

## **Lung gangrene with cavity due to tuberculosis presenting as pneumothorax: A rare complication in paediatric patient**

**Dr. Patil Prashant S, Dr. Kothari Paras L, Dr. Gupta Abhaya, Dr. Kekre Geeta, Dr. Deshmukh Shahaji, Dr. K Vishesh Dikshit, Dr. Apoorva Kulkarni**

Dept of Paediatric surgery, L.T.M.G. Hospital, Sion, Mumbai, Maharashtra, India

### **\*Corresponding author**

Dr. Prashant S Patil

Email: [docprashant2010@gmail.com](mailto:docprashant2010@gmail.com)

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**Abstract:** The common perception is that children rarely develop severe forms of tuberculosis. A variety of sequelae and complications can occur in the pulmonary and extrapulmonary portions of the thorax in treated or untreated patients. Lung gangrene due to tuberculosis has been described in adult patients. However lung gangrene due to tuberculosis is rarely reported in paediatric patients. We report a case of 2 year old female child with lung gangrene and massive cavity due to tuberculosis.

**Keywords:** Pulmonary tuberculosis, Gangrene, Thoracotomy, Pneumothorax

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### **INTRODUCTION:**

Tuberculosis has been a disease of tremendous importance to the human race. Primary tuberculosis typically appears as air-space consolidation. Post primary tuberculosis appears most commonly as nodular and linear areas of increased opacity or increased attenuation at the lung apex. Large pulmonary cavity is a life-threatening complication of chronic reactivation tuberculosis (TB). Because of its rarity, this condition is not reported adequately in the literature [1, 2]. We present a case of massive pulmonary cavity that was initially misdiagnosed as pneumothorax. When patient did not improve clinically, HRCT was done followed by thoracotomy. Massive lung cavity with gangrene of apical segment of lower lobe was found.

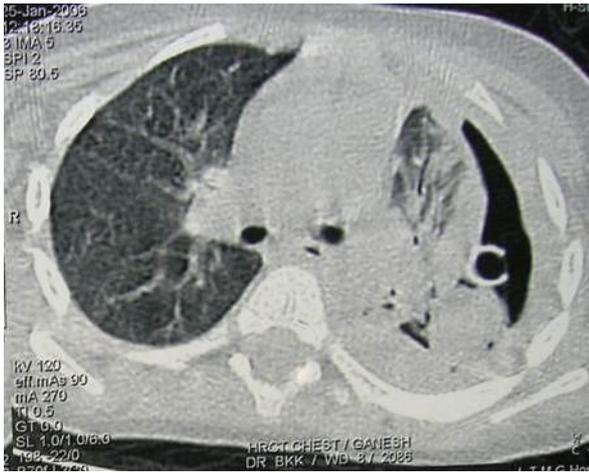
### **CASE REPORT:**

A 2 year old female child was referred with history of fever, cough for 15 days and sudden onset dyspnea recently. Physical examination revealed tachypnea (40 breaths/min), tachycardia (142 beats/min), and fever. Her oxygen saturation was 88% on room air and improved to 92% with oxygen support (4 lit/min). On auscultation air entry was reduced on left hemithorax. Hemogram revealed leukocytosis (25400 white blood cells/microL), high C-reactive protein (96 mg/L). Chest x-ray revealed large pneumothorax on left side [fig 1]. Intercostal tube drainage was done. Pleural fluid analysis showed high levels of ADA levels (46 IU/L), serum IgG and IgM for TB were positive. Sputum was positive for acid-fast bacilli smear. Patient was started on 4 drugs AKT (Isoniazid, Rifampicin, Ethambutol, and Pyrazinamide) under

direct supervision and kept in isolation. Patient was not showing clinical improvement hence HRCT was done [fig 2]. It showed left sided empyema with pneumothorax and multiple air pockets along with thickened pleura and loss of hemi thoracic volume. Patient was posted for thoracotomy and decortications. Intra-operatively gangrene of the apical segment of lower lobe along with thickened pleura was found [fig 3]. Gangrenous segment was excised. Segmental bronchial openings identified and sutured with 4/0 prolene to minimize air leak. Post-operative period was uneventful. [Fig 4] Histopathological examination reported necrotic changes in the lung segment with granulomas in decortication specimen.



**Fig 1: Chest x-ray showing large pneumothorax**



**Fig 2: HRCT showing left sided empyema with pneumothorax and multiple air pockets along with thickened pleura and loss of hemi thoracic volume.**



**Fig 3: Gangrene of the apical segment of lower lobe along with cavity**



**Fig 4: Post-op chest x-ray showing adequate expansion of remaining lung**

## DISCUSSION:

According to World Health Organisation TB report 2015, India, Indonesia and China had the largest number of cases: 23%, 10% and 10% of the global total, respectively. Children represent 5 to 15% of all TB

cases around the world and are more frequently infected and more easily affected by the most severe forms of the disease such as meningitis and disseminated form.

Reactivation of primary pulmonary TB is a serious medical condition. Advanced age, malnutrition, human immunodeficiency virus infection, malignancy, immunosuppressive drugs, and incomplete or inadequate treatment for active pulmonary TB are associated with TB reactivation. These risks factors disrupt the balance between host and pathogen. Failure to contain dormant *Mycobacterium tuberculosis* inside granulomas results in reactivation of pulmonary TB. Up-regulation of resuscitation-promoting factors and matrix metalloproteinase-1 results in reactivation of TB [4, 5].

The pathologic form of the pulmonary infection depends on the sensitivity of the infected host and is classified as primary or post primary [3]. In contrast to primary tuberculosis, in which fibrosis and healing are the rule, the post primary form of the disease tends to progress, with foci of inflammation and necrosis enlarging to occupy greater portions of the lung parenchyma. Decaying and rupturing of the granulomas result in liquefaction, Caseation, and cavitation of the lung. Intense inflammation may result in widespread arteritis and vascular thrombosis, with resulting pulmonary ischemia, necrosis, and gangrene [1].

Osler [6] described the lung as "converted into a horribly offensive greenish-black mass, torn and ragged in the centre". The gross pathologic features of lung gangrene are unique and differ from those of other forms of lung abscess. Secondary pyogenic or fungal infection may supervene in the lung cavity. Patients typically present with symptoms of fever, weight loss, night sweats, progressive dyspnea, cough, hemoptysis, and pleuritic chest pain.

This case report illustrates that patients with massive pulmonary cavities and extensive lung destruction may initially be misdiagnosed on chest X-ray as having a large pneumothorax. Prompt anti-TB treatment is essential, and antibiotics or antifungal agents are needed if bacterial or mycotic super infection is present. Adequate timing of surgical intervention should be judged individually because such information in the literature is very limited. Resection of lung, division of pulmonary vessels and bronchus in an infected pleural space may cause postoperative bleeding, prolonged air leaks due to bronchial rupture and persistent pleural infection. If tube thoracostomy failed to alleviate systemic infection, prompt surgical intervention should be considered.

The diagnosis of pulmonary cavity carries a high mortality rate. In one small series published 36

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years ago, three out of four (75%) patients with TB who developed pulmonary cavity died [1]. The patient in this report survived because of prompt institution of anti-TB therapy, supervised perioperative care and complete removal of pathologic lung segment.

#### **CONCLUSION:**

Massive pulmonary cavity secondary to reactivation TB is a rare and serious complication that can be misdiagnosed as pneumothorax and bronchopleural fistula. This diagnosis should be suspected in patients who present with a history of TB and the characteristic radiographic appearance of thick walled cavities and fibrosis of remaining lung parenchyma. Low threshold to establish accurate diagnosis is essential and prompt TB treatment and timely surgical intervention may be life saving.

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