

Primary spontaneous pneumomediastinum: Three case reports and review of the literature

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Abstract

Pneumomediastinum is defined as the presence of air in the mediastinum. Spontaneous pneumomediastinum is a very rare condition, often encountered in young male patients, and usually heals itself. In the anamnesis of a patient with spontaneous pneumomediastinum, there is chest pain most frequently observed in the substernal region. Besides pain, the reasons for applying to the clinic are difficulty swallowing, globus sensation, hoarseness and hypersalivation.

We present 3 patients, who applied with different symptoms and received conservative treatment due to spontaneous pneumomediastinum.

Key words: spontaneous pneumomediastinum, spontaneous pneumothorax, chest pain, young, male

Introduction

Pneumomediastinum is defined as the presence of air in the mediastinum. It has been classified in two types as traumatic and spontaneous. It was first described by Hamman in 1939 [1]. Spontaneous pneumomediastinum is a very rare condition, often encountered in young male patients, and usually heals itself. In a study on hospital admissions, the frequency was found to be between 1/7000-45000 [2]. In the anamnesis of a patient with spontaneous pneumomediastinum, there is chest pain most frequently observed in the substernal region. Besides pain, the reasons for applying to the clinic are difficulty swallowing, globus sensation, hoarseness and hypersalivation.

We present 3 patients, who applied with different symptoms and received conservative treatment due to spontaneous pneumomediastinum.

Case-presentation

Case 1

A 17-year-old male patient presented to our outpatient clinic with a chest pain that had been going on for two days. According to his history, he was admitted to the emergency room with chest pain two days ago; however, his chest X-ray and electrocardiogram were normal. There was no trauma in the history. There was no crepitation on palpation regarding subcutaneous

emphysema during the physical examination. Bilateral breathing sounds were detected to be natural during auscultation. In the control chest radiography, there was an image of emphysema between the soft tissues in the left axillary region (Figure 1). The patient, who was diagnosed with partial pneumothorax on the right side, pneumomediastinum and diffuse intramuscular emphysema in the computed tomography (CT) of thorax, was hospitalized (Figure 2). During hospitalization, the laboratory findings were within normal limits. The vital findings of the patient recorded in the physical examination were as follows; blood pressure: 120/70mmHg, pulse rate: 68/min, body temperature: 36.8°C, and spO₂: 95% (without oxygen). Oral intake of the patient was stopped due to the risk of mediastinitis; and prophylactic intravenous cefuroxime axetil/metronidazole treatment was started. Due to pneumothorax, 3-4 lt/min nasal O₂ and ipratropium bromide/salbutamol and fluticasone propionate as nebulizers were given. Intravenous paracetamol treatment was administered for analgesic purposes. He was followed up by intermittent physical examination and chest radiography. The patient, whose chest pain completely ceased after four days of treatment, was discharged when pneumomediastinum was observed to have disappeared on the chest radiography. After discharge, no symptoms were found in weekly physical examinations and chest radiographies. The CT of thorax

Figure 1 - X-ray of the first case; emphysema between the soft tissues in the left axillary region

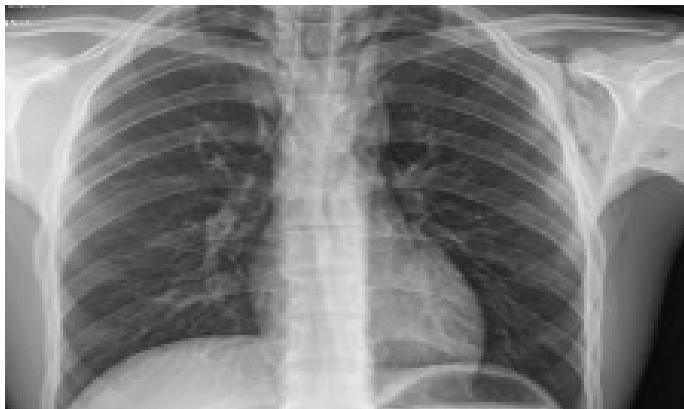


Figure 2 - Pneumomediastinum and diffuse intramuscular emphysema as shown in the computed tomography(CT) of the first case



Figure 3 - The CT of thorax performed after the one-month follow up.



performed after the one-month follow up resulted completely normal (Figure 3). There were no abnormal tracheobronchial findings in the evaluations made using fiberoptic bronchoscopy.

Case 2

A 17-year-old male patient presented to the emergency clinic during the COVID-19 pandemic with a complaint of shortness of breath and yellow sputum that had been going on for three days. According to his history, it was learned that he was released from prison 15 days ago and that he was not exposed to trauma. There was no crepitation on palpation regarding subcutaneous emphysema during the physical examination. Bilateral breathing sounds were detected to be natural during auscultation. The patient, who was diagnosed with diffuse pneumomediastinum on CT of thorax, was hospitalized in the Thoracic Surgery Clinic (Figure 4).

During hospitalization, the laboratory findings were within normal limits. The vital findings of the patient recorded in the physical examination were as follows; blood pressure: 120/70mmHg, pulse rate: 78/min, body temperature: 36.6°C, and spO₂: 98% (without oxygen). He was diagnosed negative in terms

Figure 4 - Diffuse pneumomediastinum on computed tomography (CT) of the second case.

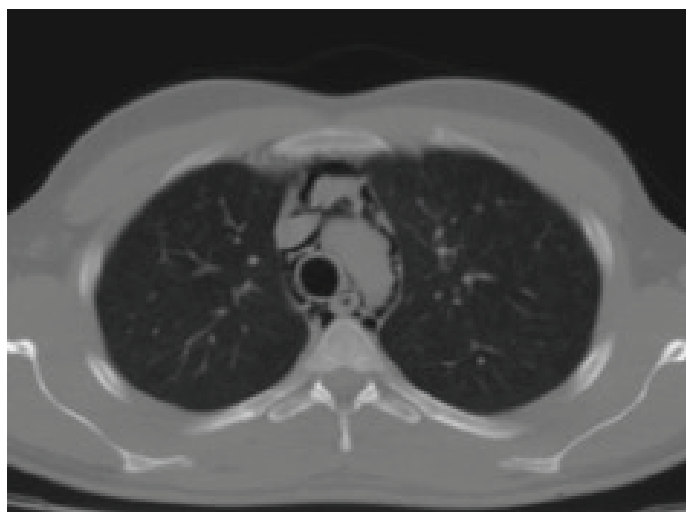


of COVID-19. Oral intake of the patient was stopped due to the risk of mediastinitis; and prophylactic intravenous cefuroxime axetil/metronidazole treatment was started. Intravenous paracetamol treatment was administered for analgesic purposes with 3-4 lt/min nasal O₂ and ipratropium bromide/salbutamol and fluticasone propionate as nebulizers. Oral intake was started at 48 hours after the presentation. The patient, whose chest pain completely ceased after four days of treatment, was discharged when pneumomediastinum was observed to have disappeared on the chest radiography. After discharge, no symptoms were found in weekly physical examinations and chest radiographies. The PA Chest x-ray taken after 3 weeks of follow-up was normal. Bronchoscopy was delayed due to the COVID-19 pandemic.

Case 3

A 22-year-old male patient applied to our emergency clinic during the COVID-19 pandemic with the complaint of sore throat and Globus sensation, which had started 6 hours ago. In the physical examination performed in the emergency room, there was subcutaneous crepitation on palpation in the neck and upper thoracic region. In auscultation, bilateral breathing sounds were natural, and Hamman sign was present in the apical region of the heart. The patient with diffuse pneumomediastinum in thorax CT was hospitalized (Figure 5). During hospitalization,

Figure 5 - Diffuse pneumomediastinum on computed tomography (CT) of the third case.



the laboratory findings were within normal limits. The vital findings of the patient recorded in the physical examination were as follows; blood pressure: 120/70mmHg, pulse rate: 86/min, temperature: 36.7°C, and spO₂: 95% (without oxygen). He was diagnosed negative in terms of COVID-19. Oral intake of the patient was stopped due to the risk of mediastinitis; and prophylactic intravenous cefuroxime axetil/metronidazole treatment was started. Intravenous paracetamol treatment was administered for analgesic purposes with 2 lt/min nasal O₂ and ipratropium bromide/salbutamol and fluticasone propionate as nebulizers. Oral intake was started at 48 hours after the presentation. He was followed up by intermittent physical examination and chest radiography. The patient, whose chest pain completely ceased after four days of treatment, was discharged when pneumomediastinum was observed to have disappeared on the chest radiography. After discharge, no symptoms were found in weekly physical examinations and chest radiographies. The PA Chest x-ray taken after 3 weeks of follow-up was normal. Bronchoscopy was delayed due to the COVID-19 pandemic.

Discussion

Pneumomediastinum can be encountered frequently due to traumatic, iatrogenic or infectious causes; and it can also occur spontaneously. Despite its incidence of 10% after severe blunt thorax trauma, spontaneous incidence is very low as in our cases [3]. It is more common in patients with the history of asthma. In a study, in which routine screening was performed on young adults presenting with unexplained chest pain or shortness of breath, the incidence of SPM was found to be 1/368 [4]. According to the opinion published by Macklin in 1944, pneumomediastinum was reported to occur due to the rupture of terminal alveoli caused by intra-alveolar pressure; and the air spread from the lung parenchyma towards the mediastinum from through this rupture due to the difference of pressure [5]. Complications such as diffuse subcutaneous emphysema, airway compression and acute respiratory failure may be encountered when the amount of air escaping to the mediastinum increases in the pneumomediastinum [6]. Our first patient had mediastinal and diffuse intramuscular emphysema; however, subcutaneous emphysema was not present on physical examination and there was no respiratory distress. Our second patient had shortness of breath and the third patient had a globus sensation. These findings

indicate that patients can present with different symptoms. The typical finding for pneumomediastinum is the crackling sound that is heard simultaneously with auscultation of the heart on the front of the chest (Hamman's sign) [7]. This sign was present only in one of our patients. Fever, hypotension, leukocytosis and dysphagia may be detected in addition to pneumomediastinum depending on the etiology [8].

The first examination to be performed in the patient suspected of pneumomediastinum is the PA and lateral chest radiographies. The most sensitive method for observing the prevalence of mediastinal air is the CT of thorax [7]. When there is suspicion of an underlying disease is suspected, bronchoscopy, esophagoscopy, esophageal passage graph and similar tests could be administered for confirmation. Treatment of pneumomediastinum varies depending on the underlying cause and severity of the disease. As in our patients, conservative treatment (avoiding triggering factors, oxygen and bed rest) is sufficient in SPM. In the presence of pneumothorax, tube thoracostomy could be administered as well as fasciotomy for draining diffuse subcutaneous emphysema; and surgical treatment could be administered in esophagus or tracheobronchial tree ruptures.

Conclusion

SPM is a rare clinical situation that mainly affects adolescent men and is usually treated conservatively after accurate diagnosis. It should be considered especially in adolescent male patients, who present to the emergency clinic with symptoms such as chest pain, hoarseness, subcutaneous air and fever. Thoracic CT imaging should not be avoided on suspicious chest radiographies.

It is characterized by accumulation of the air in the mediastinum and even in the neck region by moving to the hilum and from there to the paratracheal region through perivascular dissection instead of creating bulla bleb formations in the apex by releasing from the alveoli as in the formation mechanism of the pneumothorax. Therefore, primary spontaneous pneumothorax (PSP) should be sought at the time of application in such patients; and their follow-up should be performed according to PSP.

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