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RESEARCH ARTICLE

**PNEUMOMEDIASTINUM WITH SUBCUTANEOUS EMPHYSEMA AND BILATERAL SPONTANEOUS PNEUMOTHORAX IN SPUTUM POSITIVE MILIARY TUBERCULOSIS**

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**ABSTRACT**

Pneumomediastinum and bilateral pneumothorax are rare complications of miliary tuberculosis. In this case report, a 14-year-old girl with sputum positive miliary tuberculosis complicated by pneumomediastinum and bilateral pneumothorax, is presented and relevant literature is discussed.

**Key words:**

Pneumomediastinum,  
Pneumothorax,  
Miliarytuberculosis,  
Surgicalempysema,  
Virtual bronchoscopy.

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**INTRODUCTION**

Air in the mediastinum is referred to as pneumomediastinum. It is not a common clinical condition, although it may occur in a wide variety of different disorders. Most cases of pneumomediastinum probably are the result of alveolar rupture into the broncho vascular sheath, from momentary shearing force due to sudden pressure discrepancy between them, mainly in the presence of alveolar over distension. It is suspected by the presence of subcutaneous emphysema, mainly in the region of neck. We present a case of pneumomediastinum with bilateral pneumothoraces in sputum positive miliary tuberculosis.

**Case report**

A 14 year old girl presented with sudden onset of breathlessness since one day, progressive in nature, associated with retrosternal chest pain. She had swelling in face and neck with feeling of compression in throat since one day.

Cough since 20 days was productive, white in colour not associated with blood. Patient had one episode of fever with chills two days prior to admission. She complained of decrease in appetite and weight loss since 20 days .No past history of Koch and Koch contact, no history of any addiction. On examination patient was in distress with respiratory rate of 36/min, with a blood pressure 100/70mmhg.pulse rate of 140/min, oxygen saturation of 90% on room air. General examination revealed subcutaneous emphysema on face, neck, upper chest. No pallor icterus clubbing lymph nodes. Respiratory examination: trachea was central, chest movement decreased bilateral. Hyper resonant note in bilateral lung fields .On auscultation breath sounds were decreased bilateral with bilateral coarse crepts present. Cardiovascular examination was normal. Bio chemical and hematological investigations were within normal limits except for mild anemia. Chest x-ray showed pneumomediastinum with bilateral nodular infiltrates in all lung fields. Hrccthorax revealed extensive pneumomediastinum and subcutaneous emphysema involving neck and thorax, with bilateral small pnemothoraces. Extensive ground glass opacities with tiny nodular infiltrates involving bilateral lung parenchyma was noticed.

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The patient was managed with pigtail catheter inserted in right side in which column movement stopped on 3<sup>rd</sup> day, breathlessness increased with increase of surgical emphysema; so left side pigtail catheter inserted. The patient improved symptomatically. Surgical emphysema and breathlessness reduced after 2 days. Sputum for AFB came 3 + AFB positive. Patient was started on AKT Cat 1 under dots according to weight. In view of miliary pattern injectable steroids was also started. Pneumomediastinum and pneumothorax reduced after 5 days. The Pigtail catheter was removed on 10<sup>th</sup> day of admission. Patient was discharged on AKT.



Figure 1. showing facial swelling

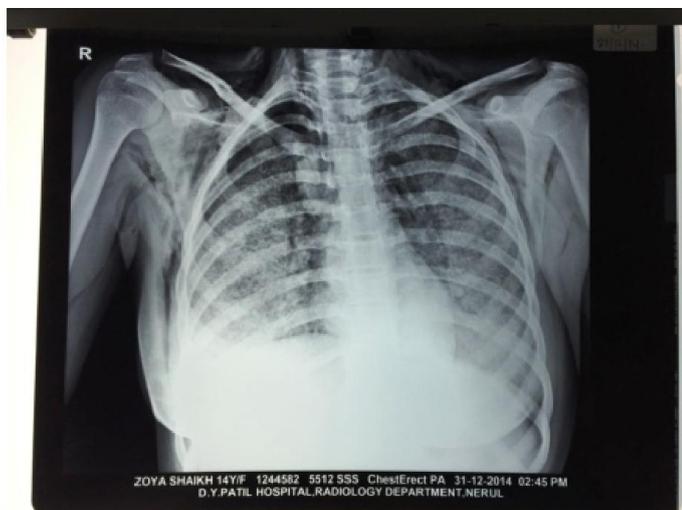


Figure 2. Chest x-ray showing bilateral reticular nodules with pneumomediastinum

## DISCUSSION

The occurrence of subcutaneous emphysema and pneumothorax complicating miliary tuberculosis is triggered off usually by coughing which results in a sudden rise of intra-alveolar pressure, with concomitant airway narrowing. This leads to alveolar rupture causing air to pass into the interstitial tissues of the lung and into the vascular adventitia of the hilum.

From there, it moves into the mediastinum along the continuous pathway that extends into the mediastinum. Once in the mediastinum, air can track along the fascial planes of the great vessels into the neck and anterior chest wall, producing subcutaneous emphysema. The air, thereafter, has access to the subcutaneous tissues and can travel elsewhere in the body. If the air in the mediastinum ruptures through the mediastinal pleura into the pleural space, this will result in a pneumothorax.

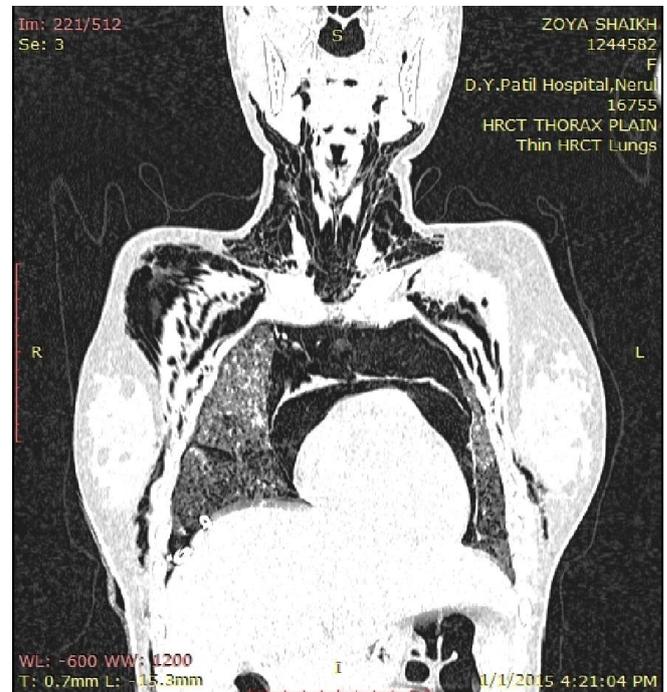


Figure 3. HRCT chest showing bilateral pneumothorax with pneumomediastinum. Right side ICD in situ



Figure 4. HRCT chest showing bilateral pneumothorax with pneumomediastinum

Miliary tuberculosis results due to hematogenous spread of TB bacilli, hence it is not common that they excrete TB bacilli in sputum. Our patient may have parenchyma lesions too, hence she came sputum AFB 3 positive. The pneumomediastinum and bilateral pneumothoraces could have occurred due to a

central airleak from the trachea or larger bronchi, but reviews with the radiologists and virtual bronchoscopy did not reveal any large site of airleak. After insertion of the first intercostals catheter, there was no bronchopleural fistula, but ICD column stopped moving. The patient became more breathless, and subcutaneous emphysema increased, so a left sided intercostals tube(pigtail catheter) was inserted. The patient felt immediate relief, and subcutaneous emphysema decreased over a period of 2 days. In view of the patient being sputum AFB 3 Positive perhaps she had endobronchial lesions along with miliary TB. These lesions could have ruptured into the mediastinum.

Miliary TB with pneumomediastinum and bilateral pneumothoraces have been described. Pneumomediastinum with pneumothorax in sputum positive pulmonary TB patient has been described ([Pneumothorax and Pneumomediastinum, 2012](#)) in a 11 year old patient who had continuous diaphragm sign on chest x-ray with bilateral patchy consolidation in both lungs. Recurrent pneumothorax has been described with miliary TB ([Case report, 1991](#)) and ([Recurrent pneumothorax, 2011](#)) tube thoracostomy was performed after 1 month of the first occurrence of pneumothorax. A case of pneumomediastinum with subcutaneous emphysema in a patient of silicotuberculosis ([Pneumomediastinum with subcutaneous emphysema in a silicotuberculosis patient, 2007](#)) was reported where the patient had bilateral reticulonodular lung opacities with areas of confluent opacities in upper and midzones, with a history of working in stone drilling factory.

Our patient had bilateral pneumothoraces with pneumomediastinum and extensive surgical emphysema with miliary lesion in all the lung fields. Hersputum report was afb 3+ . Miliary tb usually suggests a hematogenous spread so when her sputum reports was positive we repeated the ctscan,using virtual bronchoscopy to identify any visible endobronchial lesion leading to necrosis or sinus into the mediastinum; which could have lead to the air leak into the mediastinum. The senior radiologist faculty where assistance we took were unable to demonstrate any visible leak from the large airways by virtual bronchoscopy. There were also no large necrotic mediastinal lymphnodes which could have eroded into the large airways.

After 2 days of inserting right sided intercostals tube drain (whose column movement stopped after 2 days) she developed increased breathlessness with increase in size and extent of surgical emphysema so we inserted an ICD on the left side though the left pneumothorax was small. She got immediate relief from symptoms and surgical emphysema resolved dramatically. In view of the large amount of surgical emphysema and its increase even after left side ICD it was conjectured that our patient had a large leak into the mediastinum from some of the larger bronchi. The other hypothesis that there was air leak from the alveoli and through the perivascular and peribronchial spaces to mediastinum and subcutaneous tissues as also into pleural spaces seems less likely but must be also kept in mind when one confronts case of pneumomediastinum and pneumothorax.

The occurrence of subcutaneous emphysema and pneumothorax complicating miliary tuber-culosis could be triggered off usually by coughing which results in a sudden rise of intra-alveolar pressure, with concomitant airway narrowing. This leads to alveolar rupture causing air to pass into the interstitial tissues of the lung and into the vascular adventitia of the hilum. From there, it moves into the mediastinum along the continuous pathway that extends into the mediastinum. Once in the mediastinum, air can track along the fascial planes of the great vessels into the neck and anterior chest wall, producing subcutaneous emphysema. The air, thereafter, has access to the subcutaneous tissues and can travel elsewhere in the body. If the air in the mediastinum ruptures through the mediastinal pleura into the pleural space, this will result in a pneumothorax.

Also our patient was excreting bacilli in sputum inspite of having miliary lung lesions; so she may also be having endobronchial lesions, which could have ruptured into mediastinum thence to subcutaneous tissues and bilateral pleural spaces. Different x-ray signs of pneumomediastinum have been described as

- 1) Free mediastinal air as sharp lines of increased lucency enhancing the mediastinal viscera, outlining the cardiac borders and outlining the cardiac borders and widening the superior mediastinum.
- 2) Continuous diaphragm sign.
- 3) Ring around the artery sign (air around the right pulmonary artery in frontal view)
- 4) V sign the confluence of innominate veins outlined in frontal view.
- 5) Pneumopericardium and presence of retrosternal air on lateral skiagram.

In conclusion, we present this rare case of bilateral pneumothoraces, pneumomediastinum and surgical emphysema in a case of sputum positive miliary tuberculosis.

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