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A rare presentation of Mycobacterium tuberculosis complicated as necrotizing pneumonia in an infant

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Abstract: *Necrotizing pneumonia as a complication of mycobacterium tuberculosis is a rare but severe condition of lung parenchymal destruction, which is characterized by necrosis and liquefaction of consolidated lung parenchyma. Necrotizing pneumonia is complicated by cavitating pneumonia, intrapulmonary abscesses, sepsis and bronchopleural fistula. Incidence of necrotizing pneumonia is less than 1% of hospital admissions for pneumonia. In this case report, we discuss a rare case of necrotizing pneumonia as a complication of mycobacterium tuberculosis in an infant male who came to DR. D. Y. Patil Medical Hospital, Navi Mumbai. This report describes the clinical presentation, radiological features and treatment strategy.*

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I. Case Description

A 1 year old male child born through consanguineous marriage, belonging to middle socioeconomic class, Hindu by religion, presented to Dr. DY Patil hospital with complaints of cough since 2 weeks, loss of appetite & weight loss since 2 weeks, fever since 1 week and cold since 2 days with grade 1 protein energy malnutrition. He had history of tuberculosis contact (relative having pulmonary tuberculosis, taken 6 months of AKT).

On general examination, child was conscious and alert with GCS score of 15/15, temperature of 99 degree F on a digital thermometer, pulse150/min with regular rate, rhythm, normal force volume without radio-radial or radio-femoral delay with bilateral symmetry, respiratory rate 60/min with abdomino-thoracic breathing and inter-costal retraction, SpO2 98% on nasal prongs at 2L/min in all four limbs, BP-100/68 mmHg. Pallor was also seen in bilateral palpebral conjunctiva. On head to toe examination, frontal bossing and saddle nose seen while other parameters were unremarkable.

On systemic examination of respiratory system, air entry was reduced on left side and bilateral crepitations were present. Serum investigations were performed, in which hemogram was suggestive of anemia, ESR=50, CRP=67.5, COVID Antibody > 10.

II. RADIOLOGICAL FINDINGS

On radiological examination, plain chest radiograph showed left upper lobe collapse and consolidation patches with air bronchogram within and cavitatory changes in left upper and mid zones with pneumonic changes in the right mid and bilateral lower zones.

For further evaluation, High Resolution Computed Tomography (HRCT) of chest was performed, which revealed multiple centrilobular branching opacities in V-Y pattern(tree in bud pattern) with diffuse areas of air space consolidations involving the right lung parenchyma predominantly involving right lower lobe and entire left lung parenchyma with relative sparing of apico-posterior segment of left upper lobe. Few variable sized thick walled cavitatory changes were noted involving the left lung parenchyma. These findings along with the clinical history, suggested of infective etiology, likely pulmonary tuberculosis.

On intravenous contrast administration, multiple hypo-enhancing areas were also noted involving the left upper lobe. In view of non-enhancing areas, changes were suggestive of necrotizing pneumonia.

For confirmation of the radiological and clinical findings, sample of gastric lavage for Acid Fast Bacilli (AFB) was sent, which surprisingly was found to be negative and contrary to the radiological findings.

However in view of high radio-clinical suspicion, two more samples of gastric lavage for Acid Fast Bacilli (AFB) and gene Xpert (for tuberculosis) were sent consecutively. On gene Xpert testing, Mycobacterium tuberculosis bacteria was detected with resistance to Rifampicin.

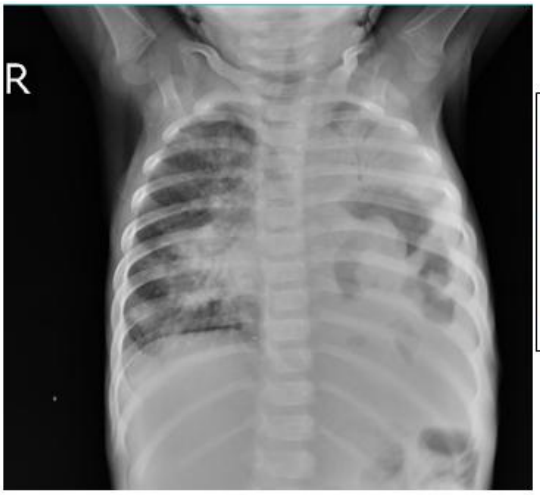

Figure 1: Chest X-Ray supine antero-posterior (AP) view was taken on admission, which revealed, left upper lobe collapse and consolidation patches with air bronchogram within and cavitatory changes in left upper and mid zones with pneumonic changes in the right mid and bilateral lower zones.

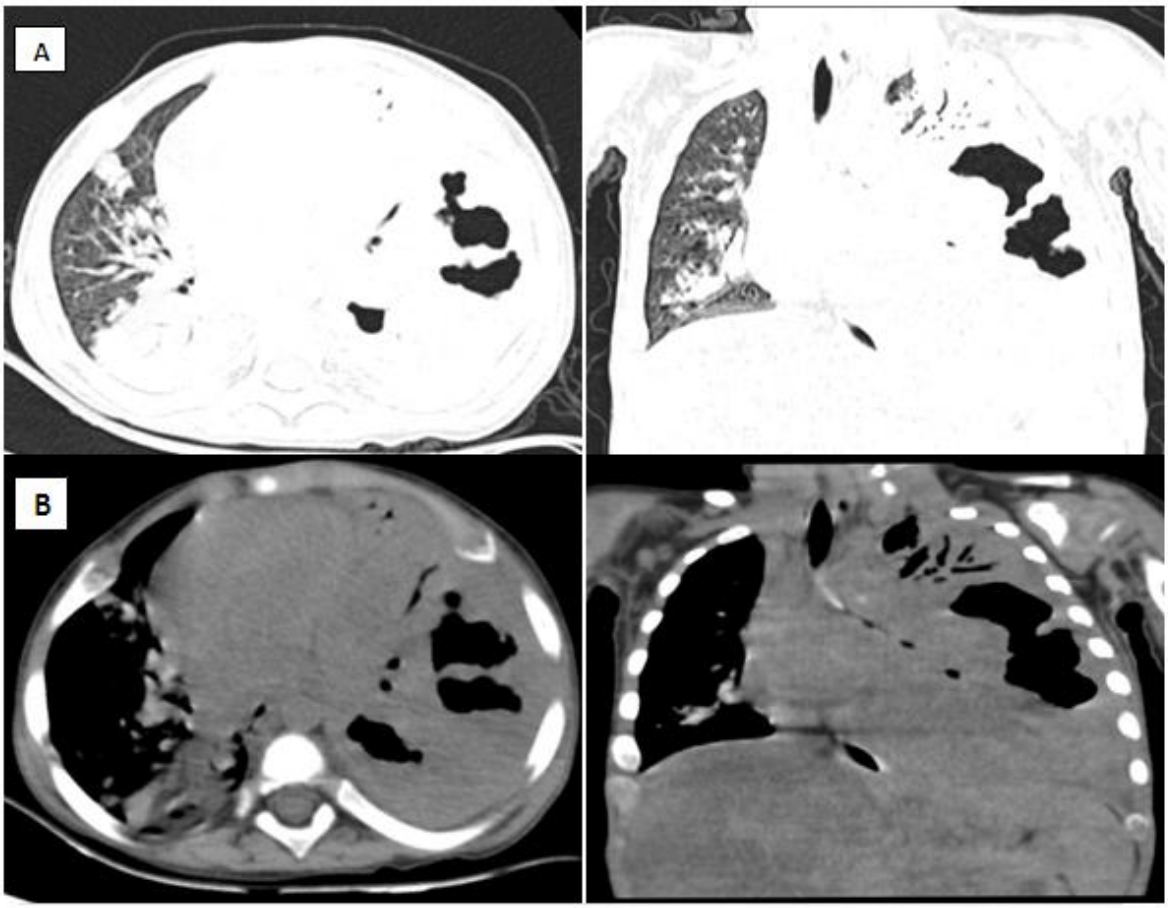

Figure 2: (A) Axial (left image) and coronal HRCT chest lung window showed multiple centrilobular branching opacities in V-Y pattern (tree in bud pattern) with diffuse areas of air space consolidation involving bilateral lung parenchyma (left > right) with few variable sized thick walled cavitatory changes. (B) Axial (left Image) and coronal CT chest soft tissue window showed areas of air space consolidation with cavitatory changes involving left lung parenchyma.

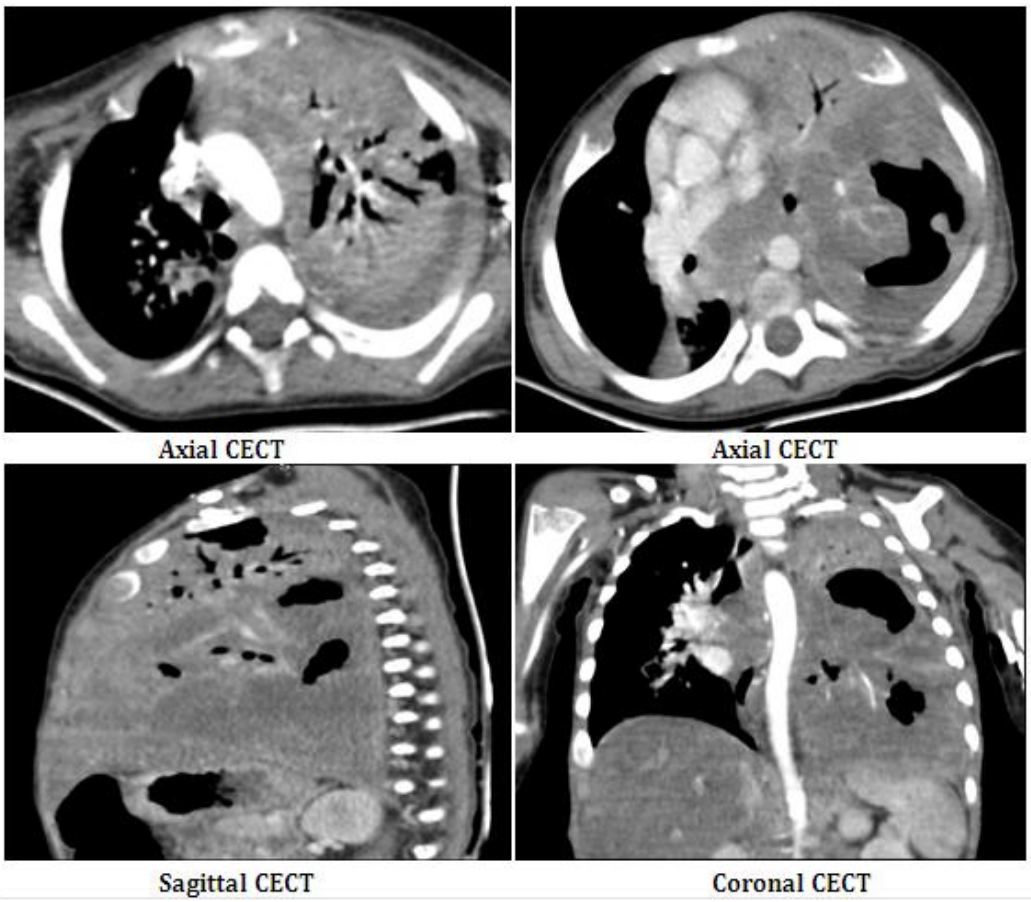

Figure 3: Contrast Enhanced CT Chest showed multiple hypo-enhancing areas involving the left upper lobe.

III. Discussion

In infant, necrotizing pneumonia (NP) is a rare but severe complication of tuberculosis which is characterized by destruction of lung parenchyma in the form of necrosis and liquefaction of consolidated lung resulting in multiple, thick-walled cavitatory changes. It is also associated with bronchopleural fistulae and empyema. Necrotizing pneumonia is a morbid and potentially fatal complication of pulmonary infection. Most common causative organisms are Staphylococcus aureus, Streptococcus pneumonia and Klebsiella pneumonia but Mycobacterium tuberculosis can also cause necrotizing pneumonia.

In our case, necrotizing pneumonia associated with mycobacterium tuberculosis was diagnosed by the amalgamation of clinical history, plain chest radiograph (consolidation with cavitatory changes), High Resolution CT scan of chest (consolidation of lung parenchyma with cavitatory changes and hypo-enhancing area) and the positive gene Xpert for Mycobacterium Tuberculosis. Usually it takes months to years for the development of tuberculosis of lung but there are few cases like pulmonary gangrene and necrotizing pneumonia in which this destruction may progress rapidly causing severe respiratory failure.

Mycobacterium tuberculosis causes alveolar consolidation, excessive pulmonary inflammation, thrombosis of the intrapulmonary vessels and arteritis which is responsible for the development of the pulmonary necrosis and multiple cavitatory changes. Necrosis contributes to the loss of lung function characterized by limited penetration of leukocytes and antibiotics into necrotic tissues.

Radiologically, the typical feature of the tuberculosis of the lung includes multiple centrilobular branching opacities in V-Y pattern (tree in bud pattern), patchy areas of consolidation and pleural effusion. In advance cases complications like cavitations and lung collapse may also be seen.

In addition to the typical features, we also picked up multiple hypo-enhancing areas which leads to diagnosis of the necrotizing pneumonia. The corticosteroid treatment could be useful in management of M. tuberculosis-associated necrotizing pneumonia.

IV. Conclusion

In our case, necrotizing pneumonia associated with mycobacterium tuberculosis was diagnosed by the amalgamation of clinical history, plain chest radiograph (consolidation with cavitatory changes), High Resolution CT scan of chest (consolidation of lung parenchyma with cavitatory changes and hypo-enhancing area) and the positive gene Xpert for Mycobacterium Tuberculosis.

Certain take home points:

- Mycobacterium tuberculosis, being one of the most common opportunistic infection in the south-east Asia region, should always be considered as a differential diagnosis irrespective of the age or presentation.
- The importance of meticulous detailed history taking and high index of clinico-radiological suspicion.
- Pulmonary tuberculosis, however rare, but can complicate into a severe necrotizing pneumonia and should be considered as a cause in infants residing in the high TB prevalence regions.

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