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A Retrospective Assessment of Radiographic Manifestations in Patients with Tuberculosis: An Institutional Based Study

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ABSTRACT

Background: Tuberculosis is considered as a granulomatous disorder that is caused by Mycobacterium tb. It accounts for 8.7% of all the locations of tuberculosis. Signs of CXR that are suggestive of TB are regarded essential for the diagnosis of TB, as per the international consensus clinical case definitions. The present study was conducted with the aim to retrospectively analyze the commonly associated signs on chest X-ray amongst TB subjects.

Materials and Methods: All the subjects who had their chest X-ray performed at initial and follow up visit were enrolled in the study. The following points were looked at the Chest X-rays, the location of airway compression, site of consolidation, presence of lymphadenopathy, nodular images etc. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software.

Results: The mean age of the subjects was 54.22+/-6.89 years. There were 60 males and 40 females with tuberculosis. There were 16 cases of lymphadenopathy amongst cases and 2 cases amongst controls. There was a significant difference amongst the two. Air space opacification was seen amongst 65 cases and 17 controls.

Conclusion: From the present study it can be concluded that lymphadenopathy and air space opacification are the most commonly seen chest Xray characteristics of subjects with tuberculosis.

KEYWORDS: Lymphadenopathy, Tuberculosis, Radiographic.

INTRODUCTION

Tuberculosis is considered as a granulomatous disorder that is caused by Mycobacterium tb. It is considered as a serious public health concern, commonly seen amongst the developing nations like India, inspite of the recognition of the pathogenic micro-organism over a century.[1]

Tuberculosis primarily disturbs the lungs, but all the organs can be afflicted.[2] Extra-pulmonary tuberculosis carry a grave public health problem, due to its unlike forms that lead the patients rapidly at health care centers where primary care is provided by the national programs against tuberculosis that are universal and free of charge; this condition is commonly not recognized or diagnosed late, which delays the treatment. This diagnostic delay is not only due to the examination delay, but also due to the difficulty in diagnosis that are associated with extra-pulmonary tuberculosis. It accounts for 8.7% of all the locations of tuberculosis.[3]

Radiographic imaging technology based on the standard radiography, ultrasonographic imaging and CT are essential for the diagnosis and sometimes also aid in interventional procedures. Chest x-rays remain a crucial tool for the diagnosis intrathoracic tuberculosis that is mostly common presentation of TB.[4] Furthermore, the signs of CXR that are suggestive of TB are regarded essential for the diagnosis of TB, as per the international consensus clinical case definitions.[5]

The present study was conducted with the aim to retrospectively analyze the commonly associated signs on chest X-ray amongst TB subjects.

MATERIALS AND METHODS

The present descriptive retrospective observational study was conducted at Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chengalpet Taluk, Kancheepuram Nellikuppam, Tamil

Nadu (India) amongst all cases of pulmonary tuberculosis that were diagnosed by imaging and further confirmed by the direct examination of the body fluids, histologic examination of biopsy samples. All the information was collected from the records of the Department of Radiology and from Pathology. The study was approved by the institutional ethical board. The demographic details and the medical symptoms of all the patients were obtained from their medical records. All the subjects who had their chest X-ray performed at initial and follow up visit were enrolled in the study.

Subjects with clinical and radiological confirmation of tuberculosis were regarded and TB cases and the controls were normal subjects without any symptoms of tuberculosis. The following points were looked at the Chest X-rays, the location of airway compression, site of consolidation, presence of lymphadenopathy, nodular images etc. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Student t test was used for statistical analysis and probability value of less than 0.05 was considered as significant.

Table 1: Chest X-ray characteristics of TB subjects

Features	TB subjects (n=100)	Non-TB subjects (n=100)	P value
Tracheal Displacement			>0.05
Yes	5	1	
No	95	99	
Lymphadenopathy			<0.05
Yes	16	2	
No	84	98	
Air Space Opacification			<0.05
Yes	65	17	
No	35	83	
Nodular Picture			>0.05
Yes	3	0	
No	97	100	
Pleural Effusion			>0.05
Yes	7	5	
No	93	95	

RESULTS

The present study enrolled 200 subjects, out of which 100 subjects had tuberculosis and 100 were controls. The mean age of the subjects was 54.22+/-6.89 years. There were 60 males and 40 females with tuberculosis. Majority of them belonged to rural areas. In the subjects, pleural effusion was present amongst 7 cases and 5 controls, making no significant difference between the two. Nodular picture was only observed amongst 3 cases, making no significant difference between the two. There were 5 cases of tracheal displacement and it was seen amongst only 1 control. On applying student t test there was no significant difference between two as the p value was greater than 0.05. There were 16 cases of lymphadenopathy amongst cases and 2 cases amongst controls. There was a significant difference amongst the two. Air space opacification was seen amongst 65 cases and 17 controls. There was a significant difference amongst the two. (Table 1)

DISCUSSION

There is not sufficient evidence in literature regarding the radiographic diagnostic criteria for tuberculosis and no agreement is present on usage of ultrasound, Computed tomography, and magnetic resonance imaging amongst such subjects. India having a huge burden of TB, it is crucial to have a set imaging criterias and guidelines. Smear results come after several days whereas culture results require several weeks.[6]

This adds to the limitations of the diagnostic efficiency of these commonly used approaches and leads to delay in isolation of infectious subjects.[7]

These tests are also affected because of their low sensitivity. Due to these limitations, diagnostic imaging theatres an important role in the evaluation of chest tuberculosis subjects and CT is generally more sensitive than CXR in this issue.[8,9]

Tuberculosis is a global health issue and the second commonly seen infectious reason of death, after HIV. According to the World Health Organization, there are 6.1 million cases of Tuberculosis seen by national TB programs in the year 2012, out of which around 5.4 million were new subjects.[10] Of these, 2.5 million subjects had sputum smear-positive, 1.9 million had sputum negative for Tb, and 0.8 million were diagnosed with extrapulmonary TB; case form was not known in the rest of the cases.[10]

India accounts for 26% of total subjects of tuberculosis around the globe in the year 2012.[10] Tuberculosis is one of the prime reasons for mortality in India, that kills two persons every 3 min, approximately 1000 every day.[11]

Primary tuberculosis is directly acquired by the inhalation of airborne micro- organisms and occurs amongst subjects that are not previously exposed to Mycobacterium tuberculosis. It commonly disturbs infants and children in the endemic area. Imaging in subjects with pulmonary tuberculosis often indicate extensive abnormalities in the predisposed areas.[12] As per our study, the mean age of the subjects was 54.22+/- 6.89 years. There were 60 males and 40 females with tuberculosis. Majority of them belonged to rural areas. In the subjects, pleural effusion was present amongst 7 cases and 5 controls, making no significant difference between the two. Nodular picture was only observed amongst 3 cases, making no significant difference between the two. There were 5 cases of tracheal displacement and it was seen amongst only 1 control. On applying student t test there was no significant difference between two as the p value was greater than 0.05. There were 16 cases of lymphadenopathy amongst cases and 2 cases amongst controls. There was a significant difference amongst the two. Air space opacification was seen amongst 65 cases and 17 controls. There was a significant difference amongst the two. Imaging results in the subjects with sequelae of tuberculosis include bronchovascular distortion, bronchiectasis, emphysema, fibro- parenchymal lesions and fibro-atelectatic bands that indicate prior infection along with scarring.[13] Amongst 5-10% subjects of primary tuberculosis, the infection is normally progressive and dissemination occurs by hematogenous route; this is classified as progressive primary tuberculosis, manifestations of these are similar to pulmonary tuberculosis.[13] A comparison of the previous radiographs or CT results is very important. If chest xray suggests tuberculosis sequelae and there is presence of no new lesions when compared with previous images, then no imaging is indicated further unless some intervention is planned.

CONCLUSION

From the present study it can be concluded that lymphadenopathy and air space opacification are the most commonly seen chest Xray characteristics of subjects with tuberculosis. Tuberculosis is a grave problem, diagnosis of the condition with imaging modalities is quick and therefore can aid in early disease detection.

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