



Pneumorrhachis: a Benign Association in Bronchial Asthma

KEYWORDS

Pneumorrhachis, Asthma, intra-spinal air

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ABSTRACT *Pneumorrhachis is defined as presence of air within spinal epidural space. It is also referred to as aerorachia, intraspinal pneumocele, pneumosaccus, pneumomyelogram or simply intraspinal air. It can be associated with a variety of etiologies like trauma, iatrogenic manipulations and in associated therapy of malignancy. There are only sporadic cases reported in the literature. Here, we report a case of a 17-year-old boy who is a known case of bronchial asthma presented with Pneumorrhachis, Subcutaneous emphysema and Pneumomediastinum. The pathogenesis and etiology of Pneumorrhachis are varied and can sometimes be a diagnostic challenge. The imaging tool of choice as diagnostic procedure should include spinal CT. There are no facial barriers between the posterior mediastinum and the retropharyngeal and epidural spaces. Thus air can diffuse freely to the epidural space and produce Pneumorrhachis. It usually represents an asymptomatic phenomenon but can rarely be symptomatic.*

Case Report:

14 yr old asthmatic boy was admitted to our hospital with complaints of shortness of breath, nonproductive cough and wheezing since 48 hours. He presented with episodic bouts of cough with scanty mucoid expectorations, dyspnea and episodes of nocturnal wheeze. He was never admitted to ICU nor did he ever receive assisted mechanical ventilation in the past. Patient did not give h/o trauma or any interventions (to rule out iatrogenic cause). On clinical examination, he was conscious, alert, afebrile and dyspneic. Vital signs were within normal limits. Cervical and thoracic subcutaneous emphysema were noted on initial physical examination. On auscultation, he had B/L scattered polyphonic rhonchi and systolic crunching sound at apex and lateral sternal border that was more pronounced on inspiration consistent with Hamman crunch. Neurological and other system examinations were normal. All routine blood investigations were within normal limits. Patient was maintaining saturation on room air.

CXR confirmed presence of extensive subcutaneous emphysema and Pneumomediastinum without any evidence of rib fracture (Fig.1).



Fig 1:

CT chest confirmed the extent of the air dissection into the subcutaneous, visceral and carotid spaces of the neck, extending along the anterior mediastinal space down to the aortic arch and pericardium (Fig.2 and 3).

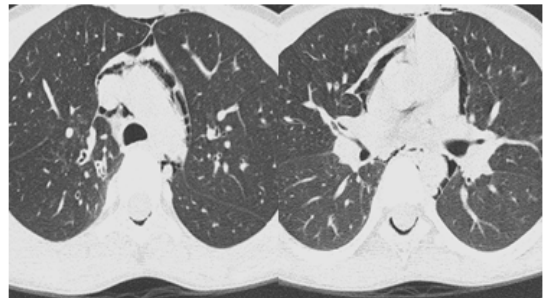


Fig 2 & 3:

Also, CT revealed air in the posterior spinal epidural space at cervicothoracic levels. There was no evidence of pulmonary interstitial emphysema, pneumothorax or any bullae on HRCT.

He was treated with high flow oxygen, inhaled bronchodilators, systemic steroids, antibiotics and supportive measures. Antibiotics were added to prevent mediastinitis. His hospital course was uneventful. He showed progressive improvement. Follow up CT was normal.

Discussion:

Pneumorrhachis is the presence of air in the spinal epidural space. The causes of Pneumorrhachis have broadly been classified into iatrogenic, traumatic and nontraumatic. Iatrogenic causes are most common^(8,16,24,25,32) followed by traumatic causes^(6,7,10,17,19,21,23). The combination of pneumomediastinum with pneumorrhachis without thoracic trauma has rarely been reported in the medical literature. Respiratory conditions causing high intra thoracic pressure and barotrauma rarely produce pneumorrhachis^(3,4,5,9,11,12,13,20,22,29,30,31,33,34). Only 13 cases are found in the literature describing pneumorrhachis caused by violent coughing secondary to bronchial

asthma or acute bronchitis^(5,12,13,20,26,27,29,30,34,35). A possible explanatory mechanism is high intraalveolar pressure during cough resulting in air leakage into pulmonary perivascular interstitium. The air dissects paths of least resistance into the mediastinum to the facial planes on neck. There is no facial barrier to prevent communication of the posterior mediastinum or retropharyngeal space with the epidural space. Air can thus communicate freely via neural foramina⁽¹³⁾. The air typically collects in the posterior epidural space because of less resistance from the loose connecting tissue as compared with reach vascular network anteriorly.

Pneumorrhachis is mostly an incidental finding and does not require specific treatment. Air gets absorbed over two to three weeks^(3,15,22). Treatment is primary directed to the underlying cause. Administration of high concentration of inspiratory oxygen promotes reabsorption of air^(18,28). Rarely

symptomatic pneumorrhachis with neurological deficit is reported⁽³⁶⁾.

In our case pneumorrhachis and pneumomediastinum did not affect the clinical outcome nor did it require any specific treatment.

Conclusion:

Barotrauma associated with acute exacerbation of asthma can rarely cause pneumorrhachis in association with pneumomediastinum. Awareness of the mechanism by which air reaches the epidural space is reassuring and allows conservative approach to be taken. Treatment of underlying cause will lead to spontaneous reabsorption of pneumorrhachis. Thus pneumorrhachis is a rare benign association of pneumomediastinum complicating bronchial asthma.

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