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ORIGINAL ARTICLE

Assessment of Radiologic Manifestation of Pulmonary Tuberculosis in paediatric patients: Retrospective study

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ABSTRACT:

Background: Tuberculosis (TB) is a major cause of disease, both pulmonary and extrapulmonary, and death in children from TB-endemic areas. Hence; we planned the present study to assess the radiological manifestations of pulmonary tuberculosis in paediatric patients. **Materials & methods:** Data records of a total of 50 paediatric patients were included in the present study. Data records of only those patient was analysed in which diagnosis of tuberculosis was confirmed by clinical, bacteriologic and radiologic features as well as tuberculin skin test. Radiographs and computed tomography scans were evaluated. All the data from the record files of the patients was extracted. Data records before the starting of the anti-tubercular therapy were analysed. **Results:** Unilateral nodular infiltration was seen in 28 percent of the patients. Bilateral nodular infiltration was present in 4 patients. Patchy consolidation was present in 24 percent of the patients. Calcified nodule was present in 6 percent of the patients. Fibrotic scar, cavity and hilar lymph node were present in 8, 16 and 76 percent of the patients. **Conclusion:** Radiographic imaging is valuable diagnostic tools for tuberculosis patients.

Key words: Paediatric, Pulmonary tuberculosis, Radiological.

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INTRODUCTION

Tuberculosis (TB) is a major cause of disease, both pulmonary and extrapulmonary, and death in children from TB-endemic areas, but is also seen in nonendemic areas because of increased international travel, population migration, and refugee resettlement.Understanding the natural history of TB is fundamental to appreciate the variable vulnerability and the diverse spectrum of disease observed in children.[1- 3] Meticulous disease descriptions from the prechemotherapy literature provide unique insight into events following primary *Mycobacterium tuberculosis* infection, summarized as the so-called "timetable of childhood TB.[4, 5]

Infants and young children are more likely than older children and adults to develop life-threatening forms of TB disease (i.e., disseminated TB and TB meningitis), and because of their age, pediatric TB acts as a surrogate for identifying recent transmission. The greatest number of TB cases is seen in children less than 5 years of age and adolescents older than 10 years of age.[6-8]Mycobacterium tuberculosis is spread through aerosolized particles by subjects with pulmonary TB during expiratory efforts, such as coughing, sneezing, speaking, or singing. Apart from conditions where drainage is present, extrapulmonary TB is not transmitted.[8- 10]Hence; we planned the present study to assess the radiological manifestations of pulmonary tuberculosis in paediatric patients.

MATERIALS & METHODS

The present study was conducted in the department of radio-diagnosis of the medical institute and it included retrospective assessment of radiologic Manifestation of Pulmonary Tuberculosis in paediatric patients. Ethical approval was obtained from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. Data records of a total of 50 paediatric patients were included in the present study. Inclusion criteria for the present study included:

- Paediatric patients between the age group of 1 year to 14 years,
- Patients with negative history of any other systemic illness,
- Patients in which complete data records was available

Data records of only those patient was analysed in which diagnosis of tuberculosis was confirmed by clinical, bacteriologic and radiologic features as well as tuberculin skin test. Radiographs and computed tomography scans were evaluated. All the data from the record files of the patients was extracted. Data records before the starting of the anti-tubercular therapy were analysed. All the results were summarized in Microsoft excel sheet and were assessed by SPSS software.

RESULTS

Data records of a total of 50 paediatric patients were analysed in the present study. Mean age of the patients of the present study was 11.5 years. There were 20 percent of the patients between the age group of 5 to 10 years. 42 percent of the patients were between the age group of more than 10 years. There were 22 males and 28 females

in the present study.Radiographic manifestations are shown in Table 3. Unilateral nodular infiltration was seen in 28 percent of the patients. Bilateral nodular infiltration was present in 4 patients. Patchy consolidation was present in 24 percent of the patients. Calcified nodule was present in 6 percent of the patients. Fibrotic scar, cavity and hilar lymph node were present in 8, 16 and 76 percent of the patients.Clinical manifestations are shown in Table 4. Cough was present in 80 percent of the patients. Fever and haemoptysis were found to be present in 16 and 6 percent of the patients. Weight loss and dyspnea were present in 10 percent and 8 percent of the patients.

Table 1: Age-wise distribution of patients

Age group (years)	Number of patients	Percentage
Less than 5	10	20
5 to 10	19	38
More than 10	21	42

Table 2: Gender-wise distribution of patients

Gender	Number of patients	Percentage
Males	22	44
Females	28	56

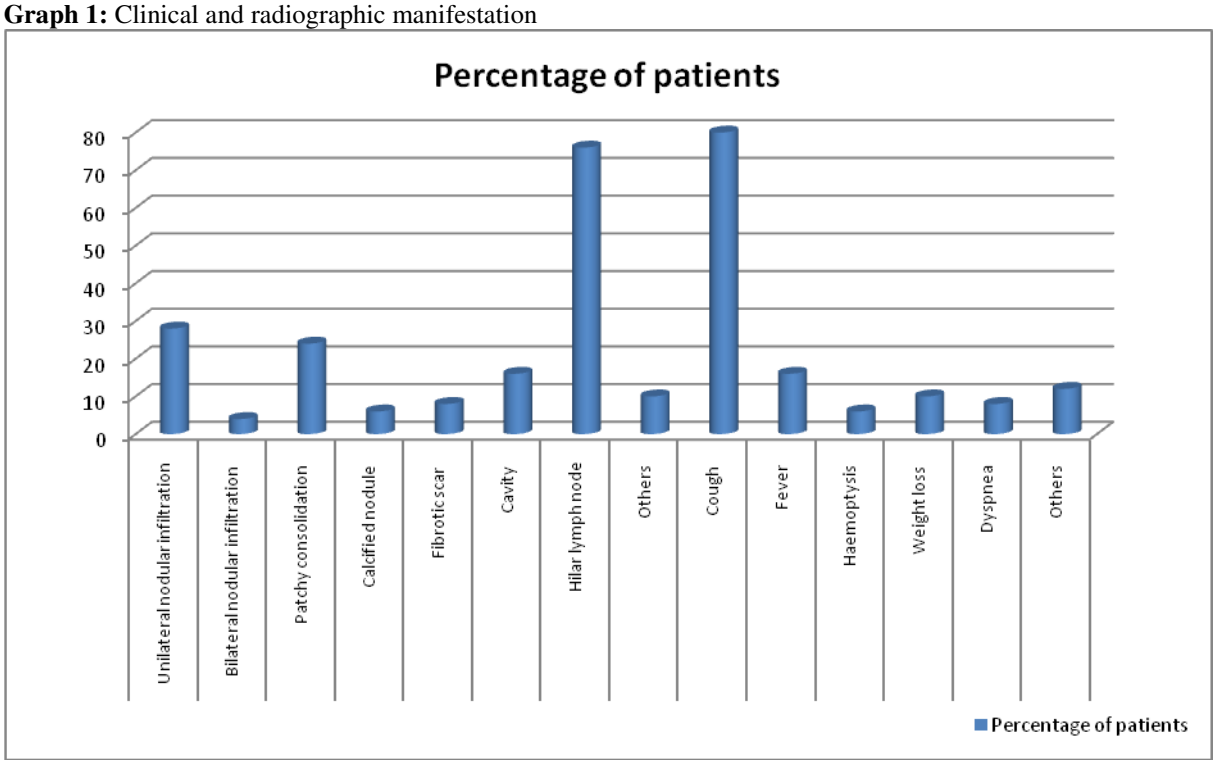
Table 3: Radiographic manifestation

Radiographic manifestation	Number of patients	Percentage of patients
Unilateral nodular infiltration	14	28
Bilateral nodular infiltration	2	4
Patchy consolidation	12	24
Calcified nodule	3	6
Fibrotic scar	4	8
Cavity	8	16
Hilar lymph node	38	76
Others	5	10

Table 4: Clinical manifestation

Clinical manifestation	Number of patients	Percentage of patients
Cough	40	80
Fever	8	16
Haemoptysis	3	6
Weight loss	5	10
Dyspnea	4	8
Others	6	12

Graph 1: Clinical and radiographic manifestation



DISCUSSION

In the present study, total of 50 paediatric patients were analysed. Mean age of the patients of the present study was 11.5 years. There were 20 percent of the patients between the age group of 5 to 10 years. 42 percent of the patients were between the age group of more than 10 years. Boloursaz MR et al analysed 70 children (43 (61%) female and 27 (38.5%) male) aged between 5 months to 15 years old during a five year period (from 2001-2006) in pediatric ward. It was performed on children who were confirmed to have TB by various clinical, bacteriologic and radiologic features and tuberculin skin test. We studied the radiologic features of pulmonary TB in these children. Right lung involvement was observed in 65%, left lung 23% and bilateral involvement was detected in 12%. Also middle and superior lobes were the most common lobes affected. The commonest radiographic feature was hilar (mediastinal) lymphadenopathy; 70% detected on chest x-ray (CXR) and 85% on CT scan. Lymph nodes on right side were affected more; 25% were calcified. Also nodular infiltration of lung parenchyma was observed in 35% of CXRS and 61% of CT scans. This was followed by patchy consolidation detected in 25% and 35% of CXRs and CT scans respectively. We also observed that children <3 yr. of age had the highest lymph node involvement but the least parenchymal lesions as compared to older children. It was concluded that primary TB is the most common form of pulmonary TB in children. This could be in the form of hilar lymphadenopathy with or without lung parenchymal involvement.[10]

There were 22 males and 28 females in the present study. Radiographic manifestations are shown in Table 3. Unilateral nodular infiltration was seen in 28 percent of the patients. Bilateral nodular infiltration was present in 4 patients. Patchy consolidation was present in 24 percent of the patients. Calcified nodule was present in 6 percent of the patients. Fibrotic scar, cavity and hilar lymph node were present in 8, 16 and 76 percent of the patients. Leung AN et al reviewed the radiologic features of primary tuberculosis in childhood and to determine whether differences in patterns of disease occur among age and ethnic groups. Chest radiographs of 191 children with pediatric primary tuberculosis were reviewed by two observers. Lymphadenopathy, present in 92% of cases, was the most common abnormality identified on the initial chest radiograph and typically involved the hilar and paratracheal regions. Parenchymal abnormalities, identified in 70% of cases, occurred more commonly in the right lung (P less than .001). Children 0-3 years of age had a higher prevalence of lymphadenopathy (P less than .01) and a lower prevalence of parenchymal abnormalities (P less than .001) than older children. A lower prevalence of lymphadenopathy was found in whites than in nonwhites (P less than .02). The radiologic abnormalities often progressed in the initial follow-up. Lymphadenopathy, with or without concomitant parenchymal abnormality, is the radiologic hallmark of primary tuberculosis in childhood. However, distinct age-related and racial differences in presenting patterns of disease exist and should be recognized.[11]

Clinical manifestations are shown in Table 4. Cough was present in 80 percent of the patients. Fever and haemoptysis were found to be present in 16 and 6 percent of the patients. Weight loss and dyspnea were present in 10 percent and 8 percent of the patients. Veedu PT et al compared the manifestations of chest tuberculosis (TB) in pediatric and adult patients based on contrast enhanced computed tomography of chest. This was a retrospective study consisting of 152 patients of chest TB including 48 children and 104 adults who had undergone contrast enhanced computed tomography of chest prior to treatment. The patterns and severity of parenchymal, mediastinal and pleural manifestations were analyzed and compared among different age groups. Parenchymal changes observed include consolidation, air space nodules, miliary TB, cavitation, bronchiectasis and fibrosis and these were noted in 60% of children, 71% of adolescents and 76.9% of adults. These changes were more common in right upper lobe in all age groups. There was no significant difference in the frequency of these changes (except nodules) in different age groups. Centrilobular nodules were seen less commonly in children less than 10 years (P = 0.028). Pleural effusion was noted in 28 (18.42%) patients and pericardial effusion in 8 (5.3%) patients. No significant difference in the serosal involvement is seen among children and adults. Mediastinal adenopathy was seen 70% of children, 76.3% adolescents and 76.9% of adults and paratracheal nodes were seen most frequently. Nodes had similar features (except matting) among all age groups. Matting of nodes was seen more commonly in children (P = 0.014). Pediatric chest tuberculosis can have severe parenchymal lesions and nodal involvement similar to adults.[12]

CONCLUSION

Under the light of above obtained data, the authors conclude that radiographic imaging is valuable diagnostic tools for tuberculosis patients. However; further studies are recommended.

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