Analysis of Radiographic Findings in Patients with Pulmonary Tuberculosis: An Institutional Based Study

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ABSTRACT

Background: Tuberculosis (TB) remains an enormous challenge to global public health with an estimated 8.7 million cases of incident disease worldwide in 2011. Hence; the present study was undertaken for analysing the data of the pulmonary tuberculosis patients for assessing the spectrum of radiographic findings.

Materials & Methods: Sample size for the present study included 110 pulmonary TB patients. Confirmation of diagnosis of pulmonary TB was done on the basis of microbiological examination. Assessment of all the radiographs was done by skilled and experienced radiologists. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

Results: Unilateral nodular infiltration was found to be present in 53 patients, while bilateral nodular infiltration was found to be present in 8 patients. Patchy consolidation was found to be present in 29 patients. Calcified nodule and fibrotic scar were found to be present in 12 patients each.

Conclusion: For assessing the severity, radiographic imaging is an effective tool in TB patients.

Key words: Pulmonary, Tuberculosis, Radiological.

INTRODUCTION

Tuberculosis (TB) remains an enormous challenge to global public health with an estimated 8.7 million cases of incident disease worldwide in 2011; this includes 1.1 million cases amongst people living with HIV and 490 000 cases amongst children. Most cases occur in Asia (59%) and Africa (26%), with smaller proportions in the eastern Mediterranean region (8%), European region (4%) and the Americas (3%). Although the global incidence rate is now declining at approximately 2% per year, this will need to fall by an average of 16% per year over the next 40 years to eliminate TB as a public health problem by 2050.[1-3] Despite the widespread implementation of standardized treatment policies and improvements in cure rates, a critical bottleneck to achieving more rapid progress in TB control is the lack of simple, rapid and accurate diagnostic assays for TB.[4]

The two types of clinical manifestation of tuberculosis (TB) are pulmonary TB (PTB) and extrapulmonary TB (EPTB). The former is most common. EPTB refers to TB involving organs other than the lungs (e.g., pleura, lymph nodes, abdomen, genitourinary tract, skin, joints and bones, or meninges). A patient with both pulmonary and EPTB is classified as a case of PTB. For example, miliary TB is classified as PTB because there are lesions in the lungs. On the other hand, tuberculous intrathoracic lymphadenitis (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, constitutes a case of EPTB.[5-7]

Hence; under the light of above mentioned data, the present study was undertaken for analysing the data of the pulmonary tuberculosis patients for assessing the spectrum of radiographic findings.

MATERIALS & METHODS

The present study was conducted in the Department of TB & Chest, Terna Medical College, Nerul, Navi Mumbai, Maharashtra (India) and it included evaluation of pulmonary tuberculosis patients for assessing 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. Sample size for the present study

included 110 pulmonary TB patients. Diabetic and hypertensive subjects were excluded from the present study. Subjects within the age group of 25 to 60 years were included in the present study. Confirmation of diagnosis of pulmonary TB was done on the basis of microbiological examination. Assessment of all the radiographs was done by skilled and experienced radiologists. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi-square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

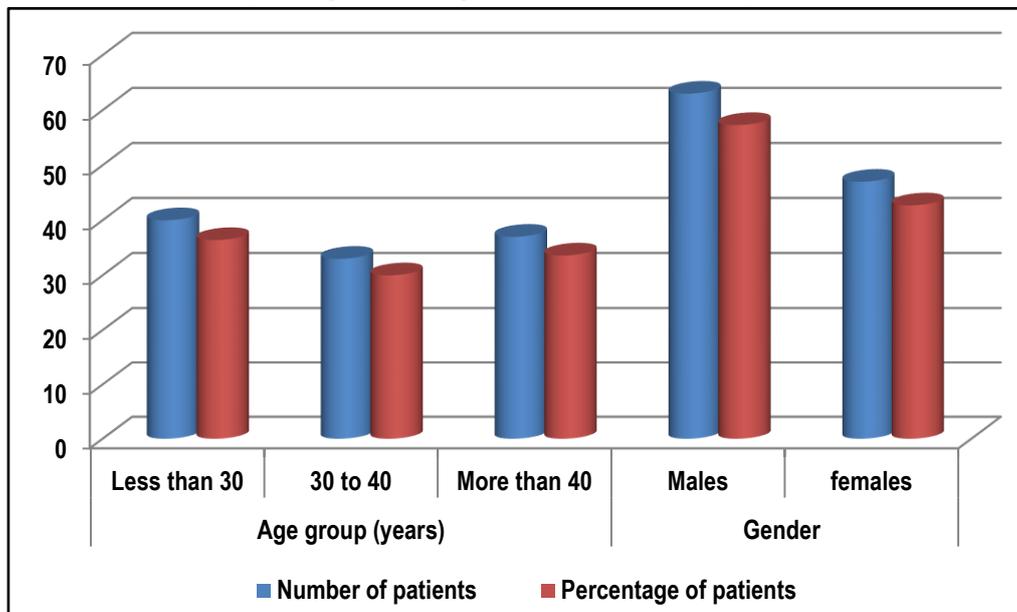**Graph 1: Age-wise and gender-wise distribution of patients**

Table 1: Demographic and clinical profile of patients

Parameter		n	%
Residence	**Rural**	73	66.4
	Urban	37	33.6
Positive family history of	**Yes**	23	20.9
pulmonary TB	**No**	87	89.1

Table 2: Radiographic manifestation

Radiographic manifestation	n
Unilateral nodular infiltration	53
Bilateral nodular infiltration	8
Patchy consolidation	29
Calcified nodule	12
Fibrotic scar	12
Cavity	8
Hilar lymph node	43
Others	10

RESULTS

In the present study, analysis of a total of 110 patients who were diagnosed with pulmonary tuberculosis was included in the present study. Mean age of the patients of the present study was 29.5 years. 36.7 percent of the patents belonged to the age group of less than 30 years. 57.3 percent of the patients were males while the remaining 42.7 percent were females. 66.4 percent of the patients in the present study were of rural residence while the remaining 33.6 percent of urban residence. Positive family history of pulmonary TB was present in 20.9 percent of the patients.

In the present study, unilateral nodular infiltration was found to be present in 53 patients, while bilateral nodular infiltration was found to be present in 8 patients. Patchy consolidation was found to be present in 29 patients. Calcified nodule and fibrotic scar were found to be present in 12 patients each.

DISCUSSION

Pulmonary tuberculosis (TB) is a common worldwide infection and a medical and social problem causing high mortality and morbidity, especially in developing countries. The traditional imaging concept of primary and reactivation TB has been recently challenged, and radiologic features depend on the level of host immunity rather than the elapsed time after the infection.[8,9] Hence; under the light of above mentioned data, the present study was undertaken for analysing the data of the pulmonary tuberculosis patients for assessing the spectrum of radiographic findings.

In the present study, analysis of a total of 110 patients who were diagnosed with pulmonary tuberculosis was included in the present study. Mean age of the patients of the present study was 29.5 years. 36.7 percent of the patents belonged to the age group of less than 30 years. 57.3 percent of the patients were males while the remaining 42.7 percent were females. 66.4 percent of the patients in the present study were of rural residence while the remaining 33.6 percent of urban residence. Positive family history of pulmonary TB was present in 20.9 percent of the patients. Ward HA et al compared the extent of pulmonary tuberculosis amongst patients detected by screening (active case finding) with that in patients detected by symptoms (passive case finding), and to identify early symptoms of pulmonary tuberculosis. In this cross-sectional study, Tuberculosis Control Program records were reviewed for method of detection and extent of disease in Canadian Plains Aborigines between 1 January 1991 and 30 June

1999. Among 903 cases, method of detection was active in 450 (49.8%) and passive in 453 (50.2%). Cough and fever were the most common symptoms in both methods of detection, and were significantly more frequent in passive detection (P < 0.05). Cough was present in 59% and fever in 19% of actively detected cases compared to 84% and 47%, respectively, of passively detected cases. Age was significantly different between the two methods of detection. Hemoptysis, weight loss and method of detection were associated with increased risk of infectiousness among those < or = 19 years, while cough, hemoptysis and weight loss were associated among those >19 years. Method of detection rather than age contributed to infectiousness in children and adolescents. Daily cough for more than 1 month and unexplained fever for more than 1 week should raise the suspicion for TB.[10]

In the present study, unilateral nodular infiltration was found to be present in 53 patients, while bilateral nodular infiltration was found to be present in 8 patients. Patchy consolidation was found to be present in 29 patients. Calcified nodule and fibrotic scar were found to be present in 12 patients each. Chest X ray (CXR) - Sputum smear microscopy, culture for AFB, and CXR postero-anterior (PA) view are the initial investigations performed in adults suspected to have TB. CXR is frequently employed as the initial test to evaluate unexplained cough. It is the primary modality for diagnosis and follow-up, and may be the only imaging required in sputum-positive cases. Apicogram/lordotic view (for lung apices) and lateral view are of limited utility and CT is the next investigation in case of equivocal CXR. CXR is useful to look for any evidence of PTB as well as to identify other abnormalities responsible for the symptoms.[11,12] The classic teaching had come into question. In 1997 Jones and colleagues examined a group of 103 patients with tuberculosis. They used molecular epidemiologic techniques to look for correlations with radio-graphic findings in patients with primary and reactivation disease and found no difference. A review of their results is instructive. In the HIV-negative group 24 of 28 (86%) patients with reactivation disease (unique isolates) and 24 of 30 (80%) patients with primary tuberculosis (clustered cases) presented with upper lung zone disease. Only two had the classic pattern of primary infection. In the HIV-positive group the opposite was true: 10 of 16 (63%) patients with primary disease and 10 of 16 (63%) patients with reactivation had the atypical pattern of primary disease. The authors concluded that the radiographic appearance of tuberculosis was not determined by the time since infection but by the state of the immune system. These results were supported by findings of a follow-up study published in 2005 by Geng and colleagues.[10-12]

CONCLUSION

From the above results, it can be concluded that for assessing the severity, radiographic imaging is an effective tool in TB patients.

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