Pneumomediastinum - An Uncommon Complication of Acute Severe Asthma

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Introduction

Pneumomediastinum, defined as the presence of air or other gas in the mediastinum, is not a common clinical disorder even though it may occur in a wide variety of conditions. The gas that causes pneumomediastinum may originate from the lungs, upper respiratory tract, the gastrointestinal tract or rarely consequent to infection by gas forming organisms [1]. Pneumomediastinum is an uncommon complication of acute severe asthma and the case is being reported for its rarity.

Case Report

A 35 year old serving personnel, a known case of bronchial asthma since 1991, was on irregular treatment and follow up. He had three hospitalisations for acute severe asthma over the preceding one year. He was admitted in a peripheral hospital with the complaints of fever of one day, sudden onset of progressive breathlessness for the last twelve hours and swelling over the chest, neck and face which had been gradually increasing for the preceding five hours. He denied any history of trauma or auto provocative manoeuvres. On examination the patient was found to have pulse rate of 150 per minute, blood pressure 140/65mm Hg, respiratory rate of 60 per minute with an audible wheeze along with cervicofacial and thoracic subcutaneous emphysema. Respiratory system examination revealed bilateral diffuse expiratory rhonchi in all lung fields. Rest of the clinical examination was non-contributory. Arterial blood gas analysis revealed pH of 7.31, PaCO₂ 52 mmHg, PaO₂ 60mmHg, and HCO₃ level of 28mmol/L, suggestive of acute respiratory acidosis with severe hypoxemia. ECG showed sinus tachycardia. Chest radiograph revealed thin radiolucent shadow along the right cardiac border and subcutaneous emphysema (Fig. 1). The patient was diagnosed as having acute severe asthma complicated by pneumomediastinum and subcutaneous emphysema. Patient was managed with

oxygen, continuous nebulisation with bronchodilators along with parenteral corticosteroids and antibiotics. Patient improved and repeat arterial blood gas analysis done one hour later revealed improvement pH of 7.39, PaCO₂ 42 mmHg, PaO₂ 72mmHg and HCO₃ level of 24mmol/L. There was complete resolution of pneumomediastinum and subcutaneous emphysema after a week. The patient was subsequently stabilised on a combination of inhaled steroids and long acting β_2 agonists.

Discussion

Pneumomediastinum, also known as mediastinal emphysema, implies the presence of air or any other gas in the mediastinum [1]. It can occur in a wide variety of clinical settings, including childbirth [1,2]. Recently it has been recognised as a complication of positive pressure ventilation. In one study of 479 radiographs of children admitted with bronchial asthma attacks pneumomediastinum was detected in 5.4% cases [3].

Fig. 1 : Chest radiograph showing sharp radiolucent shadow along the right mediastinal border

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The mechanism of pneumomediastinum in cases of acute severe asthma involves over-expansion of distal air spaces beyond small airway obstruction. This is followed by alveolar rupture, triggered by coughing or straining. The air so introduced into the pulmonary interstitium moves centripetally because of lower mean pressure in the mediastinum than in the pulmonary parenchyma [1,2,4].

Central chest pain, dyspnoea, dysphagia and dysphonia are common symptoms. A characteristic though not pathognomonic sign is the 'Hamman's crunch', a crunching or clicking noise synchronous with the heart beat which is present in approximately 50% cases [1,2,4,5]. The radiological diagnosis of pneumomediastinum can be made from frontal and lateral chest radiographs and the numerous radiological signs have been extensively reviewed by Bayers and his coworkers [6]. The commonest radiological signs consist of vertical radiolucent streaks outlining the mediastinal structures [6]. These radiolucent shadows are more evident on the left side [5], unlike our case where it was evident on right side.

Pneumomediastinum seldom requires any treatment other than reassurance, observation and analgesia. Treatment or removal of the precipitating cause is followed by gradual resolution of aberrant air [1, 2, 7]. Surgical techniques when employed include aspiration with needles, cervical mediastinotomy, infraclavicular

incisions and splitting or completely excising the sternum [1].

To conclude, pneumomediastinum is an uncommon complication of acute severe asthma which usually resolves with successful management of acute severe asthma.

Conflicts of Interest

None identified

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Erratum

Book Review: Practical Obstetric Haematology, edited by Peter Clark and Ian A Greer, published in Vol 62 page 308, was contributed by Lt Col PK Gupta, Associate Professor and Col Harsh Kumar, Professor and Head (Department of Transfusion Medicine), AFMC, Pune-40.

The omission is regretted.

Editor