

Retrospective Evaluation of Radiographic Findings in Patients with Pulmonary Tuberculosis: An Observational Study

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Abstract

Background: Tuberculosis remains a worldwide health hazard instead well documented well publicized methods of prevention and cure. Chest radiographs are used to stratify for risk and to assess for asymptomatic active disease. Hence; we planned the present study to retrospectively analyze the data of the pulmonary tuberculosis patients for analyzing the spectrum of radiographic findings. **Subjects and Methods:** In the present study, we analyzed the data records of a total of 100 pulmonary tuberculosis patients. A self-framed master cart was prepared in which, past medical history, clinical history, radiographic findings, clinical findings of all the patients was obtained. Data records of only those patients were analyzed in which both clinical and bacteriologic confirmation of the disease was present. Radiographs were evaluated. Only preoperative radiographic findings were taken into consideration. **Results:** The most common radiographic finding was hilar lymph node, found to be present in 66 percent of the patients. Unilateral nodular infiltration was found to be present in 25 percent of the patients. Patchy consolidation was seen in 22 percent of the patients. Fibrotic scar was seen in 10 percent of the patients while calcified nodule was seen in 8 percent of the patients. **Conclusion:** In diagnosing and assessing the extent of severity among tuberculosis patients, radiographic imaging is a vital tool.

Keywords: Pulmonary, Tuberculosis, Radiological.

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Introduction

Tuberculosis remains a worldwide health hazard instead well documented, well publicized methods of prevention and cure. Poverty and HIV infection are main causes for its persistence. Most tuberculosis programmers use direct smear examination of sputum but, if resources permit, culture is desirable.^[1-3] Reliable susceptibility testing is a luxury few developing countries can afford, although it is especially desirable for purposes of re-treatment. Chest radiographs are used to stratify for risk and to assess for asymptomatic active disease.^[4-6] Sequelae of previous tuberculosis that is now inactive manifest characteristically as fibro nodular opacities in the apical and upper lung zones. Stability of radiographic findings for 6 months distinguishes inactive from active disease.^[7,8] Hence; under the light of above mentioned data, we planned the present study to retrospectively analyze the data of the pulmonary tuberculosis patients for analyzing the spectrum of radiographic findings.

Subjects and Methods

The present study was conducted in the department of radio-diagnosis of the medical institute and it included retrospectively analysis the data of the pulmonary

tuberculosis patients for analyzing the spectrum of radiographic findings. Ethical approval was obtained from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. In the present study, we analyzed the data records of a total of 100 pulmonary tuberculosis patients. Inclusion criteria for the present study included:

- Subjects more than 18 years of age
- Subjects with absence any other form of systemic illness,
- Subjects in which complete data records was available
- Diabetic and hypertensive subjects

After meeting the inclusion criteria, data records of all the patients were obtained. A self-framed master cart was prepared in which, past medical history, clinical history, radiographic findings, clinical findings of all the patients was obtained. Data records of only those patients were analyzed in which both clinical and bacteriologic confirmation of the disease was present. Radiographs and computed tomography scans were evaluated. Only preoperative radiographic findings were taken into consideration in the present study. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

Results

[Figure 1] shows age-wise distribution of patients. In the present study, mean age of the patients was 41.8 years. Majority of the patients (48 percent) belonged to the age group of 30 to 50 years. 56 percent of the patients of the present study were males while the remaining 44 percent were females as shown in [Figure 2].

[Table 1] shows the radiographic manifestation observed in the present study. In the present study, the most common radiographic finding was hilar lymph node, found to be present in 66 percent of the patients. Unilateral nodular infiltration was found to be present in 25 percent of the patients. Patchy consolidation was seen in 22 percent of the patients. Fibrotic scar was seen in 10 percent of the patients while calcified nodule was seen in 8 percent of the patients.

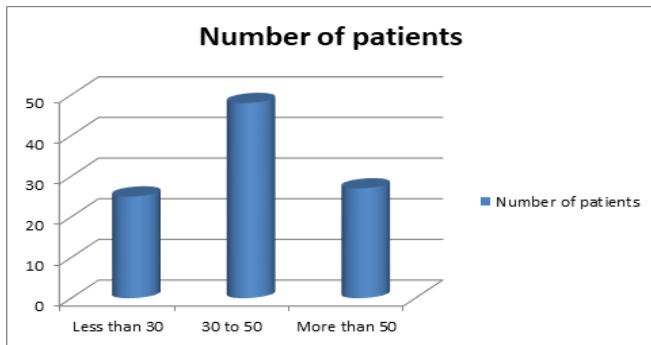


Figure 1: Age-wise distribution of patients

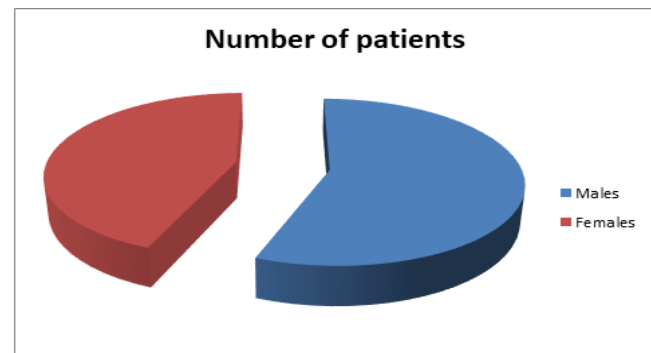


Figure 2: Gender-wise distribution of patients

Table 1: Radiographic manifestation

Radiographic manifestation	Number of patients
Unilateral nodular infiltration	25
Bilateral nodular infiltration	3
Patchy consolidation	22
Calcified nodule	8
Fibrotic scar	10
Cavity	12
Hilar lymph node	66
Others	8

Discussion

Tuberculosis (TB) is a major challenge among infectious diseases. In recent years, the prevalence of TB has been rising globally. According to 2014 Global Tuberculosis

Report, 9 million people are estimated to have developed TB and 1.5 million deaths of TB patients were reported in 2013.^[7-9] The current guidelines for diagnosis of adult chest tuberculosis (TB) are based primarily on the demonstration of acid-fast bacilli (AFB) on sputum microscopy. Chest radiograph (CXR) finds its place in sputum-negative patients not responding to a course of antibiotics.^[6-8] In the present study, majority of the patients (48 percent) belonged to the age group of 30 to 50 years. 56 percent of the patients of the present study were males while the remaining 44 percent were females as shown in [Figure 2]. TB can affect any organ system, although manifestations are most commonly related to the chest. The lungs are the most common and often the initial site of involvement. Chest involvement is most commonly pulmonary, followed by lymph nodal and pleural disease.

Radiology remains one of the most important diagnostic modalities of tuberculosis infection. Radiological manifestations of pulmonary tuberculosis are dependent on several host factors, including underlying immune status. Impaired host immunity like HIV infection, diabetes mellitus etc., have been regarded as a predisposing factor in tuberculosis. Endobronchial spread of disease, cavitary lesions and lymphadenopathy can be easily detected by Computed Tomography (CT). Pleural effusion and bronchopleural fistula can also be detected in early stages. The most common CT findings of reactivation pulmonary TB are centrilobular small nodules, branching linear and nodular opacities present as ‘tree-in-bud’ sign, patchy or lobular areas of consolidation, and cavitation. Cavitation usually indicates active disease.^[10]

In the present study, the most common radiographic finding was hilar lymph node, found to be present in 66 percent of the patients. Unilateral nodular infiltration was found to be present in 25 percent of the patients. Patchy consolidation was seen in 22 percent of the patients. Fibrotic scar was seen in 10 percent of the patients while calcified nodule was seen in 8 percent of the patients. Lachi T et al described the radiological findings of pulmonary tuberculosis in indigenous patients from the city of Dourados, MS, Brazil, according to age and sex. Chest radiographic images of 81 patients with pulmonary tuberculosis, acquired in the period from 2007 to 2010, were retrospectively analyzed by two radiologists in consensus for the presence or absence of changes. The findings in abnormal radiographs were classified according to the changes observed and they were correlated to age and sex. The individuals’ ages ranged from 1 to 97 years (mean: 36 years). Heterogeneous consolidations, nodules, pleural involvement and cavities were the most frequent imaging findings. Most patients (55/81 or 67.9%) were male, and upper lung and right lung were the most affected regions. Fibrosis, heterogeneous consolidations and involvement of the left lung apex were significantly more frequent in males ($p < 0.05$). Presence of a single type of finding at radiography was most frequent in children ($p < 0.05$). Based on the hypothesis that indigenous patients represent a population without genetically determined resistance to tuberculosis, the present study may enhance the knowledge about how the pulmonary form of this disease manifests in susceptible individuals.^[11]

Conclusion

From the above obtained results, it can be concluded that in diagnosing and assessing the extent of severity among tuberculosis patients, radiographic imaging is a vital tool.

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