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Case Report

Pneumorrhachis Associated with Bronchial Asthma, Subcutaneous Emphysema and Pneumomediastinum

Bronşiyal Astım, Subkutan Amfizem ve Pnömomediastinum ile Birlikte Pnömoraşi

Alper KARAOGLAN[1], Mehmet Alpay CAL[1], Alpay ORKI[2], Bekir Muhsin ARPAOZU[3], Ahmet COLAK[1]

[1]*Maltepe University, Faculty of Medicine, Department of Neurosurgery, Istanbul, Turkey*
[2]*Maltepe University, Faculty of Medicine, Department of Thoracic Surgery, Istanbul, Turkey*
[3]*Maltepe University, Faculty of Medicine, Department of Pediatrics and Child Health, Istanbul, Turkey*

Correspondence address: Alper KARAOGLAN / E-mail: drkaraoglan@yahoo.com

ABSTRACT

Pneumorrhachis is defined as the presence of air in the epidural space or subarachnoid space. The air may migrate along fascial planes from the posterior mediastinum, through the neural foramina, and into the epidural space. Pneumorrhachis is rare, and even more so in the paediatric population. Pneumorrhachis in itself usually is asymptomatic, does not tend to migrate and reabsorbs spontaneously. The combination of pneumomediastinum with epidural pneumorrhachis without thoracic trauma has rarely been reported in the literature. The present case report describes the presence of pneumomediastinum, subcutaneous emphysema, and pneumorrhachis in a child asthmatic patient who had a history of fever, violent cough.

KEYWORDS: Bronchial asthma, Epidural emphysema, Pneumomediastinum, Pneumorrhachis, Subcutaneous emphysema

ÖZ

Pnömoraşi, epidural mesafe veya subaraknoid mesafede hava olması olarak tanımlanır. Hava posterior mediastenden fasyal planlar boyunca nöral foramenden epidural mesafeye geçebilir. Pnömoraşi daha çok pediatrik popülasyonda görülen nadir bir durumdur. Tek başına pnömoraşi genellikle asemptomatik olup migrate olma eğiliminde değildir ve kendiliğinden rezorbe olur. Torasik travma olmadan pnömomediastinum ve epidural pnömoraşi birlikteliği literatürde son derece nadirdir. Mevcut vaka sunumu ile ateş ve şiddetli öksürük öyküsü olan astım hastası bir çocukta pnömomediastinum, subkutan amfizem ve pnömoraşi gelişimi bildirilmiştir.

ANAHTAR SÖZCÜKLER: Bronşiyal astım, Epidural amfizem, Pnömomediastinum, Pnömoraşi, Subkutan amfizem

INTRODUCTION

Epidural emphysema or pneumorrhachis (PR) is the condition characterized by spinal epidural air. It is an exceptional and often accidental radiological finding. PR usually constitutes an asymptomatic and clinically nonspecific condition. PR does not tend to migrate, and reabsorbs spontaneously (4). Most often, PR occurs following trauma, barotraumas, pneumothorax or an invasive procedure. PR associated with bronchial asthma is extremely rare and only very few cases are reported in the literature. Here we present the case of a child with pneumorrhachis associated with bronchial asthma, subcutaneous emphysema, and pneumomediastinum.

CASE REPORT

An 8-year-old female child presented to our emergency service with complaints of respiratory distress, nonproductive violent coughing, neck swelling and high fever. Before she was consulted in our hospital, she had been taking ceftriaxone for two days, prescribed by another medical center for the diagnoses of pneumonia. She had a history of bronchial asthma and hospitalized for pneumonia two years ago. She was never received assisted mechanical ventilation in the past. There was neither any previous history of pulmonary tuberculosis or anti-tuberculous treatment nor any recent trauma or surgery.

On clinical examination, she was fully conscious and oriented, but dyspneic. Vitals showed HR- 103/ min, RR- 30/min, BP- 110/70 mm Hg, SPO2-90% in normal room air by pulse oximetry and 98% with 4 L/ min oxygen delivered through nasal canula. Body temperature was 38.5°C. There was extensive subcutaneous emphysema involving neck. Auscultation revealed crepitation at bilateral basal lung regions. Bilateral basal lung regions revealed dullness on percussion. ABG on admission showed pH- 7.4, pCO2-32 mm Hg, pO2-56, SO2 90%, HCO3-26. CBC: Hb- 13.6 g/dl, Hct- 40%, Plt- 352000/ mm3, Leu- 13300 /mm3, Neu- 85.9%. Sedimentation- 30 mm/h. All the baseline biochemical parameters were within normal limits. The initial chest x-ray revealed subcutaneous emphysema involving the cervical region (Figure 1). There was pneumonic infiltration involving the left lower lobe.

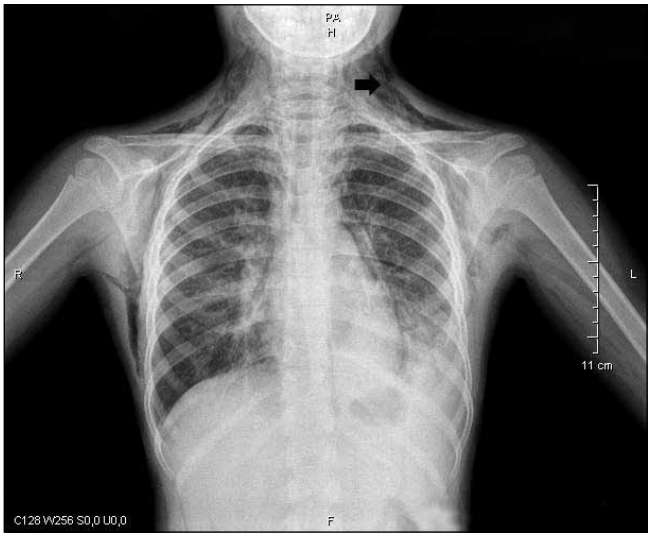

Figure 1: Chest x-ray demonstrating subcutaneous emphysema involving the cervical region (arrow).

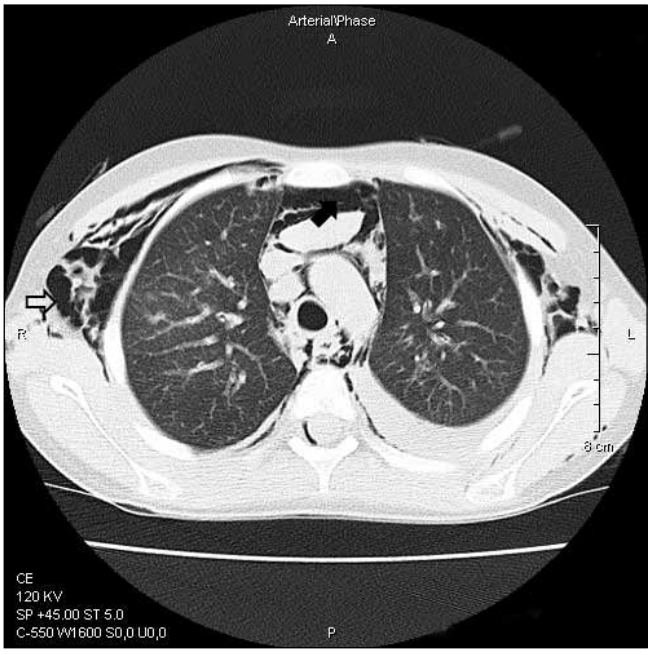

Figure 2: CT scan of the chest demonstrating air in the mediastinum (arrow) and subcutaneous tissue (open arrow).

It also revealed air in the mediastinum. She underwent computerized tomography imaging (CT) of the chest. CT showed pleural effusion. It confirmed air dissection into the subcutaneous and mediastinal spaces (Figures 2). CT also revealed air in the posterior spinal epidural space at thoracic levels (Figure 3). The patient was admitted and was treated with broad-spectrum antibiotics, inhalation bronchodilators, high-flow oxygen and other supportive measures. Antibiotics were used for ten days and clinical findings got better. She showed progressive improvement during her hospitalization and was discharged.

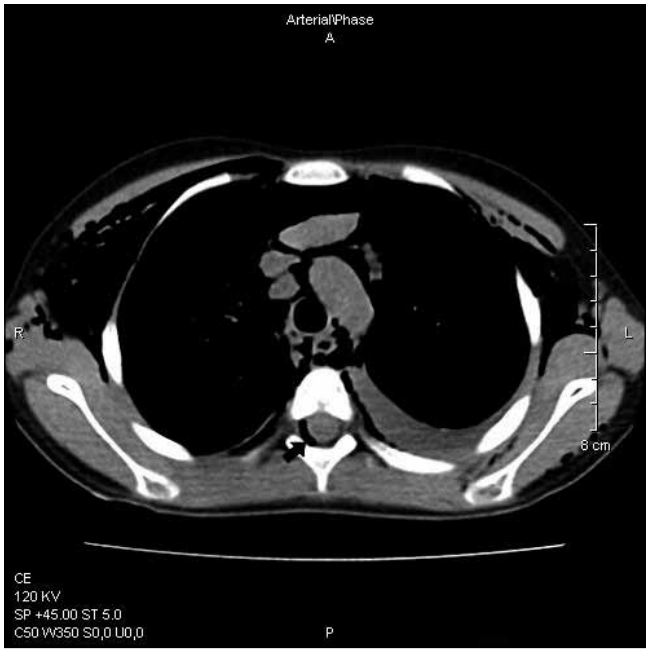

Figure 3: Chest CT scan showing air in the epidural space (arrow).

DISCUSSION

Air within the spinal canal or pneumorrhachis is a rare phenomenon. PR usually represents as an asymptomatic, probably underdiagnosed coincidental epiphenomenon underlying injuries and diseases. Air within the spinal canal can be descriptively classified into extra, or intradural PR and etiologically classified as iatrogenic, traumatic and nontraumatic PR (4, 7). Nontraumatic occurrences have been described following spontaneous or non–trauma-related pneumomediastinum or pneumothorax (2, 9). The combination of pneumomediastinum with epidural pneumorrhachis without thoracic trauma has rarely been reported in the literature. Our patient developed pneumorrhachis associated with pneumomediastinum without trauma.

Intraspinal air is usually found isolated not only in the cervical, thoracic and, less frequently, the lumbosacral regions but can also be located in the entire spinal canal. PR is almost exceptional associated with further air distributions in the body. In our case, PR was extradural and isolated in thoracic region.

Since spinal epidural air is usually asymptomatic, PR is principally a radiographic and not a clinical diagnosis. The diagnostic tools for PR should include X-ray and CT scanning of the spine. The diagnostic imaging of choice for a reliable and prompt detection of PR is CT (1, 5, 8). The PR in our case was asymptomatic, and coincidently diagnosed by thoracic CT.

In bronchial asthma with violent cough, the peripheral pulmonary alveoli may rupture due to sudden increase in the intra-alveolar pressure. The air gone into the pulmonary

perivascular interstitium may migrate along fascial planes from the posterior mediastinum (or retropharyngeal space), through the neural foramina, and into the epidural space. There are no fascial barriers to block connections of the posterior mediastinum or the retro-pharyngeal space with the epidural space (6). Air thus freely communicates via the neural foramina and collects in the epidural space (2,3).

Most cases of epidural space pneumorrhachis are usually benign and resolve spontaneously when the underlying cause is treated. In our case, pneumorrhachis almost disappeared without any intervention. Rarely, symptomatic PR with neurological deficits has been reported (10).

Our report represents a rare case of epidural pneumorrhachis secondary to pneumomediastinum with bronchial asthma. Spontaneous resolution occurs in most cases of epidural space pneumorrhachis, which permits conservative management in this benign occurrence. The attending spine specialist has to carefully evaluate and follow up the associated pathologies and neurological status as neurological deficits may occur in some cases.

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