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Pneumomediastinum due to excessive cheering during a football match

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Abstract:

A 19-year-old female presented to the emergency department with the sudden onset of chest pain. The patient had a complaint after cheering for her team during a football match. Initial blood workup and imaging were normal. However, before discharge, a widespread crepitation in the neck was detected during re-examination. Further imaging revealed a pneumomediastinum, and the patient was admitted to the hospital. This case emphasizes the importance of follow-up and re-examination before discharging the patients.

Keywords:

Chest pain, emergency medicine, pneumomediastinum, vocal exercise

Introduction

Pneumomediastinum (PM), defined as the abnormal presence of air in the mediastinum, can be classified as traumatic or spontaneous.[1] While traumatic PM may be due to blunt and penetrating trauma, spontaneous pneumomediastinum (SPM) originates from the gastrointestinal or respiratory system. It usually occurs with recurrent vomiting, coughs, or Valsalva maneuvers.[2] SPM is a rare condition with an incidence of 1 per 7000–12,000 hospital admissions, and it usually occurs in young male patients.[3] Although it is generally benign, early diagnosis is important for its management, as it can be fatal if complications develop.[4]

SPM can develop in a wide spectrum of rare etiologies, including weightlifting, childbirth, asthma exacerbations, or shouting/cheering.[5-7] Inquiring about the strenuous activities or sports events in the history of chest and neck pain patients might yield important diagnostic differentials for the physicians.

In this case report, we present a young female patient without any disease who complained of chest pain while cheering for support to her team and was diagnosed with spontaneous pneumomediastinum (SPM) during follow-up, even though her initial examination and imaging were normal. This case emphasizes the importance of follow-up and re-examination before discharging the patients with atypical complaints.

Case Report

A 19-year-old female patient admitted to the ED was complaining of a sudden onset of chest pain. The patient stated that it was located substernally and had a stinging feeling which occurred after cheering to support her team. The patient was a nonsmoker and had no illicit drug use; furthermore, she had no significant medical history or any other complaints.

The vital signs were normal with blood pressure being 110/78 mmHg, respiratory rate was 19/min, temperature was 36.7°C,

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pulse was 99 beats/min, and spO2 was 98%. Physical examination of the patient revealed that she had no mass, crepitation, or tenderness, and both lungs participated equally in respiration with no pathological sounds at admission.

Electrocardiography (ECG), hemogram, cardiac markers, and chest radiography were requested from the patient. The ECG was in normal sinus rhythm, and the initial x-ray was not significant [Figure 1]. Blood tests were ordered, and the patient's blood calcium, potassium, sodium, renal and hepatic functions were normal, and lactate and troponin levels were within the reference values. The patient was administered 50 mg dexketoprofen, and she stated that her pain disappeared and had no complaints. However, re-examination in the preparation of discharge (2 h after admission), the patient had widespread crepitation in the neck. Another X-ray was ordered, revealing diffuse signs of emphysema in the neck [Figure 1]. Computed tomography (CT) scan revealed spontaneous pneumomediastinum (SPM), and the patient was hospitalized [Figure 2]. The patient was admitted for 72 h, and she had no complications developed during the hospitalization. Furthermore, before discharge, the patient was asked to come back to the institution for follow-up examination in 30 days, which she did not comply with.

Discussion

Our patient developed SPM as a result of cheering while supporting her team with a late onset of presentation. At the time of writing, only two reported cases of SPM secondary to cheering were found in the literature.[8,9] SPM is more common in young men, and although it is very rare and usually with good outcomes, it can lead to complications that can be fatal.[1]

In the respiratory etiology of the pneumomediastinum (PM), asthma, cystic fibrosis, infections, and foreign body aspiration might facilitate alveolar rupture with the increase in the pressure gradient between the alveolar and lung interstitium. Activities that involve the Valsalva maneuver, such as diving, exposure to irritating gases, lifting heavy objects, childbirth, coughing, and shouting, are included in the etiology.[4-6,10] In our patient, PM developed due to shouting during excessive cheering. While this presentation is rare, the late onset of crepitation also makes this case unique.

Patients may present with complaints of jaw, throat, and neck pain, dysphagia, neck swelling, shortness of breath, as well as chest pain radiating to the shoulders and back, which may suggest coronary syndromes. In the physical examination of these patients, subcutaneous air, pathognomic Hamman's sign (decrease in heart sounds and precordial systolic crepitations), cyanosis, fullness of the neck veins, pneumothorax, low saturation, tachycardia, subfebrile fever, and hypotension may be detected.[11] Although it was not detected in the first examination of our patient, the re-evaluation before discharge revealed the alarming crepitation of the neck. This case brings attention to the aspect of late onset of symptoms, which should be an important topic before discharging the patients. Even though these findings are not present, physicians should keep in mind to inform the patients of the possible late-presenting pathologies. The disease has a wide range of outcomes, from silent recovery to complications leading to fatal outcomes. This makes its diagnosis important but also makes its follow-up mandatory.[12]

The first step in the diagnosis of the disease, which has many differential diagnoses due to the diversity of symptoms and findings, is high suspicion along with a detailed history and examination. It should be among the differential diagnoses in patients presenting with throat and neck pain, shortness of breath, and chest pain, especially in young patients.

In the diagnosis of SPM, chest radiography and thorax CT are important in determining the underlying cause and complications. Although it is not used routinely, magnetic resonance imaging can also be used in diagnosis when indicated.[11] ECG can be used to exclude acute coronary syndromes, one of the important differential

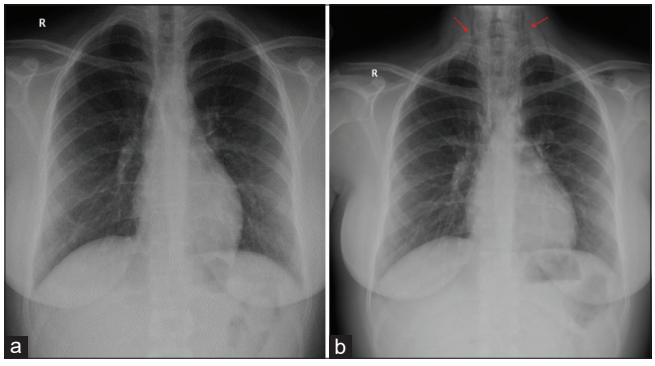

Figure 1: (a) The patient's initially obtained X-ray at admission. (b) The patient's x-ray after re-evaluation after 2 h (arrows pointing the subcutaneous emphysema)

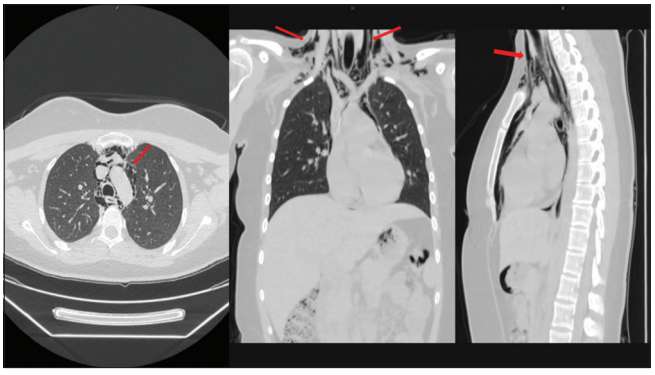

Figure 2: The patient's computed tomography images with transverse (left), coronal (middle), sagittal planes (right) revealing pneumomediastinum (arrows pointing the subcutenous emphysema)

diagnoses of the disease, and to predict complications arising from cardiac involvement of PM.[11-13]

Blood gases and cardiac markers should be monitored in patients presenting with complaints such as shortness of breath, neck pain, and chest pain. On the other hand, laboratory tests for other differential diagnoses and developing complications may also be performed.[11]

The primary determining factor in the treatment and follow-up of SPM is the presence or absence of complications. If it is not complicated, analgesia, oxygen, and rest should be provided, and factors that will increase pulmonary and gastrointestinal pressure should be avoided, and if the cause can be identified, it should be treated accordingly. In addition, if they are stable and their symptoms are mild, outpatient follow-up may be recommended to be seen again in 24 to 48 h after a few hours of observation with oxygen.[14] However, it is recommended that patients with moderate and severe symptoms be hospitalized, given oxygen therapy, and closely monitored for complications. If pneumotorax develops, decompression with a needle or thorax tube is required; if mediastinitis develops, antibiotic therapy is required, and if cardiac tamponade develops, decompression is required.[14-16] In our case, the patient had no complications and was discharged after 72 h of hospitalization.

This case underscores that patients with seemingly mild complaints may harbor rare and clinically important conditions. Therefore, careful follow-up is essential, and even when repeat evaluations are unremarkable, patients should be educated and provided with explicit recommendations regarding circumstances warranting re-admission. Patients should be advised to avoid valsalva maneuvers and strenuous activities and be educated to return to the emergency department if any symptoms recur.

Conclusion

SPM is generally a condition with a low recurrence rate and a low mortality rate when it is uncomplicated. However, when complications develop, it can be fatal. Therefore, recognition of the disease becomes important. Although there are similar case reports in terms of development for this case, our case is unique in that its initial examination and imaging were normal. In this respect, it should be taken into consideration that in case of early application, air leakage may not reach the amount that will cause symptoms, and in case of doubt, it would be appropriate to follow it up with repeated examinations. Early discharge with initial normal imaging and insufficient follow-up might result in a missed diagnosis, which might lead to unfavorable outcomes. In addition, our case draws attention to the fact that sports-related injuries may also include fans to some extent.

Author contributions statement
Conceptualization, Writing – review & editing, Supervision: EŞ, Data curation, Writing – original draft: AÖ.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflicts of interest
None Declared.

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