

Letter

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An Undiscussed Distribution of Chest X-Ray Findings in Pulmonary Tuberculosis

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Abstract

Chest X-Ray is a paramount important investigation in Pulmonary Tuberculosis (PTB). We here explain a common observation of distribution of X-Ray findings in PTB which has not been previously discussed. When the disease is bilateral and extensive, we have noted that in most of the patients the left lung is involved extensively while the right lung is less extensively involved with limitation to upper zone. The reverse pattern is rarely noted. The potential pathogenesis for this would be the differences of the anatomy of the bronchia tree, lymphatics, and the blood vessels.

Pulmonary Tuberculosis (PTB) is an ancient disease entity and a leading cause of pulmonary morbidity and mortality at least in the developing part of the world [1]. The diagnosis and the treatment of tuberculosis is still challenging because of the intrinsic nature of the *Mycobacterium tuberculosis*, chronicity of the disease, spectrum of the disease and the complexity of the treatment. Despite the awareness in the community, the patients tend to present late to the medical facility and still we see patients with extensive disease involvement of

pulmonary tuberculosis with grossly distorted pulmonary structures on imaging [2,3]. In patients with smear positive PTB, the Chest X-Ray (CXR) would be the only imaging that is required and moreover, the CXR is a paramount investigation to look for hilar adenopathy, pleural effusion,

cavitation, pneumothorax and other related complications in tuberculosis. In active post-primary PTB, classically involved regions are apical/posterior segments of the any of the upper lobes, right middle lobe, lingula lobe and the superior segments of any of the lower lobes [4,5].

When it occurs outside those mentioned regions the usual consensus is to look for possibility of immunosuppression, dual pathology, or an alternative diagnosis if it is a smear negative case.

Furthermore, the usual features of active PTB are clustered airspace nodules, consolidation with ipsilateral adenopathy, miliary nodules and cavities. The normal CXR has a high negative predictive value for active PTB and when they have the changes on CXR it is utmost important to



follow-up the patients to monitor the treatment response radiologically [4,6].

The classic findings of active PTB with the territories of involvement as above is well described in the literature. However, we would like to describe a pattern of CXR in PTB which has not been discussed in the literature previously. We as respiratory physicians in the largest Respiratory Hospital in Sri Lanka, manage a high volume of patients with PTB both as inpatients and outpatients. Moreover, Sri Lanka is considered as a country with a moderate burden of tuberculosis.

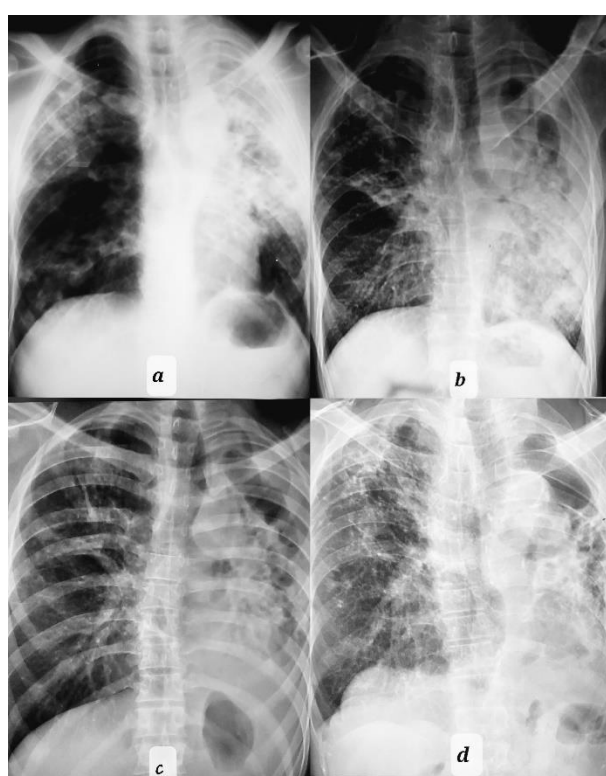


Figure 01: Here are CXRs of 4 different patients. All 4 CXRs illustrates the described asymmetrical involvement of in bilateral PTB with extensive left involvement with mild/moderate right upper zonal involvement. (a) and (b) are pre-treatment CXRs showing the active disease and (c) and (d) are during treatment CXRs showing the remaining distribution with distorted lung parenchyma.

As per our notice, the CXRs of active PTB patients have a common distribution as follows when they have got the bilateral extensive involvement and moreover, when they have completed the treatment the same distribution persists with fibro-cavitary or bronchiectatic consequences. The

noticed significant distribution is, when they have bilateral involvement, there is more tendency to have extensive left sided disease (Involving 2 or more zones) with mild-moderate disease on the right side involving the upper zone. In another way, the disease is largely asymmetrical with more predilection to the left side when it is bilateral and extensive. We see this distribution very commonly among our patients and it is very rare to see the opposite or symmetrical distribution when the disease is extensive and bilateral. Figure 01 illustrates four of those CXRs which elaborate the described distribution. Moreover, all the patients that we detected that distribution had the smear positive, drug susceptible PTB without concerning other associated underlying respiratory diseases. Therefore, there were no diagnostic dilemmas. Furthermore, we have noticed that distribution in patients of both genders.

The disease spread in PTB can occur endobronchially, through the lymphatics or through the blood vessels [7]. Therefore, we predict that pathophysiology of the occurrence is due to the asymmetry of any of them, either alone or in combination.

Therefore, we observed this as a common distribution on CXRs, and consider it as an interesting finding which needs further discussions and studies to see the statistical relevance and look for the explanations for the pathophysiological occurrence of it. We could not see any literature that had addressed this distribution of involvement and therefore, we consider it an interesting finding and would like to share our observation while opening it for consideration and to plan further studies on it.

Author declaration

Authors contribution:

Conceptualization: Kularatne S. (For Saman Kularatne)

Writing - original draft preparation: Bandara H. (For Harshana Bandara)

Writing - review and editing: all the authors.

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