

The Double Trouble Monster - Unmasking Hidden Tuberculosis in Silicosis Patients - A Case Series

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Abstract: Tuberculosis occurs commonly in silicosis and difficult to diagnose. we are presenting four cases of silicotuberculosis. First three cases of silicotuberculosis have occupational risk factors like borewell driller, construction sites and quarry presented with silicotuberculosis clinicroadiological features with negative sputum AFB and positive results for tuberculosis obtained from BAL samples. Last case developed silicosis due to inhalational burned sugarcane crops. Antituberculosis therapy started after microbiological confirmation for tuberculosis. Hence vigorous search of tuberculosis in silicosis patients is highly warranted.

Keywords: Silicotuberculosis, cavity, sugarcane, quarry

1. Background

Silicosis is the oldest occupational lung disorder discovered by Hippocrates and Pliny which is caused by inhalation of silica particle.

Silica exposed workers are at increased risk for Tuberculosis than general population. Its risk is 3 - 7 times higher in silicosis patient. Incidence of silicotuberculosis is 28.6 % in India¹. The risk of developing Tuberculosis is proportional to the severity of silicosis and intensity of exposure. The radiological findings and clinical features between Silicosis and Tuberculosis are difficult to differentiate from each other. Here we present a case series of 4 cases with different clinical background, which gave us a challenge for diagnosing Tuberculosis.

2. Case Series

Case 1:

45 year male with complaints of loss of weight for 4 months, complaints of cough with mucoid expectoration, breathlessness grade 3 mMRC and low grade fever for 1 month. He worked as a borewell driller for more than 10 years and quit 15 years back. He is a current smoker with smoking index of 300. His Sputum AFB - Negative. CT Chest shows findings of conglomeration of homogenous opacities with multiple calcified mediastinal nodes. FOB done and Broncho alveolar lavage Gene Xpert - MTB detected, Rifampicin sensitive. Hence it was concluded as a case of Microbiologically Confirmed Pulmonary tuberculosis in chronic silicosis and hence ATT started.

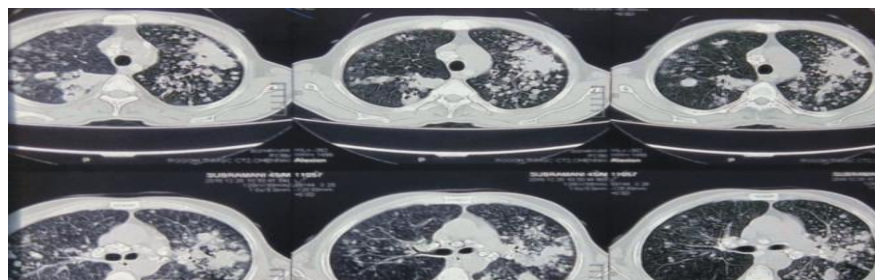


Figure 1: bilateral upper lobe consolidation with multiple nodules with mediastinal egg shell calcification

Case 2:

28 - year young male from came with history of mild hemoptysis for 15 days and breathlessness of grade 2 mMRC for 10 days. No prior ATT. He is working at construction site and used to demolish old buildings for 8

years. He is current Smoker with smoking index of 50. His CT chest shows bilateral coalescence of nodular opacities which superimposed cavity. His Sputum AFB - Negative. So, FOB done and broncho alveolar lavage GeneXpert – MTB detected, Rifampicin sensitive and ATT started.

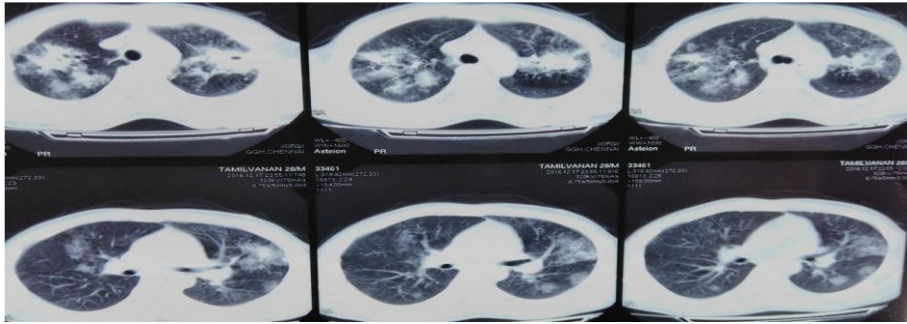


Figure 2: bilateral upper lobe showing coalescing nodules with early cavitation

Case 3:

A 43 year male, worked in Quarry for 15 years duration, 10 year back. Now came with complaints of loss of weight for 1 month and loss of appetite for 2 weeks. History of evening rise of temperature for 2 weeks. He Denies prior ATT. This patient wife also worked in Quarry, stopped 7 year back,

diagnosed as a case of silicotuberculosis. His CT chest shows consolidation in upper lobes. Now sputum AFB - Negative. Hence FOB Bronchoalveolar lavage Gene Xpert turned out to be MTB detected, Rifampicin sensitive and ATT started.

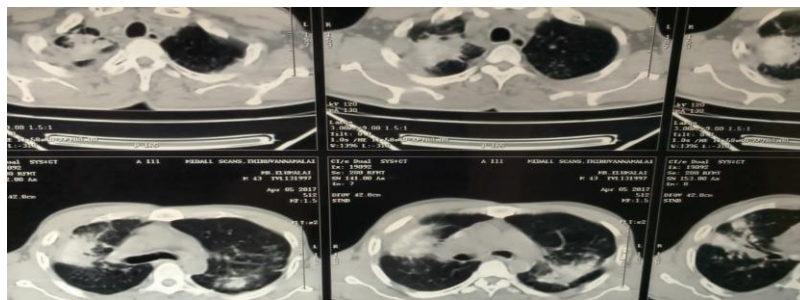


Figure 3: Bilateral Upper Lobe Consolidation

Case 4:

A 63 year elderly male, laundry worker by occupation presented to us with chest pain for 2 months and shortness of breath of grade 2 mMRC for 1 month. He also had cough with mucopurulent expectoration for 20 days. He denies prior ATT. On repeated probing, patient revealed history of exposure to sugarcane dust for the past 5 years. His CT chest

shows coalescence of nodular shadows with calcified right paratracheal lymph nodes with right sided pneumothorax. His Sputum AFB - Negative. FOB done and broncho alveolar lavage - Gene Xpert -MTB detected. This is an interesting case of Non - Occupational Silicosis due to sugarcane dust.

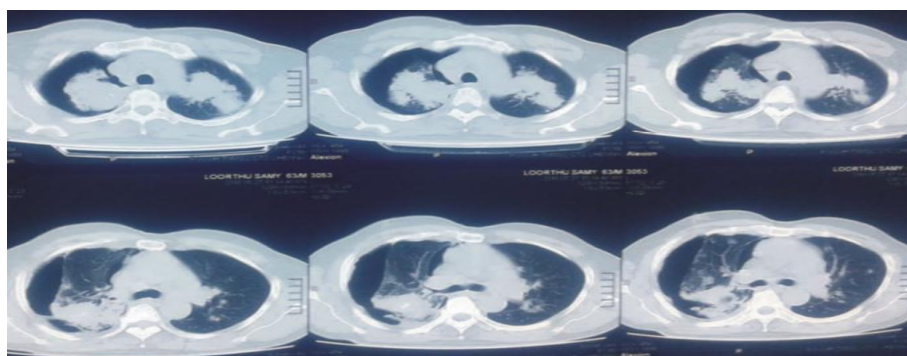


Figure 4: bilateral coalescence of nodular shadows with right sided pneumothorax

3. Discussion

Silicosis is a pneumoconiosis characterized by granulomatous lung inflammation and pulmonary fibrosis due to deposition of inhaled free silica particles in the lung. Silicosis has relatively long latency period which has chronic morbidity and premature mortality. The incidence of silicosis in India varies from 4 – 50 %. The risk to develop pulmonary tuberculosis for silicosis is 2.8 times higher than general population and there is also an increased risk for

both pulmonary and extrapulmonary tuberculosis. Next to HIV the powerful risk factors for getting tuberculosis is silicosis.

The pathophysiology of silicotuberculosis was not completely understood. Ingested silica particles are tried to eliminate by alveolar macrophages but macrophages were destroyed by engulfed silica particle. Hence defective macrophages contribute to tuberculosis, non - tuberculous mycobacterial and other fungal infections. The high - risk occupation of silicosis is coal, gold, other minerals, mining,

quarrying, tunnel building (rails and roads), foundries, cement or glass workers, ceramics, porcelain, marble stones and sand extraction. Three different patterns of silicosis have been recognized (chronic, accelerated and acute forms), primarily based upon the degree, duration of exposure and onset of symptom.

Silicosis often confused with pulmonary tuberculosis due to similar radiological resemblance like military shadows, nodules, consolidation, hilar lymphadenopathy, pleural effusion and fibrosis¹. The presence of cavities indicates high probability of tuberculosis in silicosis but rarely silicotic nodules goes for necrosis leading to cavity in silicosis. The differentiating features between early silicotic lesions with tuberculosis are in silicosis, primarily there is accentuation of broncho vascular markings followed by rounded opacities, whereas in tuberculosis, rounded opacities appear first followed by linear opacities. Tubercular nodules usually occur in upper lung field (apico posterior segment) whereas silicotic nodules are localized predominantly in upper and midzone with no connection with hilum.

Massive fibrosis in silicosis is not limited by interlobar fissure which usually occurs in tuberculosis². Unique characteristic feature of progressive massive fibrosis is presence of over inflated emphysematous changes between massive opacities in upper zone^{3, 4}. Radiological signs suggestive of tuberculosis in a silicotic lung are rapidly enlarging parenchymal shadows especially soft asymmetric opacities in upper zone, cavitation, bronchial narrowing and stenosis^{5, 6, 7}.

Complications of silicosis are Tuberculosis, NTM, Lungcancer, Scleroderma, Rheumatoid arthritis, pneumothorax and respiratory failure.

Sugarcane leaves contain amorphous silica which may crystallize to form crystalline silica during commercial sugarcane harvesting, when sugarcane plants are burned, these respirable airborne particles produce health hazard. In our case, resident near sugarcane factory produce progressive massive fibrosis, presented as non - occupational exposure to silica⁸.

Serum club cell protein 16 as a potential novel bio marker for silicosis and silicotuberculosis under study. Silicotuberculosis patients' needs eight months of antituberculosis therapy because of poor drug penetration in the silicofibrotic lung. Apart from dust control measures in occupational sites, periodic surveillance of silicosis patients is warranted to prevent future complication. Currently chemoprophylaxis to prevent tuberculosis in silicosis is not routinely available and also no proper guidelines available.

In all the above cases we find it difficult to diagnose tuberculosis because of negative sputum acid fast bacilli. But FOB broncho alveolar lavage was taken and gene Xpert yielded positive tuberculosis results.

4. Conclusion

Tuberculosis in silicosis is often under diagnosed & under treated. Any recent onset of fever with worsening symptoms and recent deterioration of radiographic imaging should alert the treating physician to suspect tuberculosis in a silicosis patient. Silicotuberculosis is usually have negative sputum acid fast bacilli and hence FOB broncho alveolar lavage Gene Xpert is advised whenever high clinical suspicion is present. Physician should be aware that Silicosis can also occurs among people who exposed to sugarcane crops.

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