CHEST RADIOGRAPH FINDINGS OF SMEAR POSITIVE AND NEGATIVE PATIENTS WITH PULMONARY TUBERCULOSIS

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ABSTRACT

OBJECTIVE: In this study chest radiograph findings of pulmonary tuberculosis were compared in two groups of smear positive and smear negative patients

MATERIAL AND METHODS: In this retrospective descriptive analytical study 240 patients who were having confirmed pulmonary tuberculosis in OPD of Lady Reading Hospital, Peshawar. Out of these 240, 64 patients had smear positive Pulmonary Tuberculosis. Among smear negative patients 64 were selected under similar demographic conditions in which positive smear patients were seen. All of these were subjected to chest radiographs, reported by two radiologists. Patients sputa were examined by an expert laboratory technician of Lady Reading Hospital. The obtained data were compared.

RESULTS: The relative frequency of other radiographic findings in smear positive patients were more than negative smear patients except reticulonodular pattern.

CONCLUSION: Depending on the outcome of this study, though radiographic findings are not diagnostic in Pulmonary Tuberculosis. These findings are helpful if the assessment is correlated with clinical manifestation and sputum smear

KEY WORDS: Pulmonary Tuberculosis, Smear Negative, Smear Positive, Chest Radiograph

INTRODUCTION

Tuberculosis is chronic infection caused by bacteria (Mycobacterium tuberculosis) that most often affect the lungs. Tuberculosis is curable and preventable. This disease caused more than 30% of all deaths in the 18th and 19th centuries. About one third of the world population has been infected by Tuberculosis bacteria but are not (yet) ill with the disease and cannot transmit the disease. Tuberculosis is second only to HIV/AIDS as the greatest killer worldwide due to single infectious agent. It causes 09 million new cases and two million deaths annually[1-3]. It is expected that over one billion world population will be infected by Tuberculosis by 2020. Besides this one million deaths will occur due to Tuberculosis. Now thirty million people are infected by Tuberculosis, almost 300 million people are contaminated and 90 million will be involved with Tuberculosis within the next ten years[1,4,5]. Currently Tuberculosis in association with Acquired Immune Deficiency Syndrome is dreaded public health problems in Asia, Africa and Latin America. Thus it was called an emergency by World Health Organization in 1995[6,7]. The single definitive method for diagnosis of Pulmonary Tuberculosis is sputum smear with Ziehl-Neelsen staining for three consecutive days[1,3]. Although smear negative Tuberculosis has significantly reduced. Still a good number of cases occur in this group.

In a study conducted in Iran in 1996, 11.25 per 100,000 smear positive and 6.62 per 100,000 smear negative and 2.72 per 100,000 Extrapulmonary Tuberculosis were seen in South Khurasan[9]. As each smear negative patient can contaminate two people each year, rapid diagnosis of Tuberculosis is as important as the smear positive patient. In smear negative and smear positive radiographic findings are helpful in disease diagnosis. Although some Chest X-rays findings include nodular or patchy infiltration in the posterior part of upper lobe or the anterior segment of inferior lobe in bilateral involvement associated with cavitation are not specific for Pulmonary Tuberculosis. Clinically manifestations and epidemiological findings are very specifically diagnostic[10,11].

Common radiologic findings in secondary Pulmonary Tuberculosis are bronchiectasis, consolidations, patches, cavity and miliary Tuberculosis[12,13].

MATERIALS AND METHODS

In this retrospective study 240 patients who had been confirmed with Pulmonary Tuberculosis were referred to Lady Reading Hospital Peshawar from January 2014 to December 2014. Out of 240 patients 164 with a positive smear based on WHO criteria were selected. IN addition among negative smear patients, 64 patients were selected as control group in whom similar demographic characteristics with positive smear

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patients were seen. All the patients underwent chest radiographs which were interpreted by two expert radiologists independently. In addition all patents sputa were examined by an expert technician. The obtained data were analyzed by means of frequency distribution table and descriptive statistics using SPSS version 20.

RESULTS

Out of 128 patients who were studied all of them belong to Khyber Pakhtunkhawa. 62% were female and 60% were from urban areas. The age distribution groups were 1-13, 14-55 and above 55 years respectively. The mean age in the female was 50 +/- 22 years. 49 +/- 22 years in the female 48 +/- 22 in the positive smear group and 51 +/- 21 in the negative smear group.

Based on the outcome of the study the most frequent radiographic manifestation in smear positive cases were calcification (56%), adenopathy (53%), bronchiectasis (40%), reticulonodular infiltration (36%) and patchy infiltration 30%.

Apical involvement, cavity, incomplete pulmonary destruction, pleural effusion, mediastinal lymphadenopathy and fibrosis were the next common findings. In smear negative patients calcification (27%), reticulonodular infiltration (41%), fibrosis (23%), adenopathy (21%) and patchy infiltration (14%) were the most common radiological findings. Apical involvement, bronchiectasis, pleural effusion, cavity, mediastinal widening were the next common findings. The frequency of patchy infiltration, calcification, mediastinal widening and hilar lymphadenopathy was higher in smear positive patients.

Although the frequency of pleural effusion, complete pulmonary destruction, miliary tuberculosis, fibrosis and apical involvement were common in smear positive and reticulonodular infiltration in smear negative one, but neither showed any significant statistical difference.

Thus, the frequency of calcification, pulmonary hilar lymphadenopathy, incomplete pulmonary destruction, cavity, mediastinal widening, bronchiectasis and patchy infiltration were more common in the smear positive group compared to smear negative group.

The frequency of pulmonary fibrosis, apical infiltration, pleural effusion, complete pulmonary destruction and miliary tuberculosis were higher but not statistically significant. In contrast, reticulonodular infiltration was seen more commonly in smear negative group rather than in smear positive group with no significant statistical difference.

DISCUSSION

Despite great advances in prevention and treatment, Pulmonary Tuberculosis remains an important health problem in third world and developing countries. Proper diagnosis and follow up of the patient is welcome[14]. Thus in this study the patients who had smear positive and smear negative Pulmonary Tuberculosis in terms of radiological findings were compared.

In the study performed by Rathman et Al, of 1389 patients suspicions of Tuberculosis, 34% were smear positive and 66% were smear negative. Radiographic findings were assessed in two groups. Cavity was noted in smear positive cases more than smear negative.

In the study conducted by Van Cleeff et al smear negative and smear positive tuberculosis patients were followed up for ten years and the chest radiographic changes raised from 01% to 10% in smear negative cases. Generally reticulonodular infiltration, cavity and pleural effusion were more frequent in smear negative than smear positive patients. Patchy infiltration, calcification, lymphadenopathy and bronchiectasis were more frequent in smear positive compared to smear negative group[16].

In the study conducted by Azadeh Ebrahimzadeh et al calcification, hilar adenopathy and incomplete destruction and bronchiectasis were more common in smear positive patients. Whilst reticulonodular infiltration were more common in smear negative[25].

The study carried out by Miller et al pulmonary findings seen in smear positive patients were patchy infiltration, cavitation and calcification[17]. The study conducted by Gatner et al lesion compatible with smear negative Pulmonary Tuberculosis, hilar lymphadenopathy, diffuse reticulonodular infiltration and pleural effusion were more common[18].

In our study similar to other studies, some pulmonary radiological findings were seen more frequently with a statistically significant difference between smear positive and smear negative patients such as patchy infiltration, calcification and adenopathy in smear positive and reticulonodular in smear negative one. This should be kept in mind, hence according to the study performed by Jones et al in Jail, 20% of the patients with smear negative Pulmonary Tuberculosis might have been missed when radiographic changes were neglected[19]. In another study on 518 Pulmonary Tuberculosis patients, 14% of smear negative patients had typical pulmonary findings compatible with Pulmonary Tuberculosis[20].

The study performed by Rajeb Zadeh et al on tuberculosis patients who were older than 50 years segmental infiltration was seen in 40% of the patients and unilateral lung infiltration was the most common findings which were followed by apical involvement, pleural effusion and adenopathy[22].

The study conducted by Bakhshayesh Karam et al on 100 smear positive tuberculosis patients, the most common pulmonary involvements were reticulonodular infiltration, cavity, pleural thickening, adenopathy and fibrosis[23]. In another study on smear positive patients

infiltration with or without cavity in the upper pulmonary segment hilar lymphadenopathy and pleural effusion were the most common manifestations[24].

The study performed by Cohen et al, 12 out of 50 Pulmonary Tuberculosis patients coincided with malignancy. Therefore a higher frequency of adenopathy and cavity were noted[24].

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