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# A Rare Cause of Spontaneous Pneumomediastinum: High Altitude

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## Abstract

**Introduction:** Spontaneous pneumomediastinum (SP) is defined as presence of air within the mediastinum. SP is a rare, mild and self-limiting condition in young males. The etiology includes sudden increase in alveolar pressure, pulmonary diseases, labor, inhalation of toxic agents and high altitude rarely.

**Case Report:** A 30-year old male patient who were in a high-altitude province 10 days ago admitted to emergency room caused by dyspnea. Physical examination was normal. The complaint of dyspnea continued, computerized thorax tomography (CTT) was taken for diagnosis. In the CTT, air densities were observed in the posterior mediastinum. The patient was admitted to the thoracic surgery service with the diagnosis of spontaneous pneumomediastinum.

**Conclusion:** SP is a self-limiting clinical condition which responds to conservative therapy well. However, the diagnosis is difficult and it is necessary to keep in mind the diagnosis with anamnesis and physical examination.

**Key words:** Spontaneous pneumomediastinum, high altitude, dyspnea, emergency department

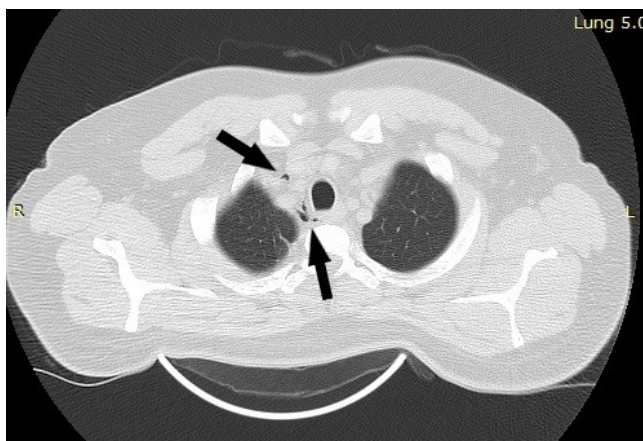
## Introduction

Spontaneous pneumomediastinum is defined as existence of interstitial air within the mediastinum<sup>1,2</sup>. SP is a self-limiting disease with a well prognosis detected in young male adults<sup>3</sup>. Macklin reported that clinical presentation of SP appears as a result of rupture of the terminal alveoli due to increased intraalveolar pressure<sup>1,4</sup>. Incidence of SP was reported as 1 case per 30,000 referrals to ER<sup>2</sup>. The patients with SP usually present dyspnea as well as findings with subcutaneous emphysema<sup>5</sup>. This condition may be diagnosed correctly almost in 100% of the cases through medical history, physical examination and radiological scans<sup>3</sup>. Since SP may potentially cause life threatening clinical presentations, early diagnosis should be established and treatment should be planned<sup>3</sup>. In the present article, we wanted to discuss early diagnosis and treatment process of a patient who referred because of dyspnea with an only significant history of staying in a high altitude province 10 days ago diagnosed with SP.

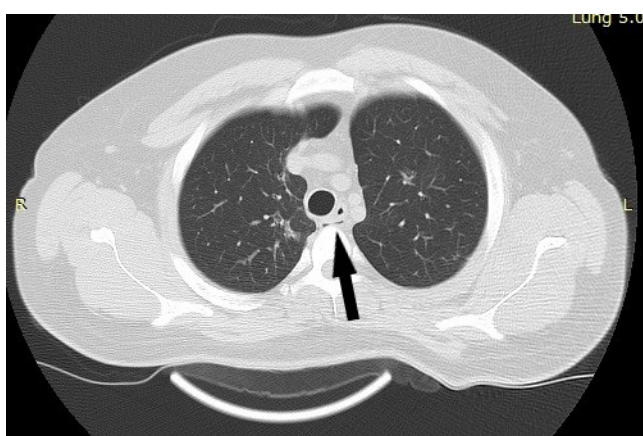
## Case Report

A 30-year old male patient referred our emergency department due to dyspnea. The medical history revealed no

concomitant disease or additional condition; however, it was expressed that the patient were in a high-altitude province 10 days ago. The patient was conscious with a well overall condition. Vital signs were as follows; blood pressure:120/90mmHg, pulse: 80pulse/min, respiration count: 22breaths/min; SpO<sub>2</sub>:%97 body temperature:36.6°C. Cardiac and respiratory sounds were normal in physical examination. Hamman's sign (the crackling sound heard simultaneously with peak heart rate) we not detected on the anterior surface of the chest by auscultation. The patient was taken under observation and monitored. O<sub>2</sub> therapy by 2 l/min was started. Laboratory analyses revealed the following; CRP:46.10(<5mg/L) and no other pathological result was obtained. Arterial blood gas analysis was within physiological limits as pH:7.40 pCO<sub>2</sub>:34 pO<sub>2</sub>:89 HCO<sub>3</sub>:24. The electrocardiogram (ECG) was assessed as normal sinus rhythm. There was not any pathology in the lung x-ray. Since the complaint of dyspnea continued, computerized thorax tomography (CTT) was taken for diagnosis. In the CTT, air densities were observed in the posterior mediastinum (Image 1, 2). The images were evaluated by a thoracic surgeon; antibiotherapy was started and the patient was hospitalized for monitoring and treatment. The patient presented a clinical relief and was discharged on the second day of admission.



**Image 1.** Free air in apical CTT slices



**Image 2.** Free air detected on the middle zones in CTT

## Discussion

The case whom we presented did not have any predisposing factor or concomitant disease except high altitude which may cause SP. A level of 1,500 meters and over from the sea level is accepted as high altitude. High altitude may cause some cardinal symptoms such as nausea, cough, dyspnea as well as significant conditions such as acute mountain disease, high altitude cerebral edema, high altitude pulmonary edema<sup>14</sup>. SP appears as a result of rupture of the terminal alveoli due to intraalveolar pressure in the conditions that cause increase in alveolar pressure such as coughing, vomiting, straining and valsava maneuver. Predisposing diseases include pulmonary diseases (asthma, chronic obstructive pulmonary disease, diffuse interstitial fibrosis, malignancies of the lung, cystic lung diseases), diabetic ketoacidosis, heavy exercise, inhalation or smoking marijuana, cocaine, extacy, infections of the upper respiratory tract<sup>6-9</sup>. The patient had not any previous disease and there was not any chronic pulmonary disease detected in the analyses performed in ER. Some metabolic and toxic diseases, inhalable toxic agents, barotrauma during mechanic ventilation, hyperbaric treatment, ascending phase of diving, high altitude

may exist as a cause<sup>6-13</sup>. The only significant history in our patient was a short trip to a high altitude province.

In the study of Koulias et al. performed on 24 cases; pulmonary disease (acute bronchial asthma, idiopathic pulmonary fibrosis and severe cough) was detected in 8 (%33.2) patients; 6 (%25) patients presented use of illegal drugs (cocaine and heroine); heavy physical activity (tennis, halter, football and wrestling) was detected in 6 (%24.9) patients whereas 2 (%8.3) patients presented severe vomiting attacks. There was not any other predisposing factor in other 2 (%8.3) patients<sup>8</sup>. Panacek et al. performed a SP study on 17 cases and detected 13 (%76) cases associated with inhalation and use of illegal drugs<sup>9</sup>. Drug use is considered as the most important triggering factor for SP among young population all over the world. Our patient was investigated in terms of illegal drug use and it was learned that he did not use. We did not detect any predisposing factor during the examination of the patient. We believe that the patient had SP due to high altitude.

The most common signs and findings in SP are chest pain, dyspnea and subcutaneous emphysema<sup>5</sup>. The most common symptoms in SP were dyspnea (%85), swelling in neck (%69), chest pain (%69) and cough (%54), and determined subcutaneous emphysema in %85 of them according to the study of Panigrahi and colleagues<sup>11</sup>. Typical physical examination finding is Hamman's sign<sup>4</sup>. Panacek et al. detected the Hamman's sign in %52 of the patients in their SP series including 17 cases<sup>9</sup>. We could not detect the Hamman's sign; dyspnea was the only symptom.

Posterior-Anterior lung x-ray and CTT are sufficient for diagnosis of these cases<sup>6</sup>. Kaneki et al. detected that %30 of the cases presented normal chest x-ray whereas the remaining cases were diagnosed by chest tomography<sup>12</sup>. CTT is accepted as a gold standard for diagnosis of SP<sup>2</sup>. There was not any pathology detected in the PA lung x-ray of the patient. We established the final diagnosis through CTT which is the gold standard test in the literature.

SP responds very well to the conservative treatment<sup>3</sup>. SP treatment includes a careful observation, bedrest, oxygen inhalation, analgesic and antibiotic treatments<sup>8</sup>. In the SP study of Kim et al. conducted on 64 patients, oxygen inhalation therapy and bedrest were performed to all patients (%100); 57 (%89.1) patients received prophylactic antibiotic therapy and 47 (%73.4) patients received analgesic drugs; no mortality and morbidity was detected in the cases<sup>1</sup>. We also implemented oxygen therapy, bedrest and prophylactic antibiotic therapy for our patient.

## Conclusion

Consequently, SP is a self-limiting clinical condition which responds to conservative therapy well. However, due to potential life threatening risk, a detailed medical history tak-

ing, physical examination as well as appropriate imaging methods should be used for rapid diagnosis and treatment planning.

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