



A case of spontan pneumomediastinum

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Summary

Spontaneous pneumomediastinum is the presence of free air in the mediastinum without any identifiable etiology like trauma or invasive procedure. Thoracic pain is the major complaint. The symptom triad of thoracic pain, dyspnea and subcutaneous emphysema is typical. Here, we present a 13- year old young male who presented to the emergency room with a complaint of thoracic pain. Physical examination was unremarkable except for Hamman's sign. Detailed examinations including chest x-ray revealed pneumomediastinum. Our aim was to emphasize the importance of physical examination, particularly cardiac auscultation in patients presenting with thoracic pain. (*Türk Arch Ped* 2013; 48: 336-338)

Key words: Chest film, chest pain, dyspnea, Hamman's sign, spontaneous pneumomediastinum, subcutaneous emphysema

Case

A 13-year old male patient presented to the emergency outpatient clinic with a complaint of stinging chest pain which started on the same day, increased in severity and spread to the left arm. The patient's personal and familial histories were negative. No cough or dyspnea before chest pain was described. There was no history of smoking or drug usage.

On physical examination his general status was well, he had no fever and his hemodynamical variables were found to be normal. Examination of the respiratory system was normal, he had no dyspnea. A crunching sound together with the second heart sound was heard predominantly in the mesocardiac area. There was no subcutaneous crepitation.

On postero-anterior chest graphy, linear air intensities starting from the superior part of the left atrium adjacent to the left ventricular wall and the medial edge of the left lung extending to the diaphragm compatible with pneumomediastinum were observed (Picture 1:A-B). On computerized lung tomography, appearance compatible with pneumomediastinum was present in all areas in the mediastinum showing continuance with the deep planes of

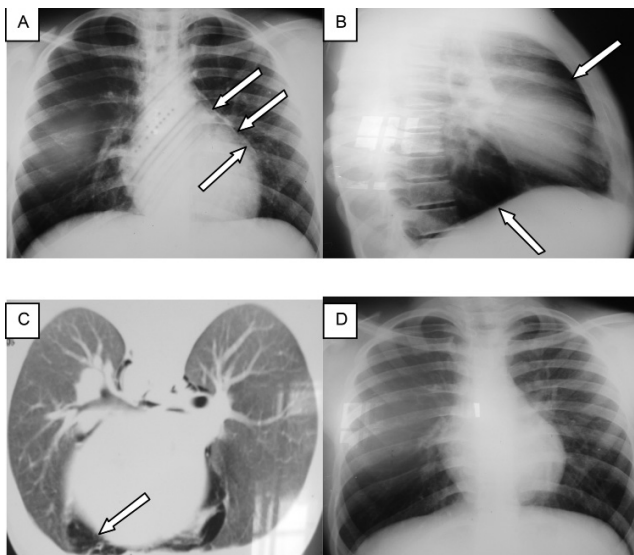
the neck superiorly. No bulla or pneumothorax was found in the lung parenchyma (Picture 1:C).

Sinus rhythm with a heart rate of 72 was found on electrocardiogram. Pericarditis was not found on echocardiogram performed to exclude pericarditis, but free air was observed around the heart.

Laboratory tests were found to be normal (complete blood count, renal and hepatic function tests, blood glucose, electrolytes). Blood gases were as follows: pH: 7.37, pCO₂:47.3 mmHg, HCO₃: 26.9 mmol / L. Oxygen saturation was found to be 97% in room air.

The patient was hospitalized and monitorized. Oxygen therapy with mask and ampicillin-sulbactam treatment was started. Hamman sign disappeared in 48 hours after the first presentation.

No complication developed in the follow-up and he was discharged on the third day of hospitalization to be followed up in the outpatient clinic. The patient was followed up with chest graphies and his chest graphy and clinical findings improved completely in one week (Picture 1:D). We could find no cause which would lead to pneumomediastinum in our patient. Therefore, we considered this case idiopathic spontaneous pneumomediastinum.



Picture 1. A: Postero-anterior chest graphy; double air line around the cardiac shadow
B: Left lateral chest graphy: appearance of pneumomediastinum in the anterior mediastinum and lower part of the lung
C: Computarize tomography of the chest; free air in the mediastinum
D: Chest graphy: Normal (8th day)

Discussion

Pneumomediastinum or mediastinal emphysema was defined by Laennec in 1819 for the first time as presence of air in the mediastinum related with a traumatic accident (1). The source of mediastinal air may be intra-thoracic (trachea and main bronchi, esophagus, pleural space) or extra-thoracic (head, neck, peritoneum) (2).

Pneumomediastinum may occur spontaneously or secondarily (blunt chest trauma, mechanical ventilation, following endoscopy and bronchoscopy, head and chest surgery, hollow organ perforation). Spontaneous pneumomediastinum was defined by Hamman in 1939 for the first time. A crunching sound simultaneous with the systole specific for this disease was defined as Hamman's sign (3). The prevalence of spontaneous pneumomediastinum has been reported to be 1/800-1/42 000 (2,4,5,6). The prevalence makes two peaks below the age of 7 years and between the ages of 13 and 17 years (7).

The cause of pneumomediastinum may be explained as extension of air into the mediastinum as a result of alveolar rupture related with increased intra-thoracic pressure (8). This air may extend to other serous structures and subcutaneously.

The factors which enhance development of pneumomediastinum include asthma (most commonly), interstitial and other lung diseases, smoking, use of

inhaled drug, corticosteroids and inhalation of irritating substance. Factors which increase intra-thoracic pressure including vomiting, cough, asthma attacks, defecation, physical exercise, delivery, valsalva maneuver, upper respiratory tract infection and neonatal respiratory distress syndrome may lead to pneumomediastinum. Recurrence of pneumomediastinum is very rare (4,5,6).

The classical clinical triad for pneumomediastinum includes chest pain (mostly pleuritic and behind the sternum), dyspnea and subcutaneous emphysema. Cough, fever, dysphonia, odynophagia and dysphagia may also be observed. Although the Hamman's sign is found in 10% of the patients, it is patognomonic and is best heard in the left decubitus position and disappears in the supine position and while standing (3,6,9). This sound may sometimes also be heard by the patient (10).

Chest graphy is considerably useful in the diagnosis. The most common radiographic finding is a radioopaque line extending along the arcus aorta and the left border of the heart. Other findings include appearance of the diaphragm as to extend along the lower border of the heart and radioopaque lines in the retrosternal area and around the heart and trachea (11). If the findings on chest graphy are not clear, the diagnosis is confirmed with thoracic computarized tomography. Some experts report that chest graphy is sufficient and recommend that tomography should be used only in suspicious cases, although tomography is the golden rule in detecting mediastinal air (2,3). Enlargement and air bubbles in the mediastinum confirm the diagnosis (12). Thoracic computarized tomography also provides differentiation of parenchymal disease from pleural disease. Yellin et al. (4) recommend chest graphy in young patients who present with unclear chest pain. Esophagus passage graphy may be necessary to exclude gastrointestinal system problems, since they may lead to severe complications. Endoscopy is not considered primarily. It is even not recommended, since it may worsen the status (3,9).

Electrocardiogram (ECG) changes in pneumomediastinum cases include decreased voltage, non-specific axis change, ST/T wave changes and elevated ST in lateral precordial derivations (12). Our patient had a normal ECG.

In the differential diagnosis, serious diseases which may lead to precordial pain including acute coronary damage, pericarditis, pneumothorax, pulmonary emboly and esophageal rupture should be considered.

When the diagnosis is definite, the patient should be hospitalized and monitorized. Oxygen should be given and triggering factors should be prevented (5). Administration of prophylactic antibiotic treatment to prevent development of mediastinitis is controversial. Thoracic tube should be placed in presence of pneumothorax and hypertensive pneumomediastinum (6). The mortality rate is high (70%), if the cause is esophageal rupture (9).

Conclusively, search for Hamman's sign in addition to detailed physical examination may be directive for the diagnosis in patients who present with chest pain.

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