussão/Conclusão: Pós-emético ruptura espontânea do esôfago é um diagnóstico sério. Migração da flora oral e da enzima digestiva em um espaço estéril (para-mediastino e no espaço pleural) pode provocar graves complicações. O rápido diagnóstico e reparação cirúrgica deve ser feita de alta prioridade. Perfurações esofágicas possuem uma alta taxa de mortalidade e de complicações, portanto, um paciente que apresenta dor torácica e seguintes crises de vômitos e tosse e mais uma radiografia de tórax anormal deve-se levar em consideração perfuração do esôfago.

Palavras-chave: Empiema; Perfuração do esôfago; Derrame pleural; Amilase; Pós-emético.

Introduction

When a patient presents with a new pleural effusion, Light's Criteria are applied to determine whether the fluid is transudative or exudative. Physicians combine this pleural fluid data with the patient's history to determine the cause for the pleural effusion, which always includes the common differential diagnoses such as heart failure, bacterial infection and malignancy. This simple method alone leads to the underlying etiology of the effusion in 75% of cases. However, occasionally the fluid results present a mixed picture, or the differential we have created is too narrow and we must expand testing on the pleural fluid to determine the etiology. We have a case of an otherwise healthy 66-year-old male who presented with a new pleural effusion that was discovered to contain an unusual lab finding in the pleural fluid ultimately leading to the diagnosis.

Case

A 66-year-old male presented to the Emergency Department (ED) with a complaint of chest pain, cough, and malaise. His past medical history is pertinent for a recent hemorrhoidectomy 3 weeks prior, otherwise the patient is without any chronic health conditions and is not taking medications/supplements in the outpatient setting. In the immediate post-operative period following the hemorrhoidectomy, he had vomited multiple times secondary to anesthesia. Some of these episodes were violent enough to induce acute, sharp mid-upper back pain. He presented to the ED 24 hours after surgery with these complaints. His vital signs were completely stable. Physical exam was only remarkable for upper thoracic para-spinal muscular pain to palpation. Other aspects of the exam (Heart, Lungs, Abdomen) were normal. A chest x-ray was performed (Figure 1A). His basic lab values (Complete Blood Counts, Electrolytes, Renal Function) were all within normal limits. The patient was discharged from the ED with analgesics and a script for Azithromycin for a possible early pneumonia. Over the following 3 weeks, his chest discomfort persisted. His pain was now located on the left side and was pleuritic in nature. Additionally, he had developed a persistent non-productive cough.

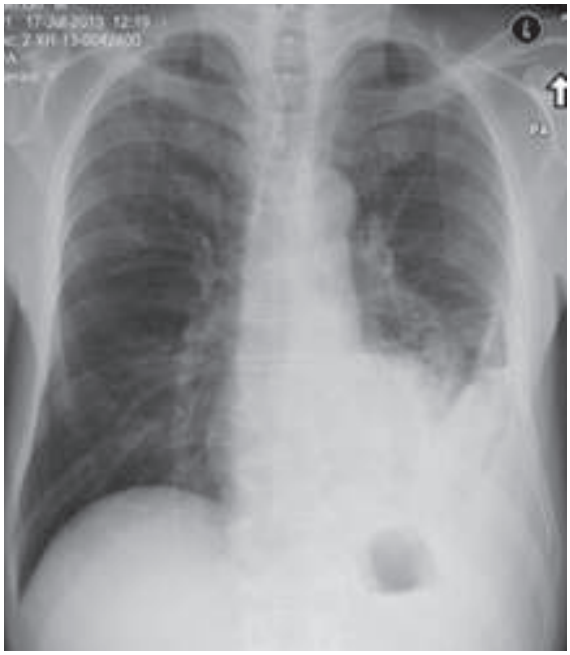
On his return presentation to the ED, he was noted to be tachycardic, tachypnic, and fe-

brile with a mild leukocytosis of 11,800/mm^3. A chest x-ray revealed worsening findings (Figure 1B). Decubitus films revealed an air-fluid level suspicious for a possible abscess within the lung parenchyma and a loculated effusion highly suspicious for an empyema. CT of the chest was performed (Figure 2).

There was concern for an empyema and a thoracentesis was performed. (See Table 1). Although most of the effusion values are abnormal, the bolded values are strikingly abnormal and most quickly helped us confirm the diagnosis and etiology.

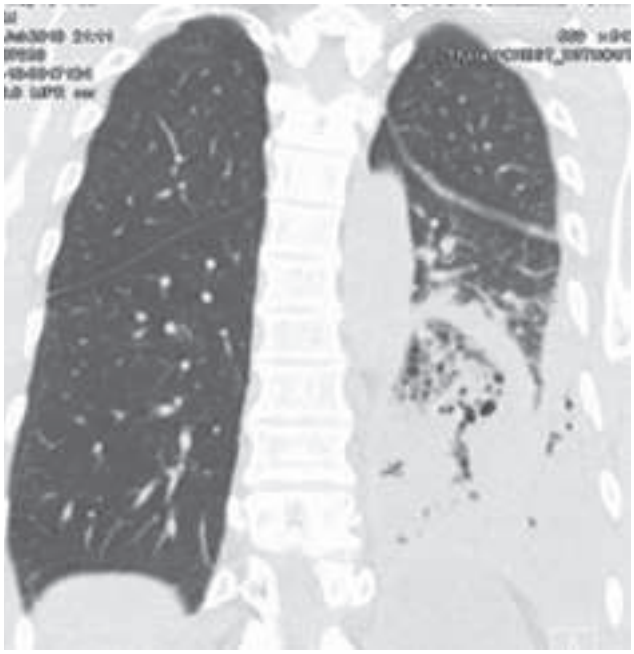
CXR 15 days prior to presentation (Fig. 1A)

Left lower lobe infiltrate



CXR on presentation (Fig.1B)

Left lower lobe infiltrate, new moderate left pleural effusion with suspected loculated fluid in left major fissure



CT thorax without contrast (Fig. 2)

Loculated hydropneumothorax on left side, Left lower lobe infiltrate with rounded heterogeneous retro-cardiac infiltrate which could represent a developing abscess

Gastrografin Esophagram leakage from esophagus (Fig. 3)

Free extravasation of Gastrograffin from the esophagus into the left paramediastinum consistent with esophageal perforation most likely at the distal esophagus.

Table 1: Pleural Fluid Results

Parameter	Result
Color/Quality	Yellow, Cloudy, Turbid
pH	6.37
Total protein	1.4 g/dl
LDH (Lactate Dehydrogenase)	40,121 IU/L
Glucose	9 mg/dl
Triglyceride	117 mg/dl
Cholesterol	17 mg/dl
Amylase	4,768 U/L
Albumin	<1 g/dl
Serum Total Protein	5.9 g/dl
Serum LDH	98 IU/L
Gram stain	4+White Blood Cells (WBC), 4+gram positive cocci pairs

The thoracentesis results raised suspicion for a possible esophageal perforation. Subsequent Gastrografin esophagram revealed extravasation of Gastrografin from the distal esophagus (Figure 3). Effusion cultures grew multiple oral flora (Strep Viridans, Prevotella Oralis, Stomatococcus) which likely migrated from colonized oral mucosa to the pleura and lung parenchyma, where bacterial proliferation and consequent infection took place. The patient was transferred to a tertiary care center for esophageal repair. After lengthy antibiotic therapy and close follow-up, he is currently doing well.

Discussion

This case highlights the routine workup for a pleural effusion/empyema and leads us down a path to the diagnosis of an uncommon reason for developing a pleural effusion/empyema. Firstly, a thoracentesis is of vital importance. It assists with diagnosis and more importantly, whether a patient needs urgent management such as chest tube drainage. A common expression used among physicians trained in the United States is “Do not let the sun set on an empyema”, which means DO NOT ignore the urgency for drainage.

Lights Criteria is the well-known means of determining whether a pleural effusion is a transudate (often benign in nature) or exudate (often inflammatory/infectious in nature) following a thoracentesis. An exudate is identified if an effusion meets one of the three following criteria: Pleural Total Protein / Serum Total Protein >0.5, Pleural LDH / Serum LDH >0.6, or Pleural LDH >2/3 of the upper limit of the normal serum LDH. The patient in the above case meets for all three

without a doubt.[7] Also, such a low glucose in our case means an infective agent is metabolizing pleural glucose stores as energy. Finally, it is important to remember that the pleural pH is the first value a physician should want to know. A pH under 7.2 demands a chest tube, which was the case with this patient.[8]

When reviewing the patient's medical history and history of present illness, it was felt that our differential diagnosis of this effusion/empyema needed to be broadened. This is why we decidedly checked the pleural amylase level which was astonishingly high leading us to the diagnosis of Boerhaave's Syndrome (Post-emetic spontaneous esophageal rupture). Boerhaave's Syndrome is not uncommon and usually occurs in patients without any esophageal problems. Severe straining when vomiting, coughing, heavy lifting, or during childbirth gives rise to a sudden increase in intraesophageal pressure and decrease in intrathoracic pressure. This can give rise to esophageal perforation causing excruciating retrosternal chest pain.[6]

Patients with peptic ulcer disease and alcoholism make up over 80% of those affected.[4] Esophageal perforations carry a high mortality, especially when surgical intervention is delayed.[1] Oral flora and digestive enzyme migration from the esophagus into the sterile spaces (para-mediastinum and pleural space) can give rise to major complications. Rapid diagnosis and repair within 24 hours results in the most favorable outcomes.[5] Few guidelines actually exist with which to facilitate treatment in non-iatrogenic injuries to the esophagus as in this case.[2] Pain and vomiting are the most common complaints associated with esophageal perforations.[3] Less than 30% of patients with spontaneous esophageal rupture demonstrate palpable cervical or mediastinal emphysema, which was not found in our patient.[3] This makes physical exam findings unreliable for diagnosis of esophageal perforation. Retrospectively, our patient did have upper thoracic para-vertebral musculature tenderness representing visceral-somatic changes associated with esophageal injury. A chest x-ray is also unreliable as 97% will show an abnormality, but only ~ 25% will be read as compatible with esophageal perforation, and only if the differential is considered.[3]

Conclusion

Two teaching points regarding this case include the following:

1. When presented a patient with a new pleural effusion, Lights criteria alone will not always point the provider to the appropriate diagnosis. Therefore expanding the differential, as well as expanding laboratory testing on the pleural fluid, should be the next step.

2. Esophageal perforations carry a high complication rate and mortality. With this in mind, a patient presenting with chest pain following bouts of vomiting with a new cough +/- an abnormal chest x-ray should prompt consideration of esophageal perforation.

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