

# A CASE OF SPONTANEOUS PNEUMOMEDIASTINUM

Tamer Colak\*, Kaan Celik\*

\* Abant Izzet Baysal University Medical Faculty Izzet Baysal Training and Research Hospital, Emergency Department, Bolu, Turkey

## Abstract

**Introduction:** Spontaneous pneumomediastinum is described as the presence of air in the mediastinum without any specific etiological factor or trauma, and it is a rare clinical situation. In this case report, a rare case of spontaneous pneumomediastinum was presented.

**Case report:** A 23-year-old male patient was admitted to our emergency department with the complaints of throat congestion, difficulty in breathing and chest pain while playing soccer. An increase of linear-type transparency starting from the right paratracheal area and extending to the mediastinum, and a subcutaneous emphysema in the neck region were detected on the posteroanterior (PA) chest X-ray of the patient, which is compatible with pneumomediastinum (PM).

**Conclusion:** History, systemic examination and radiological imaging are very important for the patients with chest pain. Spontaneous pneumomediastinum should be taken into consideration in the differential diagnosis of chest pain and breathing distress.

**Keywords:** Spontaneous Pneumomediastinum, Soccer, Chest pain, Dyspnea.

## Introduction

Pneumomediastinum (PM) is defined as the presence of free air between the mediastinal tissues due to intrathoracic and extrathoracic causes. Free air in the mediastinum can be the sign of a serious complication (1-2). This condition was firstly described by Hamman in 1939 as a spontaneous occurrence (3). PM is defined as a condition caused by the free air released from the alveoli that is torn because of a sudden increase in the alveolus pressure following the increase of the internal pressure in the thoracic cavity due to a certain reason, spreading to the hilum of the lungs and reaching the mediastinum (4). Spontaneous PM usually stems from precipitating events such as asthma attack, severe cough, heavy exercise, valsalva maneuvers and vaginal delivery (7). The incidence of spontaneous PM varies between 1/8000-15000 for the cases recorded in the emergency departments, and it is more commonly observed in male patients (8). This ratio was found to be between 1/7000-32000 in another study (9). In our case report, we aimed to draw attention to the Spontaneous PM in differential diagnosis by analyzing a case presenting to the emergency department with the complaints of congested throat, shortness of breath and chest pain.

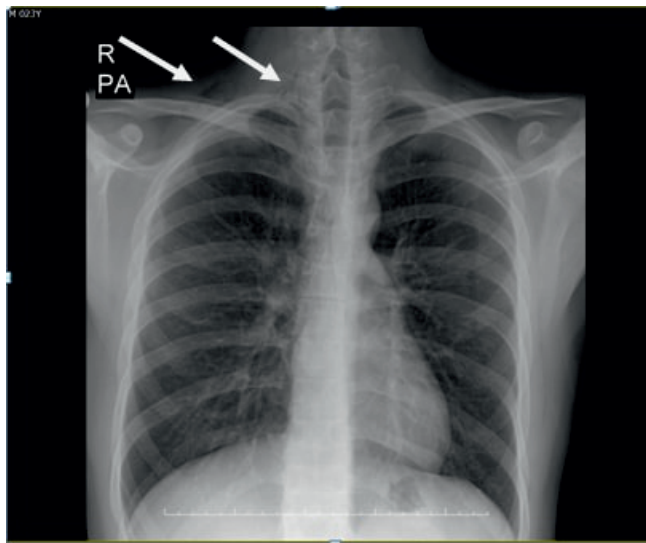
## Case Report

A 23-year-old male patient presented to the emergency department with the complaints of shortness of breath.

The patient suffered from sudden feeling of stinging pain on the chest, shortness of breath and feeling of congested throat while playing soccer 30 minutes ago. The history of the patient revealed that he was not exposed to any trauma before or during the match; however, he remarked that he shouted aloud a few times and made a lot of effort while playing soccer. As stated in the history, the patient was a civil engineer, he was not exposed to any physical trauma in the last few months, he did not smoke or use alcohol, and he was not diagnosed with any other disease before. There was no significant medical problem in his family history.

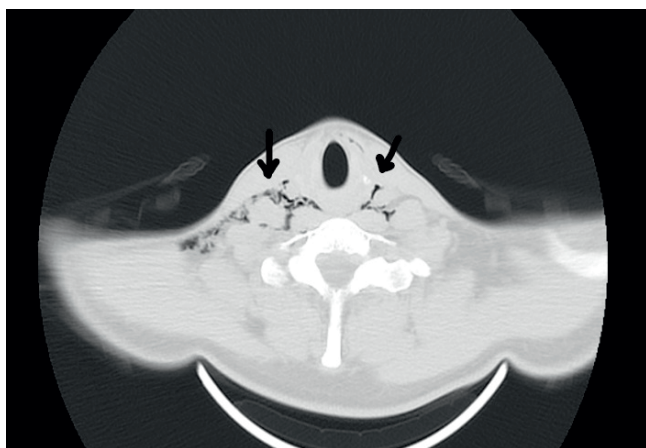
The vital findings of the patient recorded in the physical examination were as follows: blood pressure: 110/75 mmHg; respiratory rate: 20 / min, pulse rate: 105 / min, body temperature: 36.9 °C, and sPO<sub>2</sub>: 96% (without oxygen). The examination of the head and neck revealed the existence of subcutaneous emphysema felt bilaterally in the lower half of the neck through deep palpation. The patient was seen to be slightly tachypneic in the respiratory system examination, and his heart was detected to be rhythmical and tachycardic in the cardiovascular system examination. The results obtained from other system examinations were normal. The electrocardiogram of the patient showed the existence of sinus tachycardia with a heart rate of 105 / min. An increase of linear-type transparency starting from the right paratracheal area and extending to the

mediastinum, and a subcutaneous emphysema in the neck region were observed on the posteroanterior (PA) chest X-ray of the patient (Figure 1).

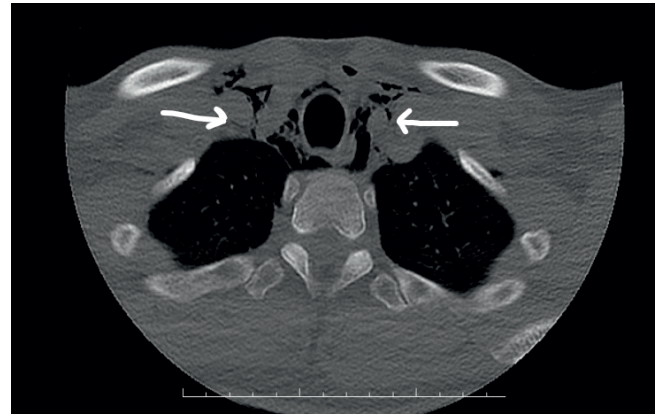


**FIGURE 1.** Air bubbles in the paratracheal area and under the skin as seen in PA chest X-ray (arrow)

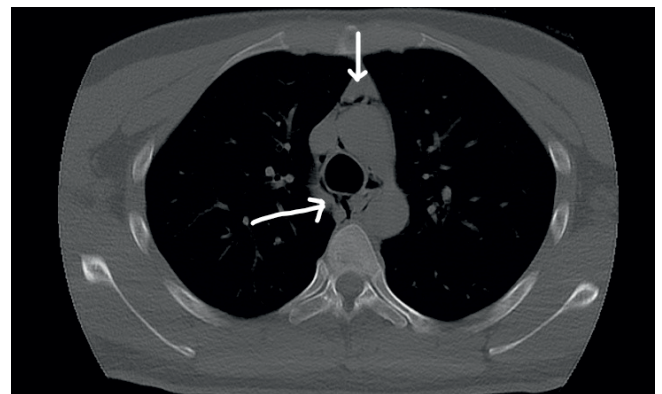
Computed Tomography of the Thorax (CTT) and Computed Tomography of the Neck (CTN) were ordered for further evaluation of the patient considered to have spontaneous PM. The tomography findings showed the presence of diffused free air in the mediastinal area, around the pericardium, in the paratracheal area and around the neck. (Figures 2,3,4).



**FIGURE 2.** Diffused air bubbles in the paratracheal area and under the skin as shown in the Computed Tomography of Thorax (arrow)



**FIGURE 3.** Diffused air bubbles encircling the trachea in the mediastinal area as shown in the Computed Tomography of the Thorax (arrow)



**FIGURE 4.** Diffused air bubbles around the trachea, esophagus, and arcus aorta as shown in the Computed Tomography of the Thorax (arrow)

The emergency physicians consulted the department of thoracic surgery about the diagnosis of the spontaneous PM, and the patient was hospitalized. However, the patient refused to stay at the hospital; therefore, he was discharged with his own consent after receiving suggestions from the physicians. He was asked to come to the hospital for check-up on the 3rd day of his discharge. The complaints of the patient were almost completely eliminated, and his physical examination and vital findings were entirely normal. Another PA chest X-ray was scheduled for the patient to check his current condition; however, the patient stated that he had no complaints and did not want to undergo same procedures once again. Consequently, he was discharged.

## Discussion

Spontaneous PM is a rare clinical condition in which the symptoms are often self-regressive and observed especially in young male patients (11). When the studies carried out on this condition are taken into consideration, the incidence of the disease is reported to be 1 out of approximately 30,000 cases, with variable incidence (12). Alveolar rupture occurs after vomiting, coughing, straining and valsalva maneuvers which usually lead to an increase in alveolar pressure (13). Asthma, heavy exercises, drug abuse, interstitial lung disease, diabetic ketoacidosis, barotrauma resulting from mechanical ventilation and hyperbaric oxygen therapy are predisposing factors for PM (14). Outcries in military and sportive activities may lead to PM by causing barotrauma (15). Spontaneous pneumomediastinum should be suspected in young patients who come with emergency department with complaints such as chest pain and shortness of breath after activities that will increase intrathoracic pressure. Our case report is based on the condition of a 23 year-old young male patient whose age and sex are compatible with the data in the literature. The fact that the patient's complaints had arisen while playing soccer suggests that PM developed due to heavy exercise or loud shouting.

Sudden onset of chest pain (increasing with deep breathing and coughing), shortness of breath, stomachache, feeling of congested throat, and neck and back pain are clinical findings of the patients with spontaneous PM (16). Physical examination of the patients with spontaneous PM may be completely normal while such patients may also have certain abnormal findings such as tachypnea, tachycardia, fever, hypotension, cyanosis, jugular venous distention, and subcutaneous emphysema (3,7). The typical finding of examination in these patients is the crackle sound which is called Hamman's Symptom and that is synchronized with cardiac apex beat and heard through auscultation on the frontal side of the chest. Our patient presented to the emergency department with the complaints of sudden onset of stinging pain on the chest, shortness of breath, and feeling of congested throat. The physical examination of the patient revealed the findings of tachycardia, tachypnea, and subcutaneous emphysema in the neck.

Standard PA and lateral chest radiographs are usually sufficient for the diagnosis of PM (3,10). Air

accumulations in the form of bars or bubbles surrounding the esophagus, main bronchi and mediastinal blood vessels may be detected through PA chest X-rays. Chest radiographs may be evaluated as normal in approximately 10% of the cases. Computed tomography plays a more significant role in the determination of the findings not detected through chest X-rays in PM cases (2,3,14). Thorax CT scan is the most sensitive diagnostic method for spontaneous PM (10). The diagnosis of PM is made with the determination of mediastinal dilatation and the presence of free air bubbles in CT scans (12). In our case, the patient was diagnosed with spontaneous PM due to the presence of free air bubbles in mediastinum and under the skin as observed in the PA chest X-ray and CT scan.

The therapy for spontaneous PM is etiology-directed; therefore, this disease should be diagnosed as soon as possible and, if necessary, early surgical treatment should be planned (3). Follow-up durations of patients should be at least 24-36 hours. The follow-up period can be extended according to the clinical status of the patients. In this period, the patients should be followed up through daily physical examinations and PA lung imaging. Clinical findings of the patients usually regress spontaneously within the first 48 hours. If the patient suffers from severe shortness of breath, 100% oxygen supplementation should be provided, and antibiotherapy should be administered if mediastinitis develops (3,7). In our case, surgical intervention was not needed, and conservative treatment was planned. However, the patient refused to be hospitalized; therefore, he was discharged from the hospital after receiving recommendations from the physicians. The patient was asked to come to the emergency department on the third day of his discharge, and it was observed that his symptoms regressed completely.

## Conclusion

Consequently, patients' histories should be analyzed carefully, and detailed physical examinations should be performed in all patients presenting to the emergency departments with the complaints of chest pain and shortness of breath. Although PM is a rare condition, it should be taken into consideration while excluding the diseases with high morbidity and mortality rates.

### Authors' Contributions:

Concept – T.Ç., K.Ç.; Planning and Design – T.Ç., K.Ç.; Supervision – T.Ç., K.Ç.; Funding – T.Ç.; Materials K.Ç.; Data Collection and/or Processing – T.Ç., K.Ç.; Analysis and/or Interpretation – K.Ç.; Literature Review – T.Ç.; Writing – T.Ç.; Critical Review – T.Ç., K.Ç.

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