TUBERCULOSIS RATHER THAN INTERSTITIAL LUNG DISEASE, THE COMMONEST RADIOLOGICAL FINDING ON HIGH RESOLUTION COMPUTED TOMOGRAPHY IN A LOCAL COMMUNITY

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ABSTRACT

Objective: To determine the common radiological findings and diagnosis on High Resolution CT in our community.

Methodology: This retrospective observational study was carried out in Department of Radiology, Hayatabad Medical Complex, Peshawar from 1st January 2014 to 31st December 2014. 101 consecutive cases of HRCT done in the specified period were retrospectively analyzed. Standardized proforma was designed for data collection. All patients who were referred by clinicians for HRCT to radiology department were included in the study. HRCT was done using standard protocols of 2mm thickness, non contrast pulmonary window.

Results: Commonest radiological findings were consolidation (54.4%) and bronchiectasis (35.1%). Cavitation was seen in 29.8% and fibrosis in 26.3% of cases. Commonest radiological diagnosis based on these findings was chronic inflammatory lung disease-tuberculosis (56.4%). Second common diagnosis was infective pneumonia (19.8%) and interstitial lung disease was seen in 7.9% of cases.

Conclusion: Although HRCT is the modality of choice for interstitial lung disease, but radiological manifestations of tuberculosis and its sequelae was found the most common radiological diagnosis in our study due to high prevalence of disease in the community.

Key Words: HRCT; ILD; Tuberculosis

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INTRODUCTION

High resolution computed tomography (HRCT) imaging of the lungs provides detailed visualization of lung parenchyma and is being used to evaluate interstitial lung disease.[1-5] To fully appreciate the HRCT findings, one should understand the anatomy of secondary pulmonary lobule and the pathophysiology of pulmonary diseases.[6]

Tuberculosis (TB), an airborne infectious disease caused by Mycobacterium tuberculosis is a major cause of morbidity and mortality, particularly in developing countries. In 2015, there were about 10.4 million new TB cases world wide, and Pakistan is fifth in countries with the highest number of new cases.[7]

Computed tomography is more sensitive than chest radiography in the detection and characterization of radiological manifestation of tuberculosis, both subtle localized or disseminated parenchymal disease and associated mediastinal lymphadenopathy. CT with contrast and high-resolution CT are especially helpful in the detection of small focal cavitation in areas of confluent pneumonia and in areas of dense nodules and scarring.[8] In addition to the diagnosis of TB, high-resolution CT is useful in determining disease activity and its quantification.[9]

METHODOLOGY

This retrospective observational study was carried out in Department of Radiology, Hayatabad Medical Complex, Peshawar from 1st January 2014 to 31st December 2014. 101 consecutive cases of HRCT done in the specified period were retrospectively analyzed. Standardized proforma was designed for data collection. All patients who were referred by clinicians for HRCT to radiology department were included in the study. HRCT was done using standard protocols of 2 mm thickness, non contrast, and pulmonary window. Reporting was done by one senior consultant radiologist. Radiological findings and diagnoses were analyzed using latest SPSS version.

RESULTS

Out of 101 cases, 32 patients were male and 69 were females. Age range was 9 to 85 years with a mean age of 54.5 years (Table 1) {Figure 1,2}. Commonest radiological findings were consolidation in 54.4% and bronchiectasis in 35.1% of cases (Figure 3). Commonest radiological diagnosis based on these findings was tuberculosis (56.4%) (Figure 4).

For those patients in whom the radiological findings suggested TB, the commonest HRCT findings were consolidation in a typical distribution was 54.4% followed by bronchiectasis 35.1% cases and cavitation in 29.8% cases (Figure 5, 6).

Table 1: Data of patients

Variable	N=101
Sex	
Male	32
Female	69
Age range (years)	9-85
Mean age (years)	54.5
Total patients with findings of TB	**57**
Male	20
Female	37

Figure 1: Patient gender in all cases

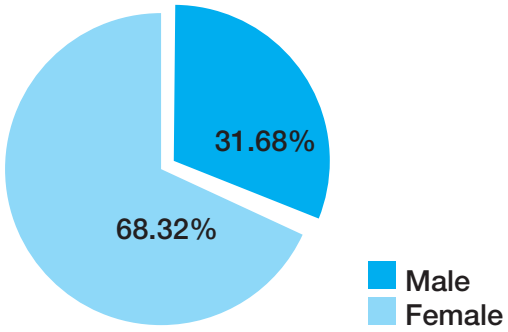


Table 2: Diagnosis of TB

	Frequency	Percent
Yes	57	56.4
No	44	43.6
Total	101	100.0

Figure 2: Gender of patients diagnosed as TB

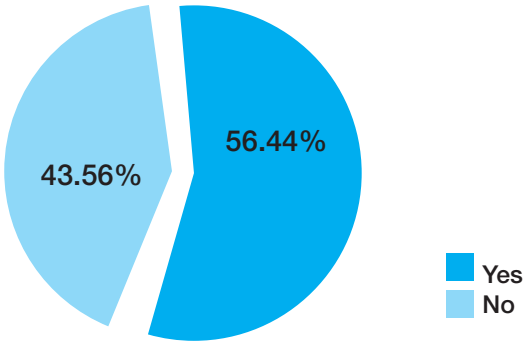


Figure 3: Radiological findings in all HRCT cases (including tuberculous and non tuberculous)

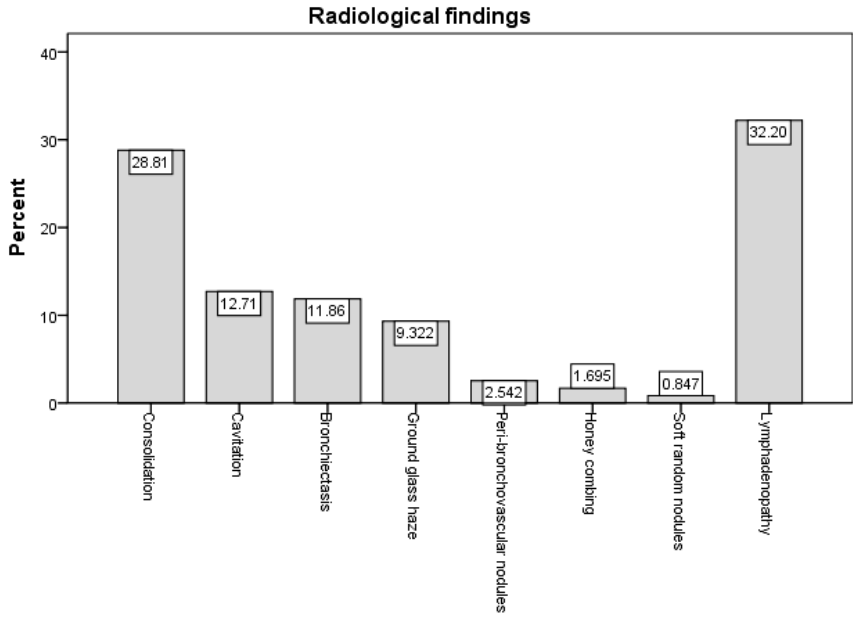


Figure 4:

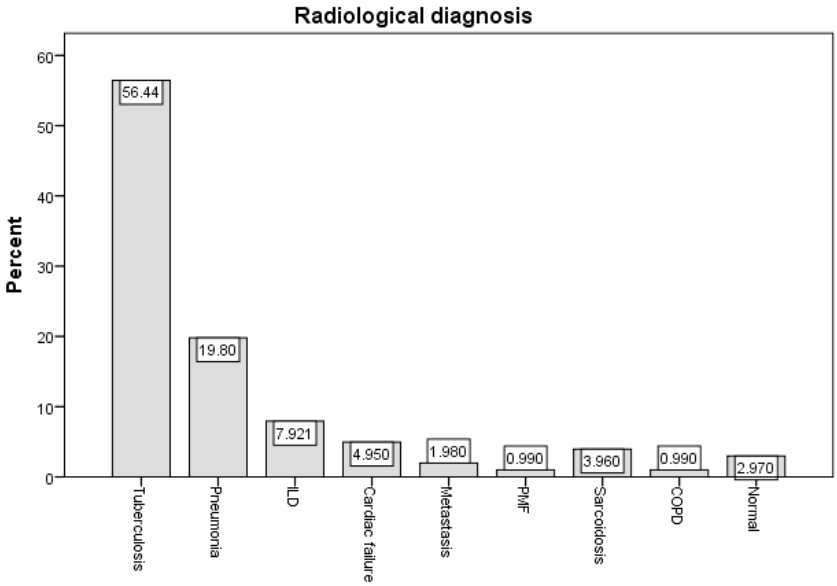


Figure 5: Common Patterns of TB

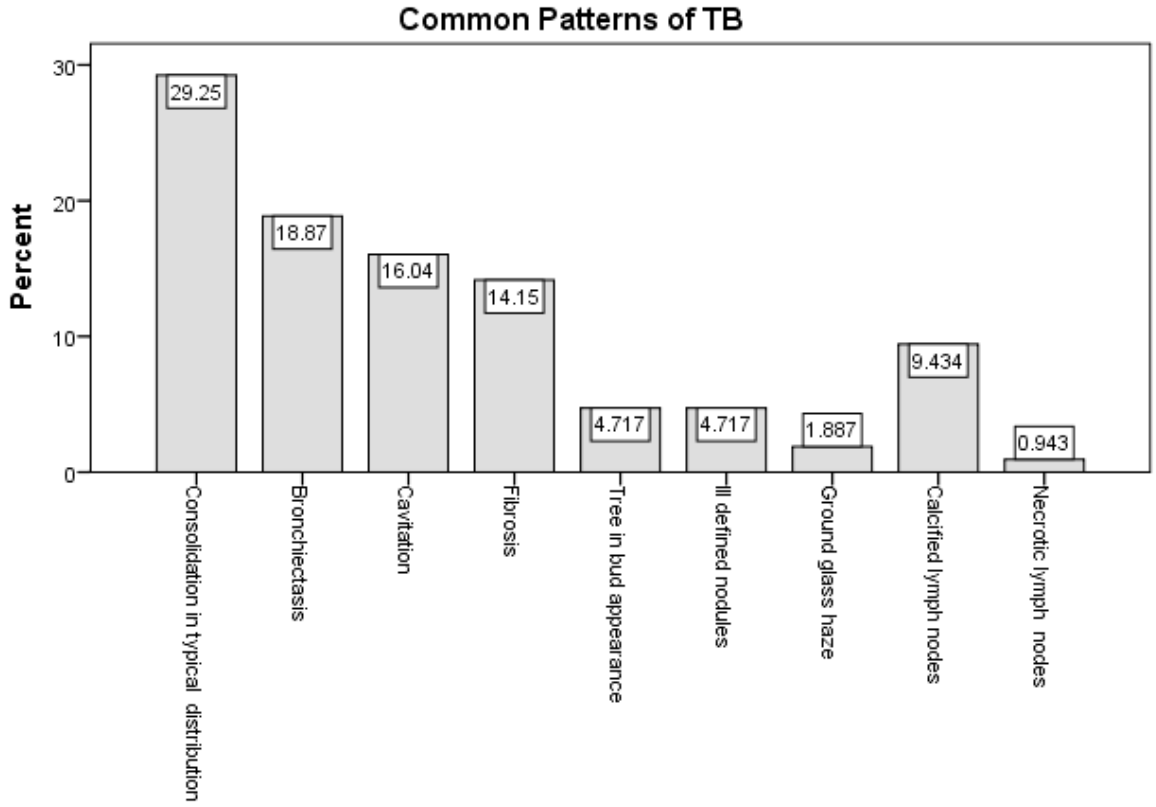
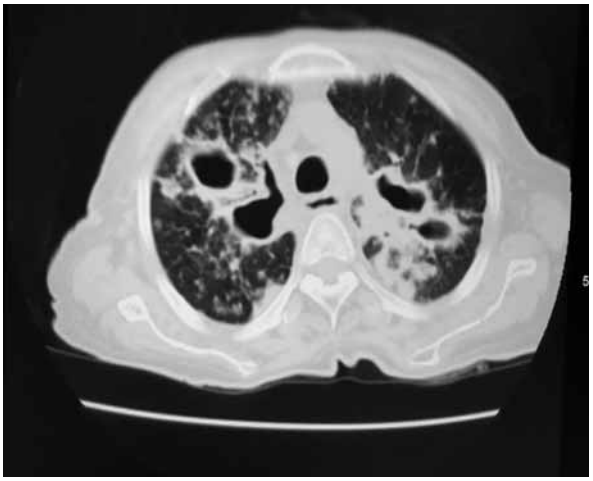


Figure 6: Axial section of HRCT showing cavities and ill defined nodules in upper lobes



DISCUSSION

Pulmonary tuberculosis (TB) is a common worldwide infection and a medical and social problem causing high mortality and morbidity, especially in developing countries.[10] About one-third of world's population is infected with this disease[11] and Pakistan is fifth amongst 22 countries with highest burden of TB.[12]

Chest radiography remains the mainstay initial

imaging modality,[13] however normal radiographic findings may be seen in up to 15% of patients with proved tuberculosis. The radiographic diagnosis of TB is initially correct in only 49% of all cases, 34% for the diagnosis of primary TB and 59% for the diagnosis of reactivation TB.[14] With CT, the diagnosis of pulmonary TB is correct in 91% of patients and TB is correctly excluded in 76% of patients.[15]

In addition to the diagnosis of TB, high-resolution CT is useful in determining disease activity. If there is airway disease especially endobronchial spread, tree in bud opacities may develop.[16] This pattern resembles branching tree with buds at tips of the branches representing active disease. In our study tree in bud appearance was appreciated in five cases (8.7%).

The technique of HRCT involves the use of thin-section (up to 2-mm slice thickness) collimation scans with a high spatial frequency algorithm that sharpens the resolution of thin linear structures, to detect and characterize diseases that affect the pulmonary parenchyma and small airways.[17]

In Primary Tuberculosis Airspace consolidation is usually unilateral. It shows no predilection for any particular lung zone. On CT, the parenchymal consolidation in primary TB is most commonly dense and homogeneous but may also be patchy, linear, nodular, or mass-like. Lymphadenopathy is typically unilateral but it may be bilateral in one third cases and presence of central necrosis indicates active disease.[18-21]

The most common radiographic manifestation of reactivation pulmonary TB is focal or patchy heterogeneous consolidation involving the apical and posterior segments of the upper lobes and the superior segments of the lower lobes.[22] Another common finding is the presence of poorly defined nodules and linear opacities, which are seen in approximately 25% of patients. Cavitation, the hallmark of reactivation TB and a sign of active disease, affects about 20–45% of patients.[23] Cavitation usually heals as a linear or fibrotic lesion. For milliary tuberculosis the classic radiographic finding is of evenly distributed diffuse small 2–3-mm nodules, showing slight lower lobe predominance. High-resolution CT is more sensitive than conventional radiography and demonstrates nodules earlier than they become radiographically apparent, with nodules seen in a random distribution.[24]

In our study patterns suggestive of tuberculosis were seen in 57 (56.4%) patients and the most common finding was consolidation of upper lobe and/ or apical segment of lower lobe (54.4%) followed by bronchiectasis in 35.1% cases. Cavitation was seen in 29.8% fibrosis in 26.3%, ill defined nodules and tree in bud appearance in 8.9% each. Calcified lymph nodes were appreciated in 17.5% cases.

CONCLUSION

Our data supports the fact that HRCT is a valuable imaging modality in diagnosis of both primary and secondary pulmonary tuberculosis and its sequelae. In addition the above series of data proves that the most common radiological finding on HRCT was of pulmonary tuberculosis and its manifestations rather than interstitial lung disease which reflected its prevalence in the local community.

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