The Role of X-Ray Chest in Diagnosis of Pulmonary Tuberculosis in Teaching Hospital

Vikram[1], Saitejas M[2*]

**[1]Senior Resident, Department of Radiodiagnosis,
Vishwa Bharathi Medical College, Kurnool, Andhra Pradesh, India.
[2]Senior Resident, Department of Radiodiagnosis,
Bhaskar Medical College, Hyderabad, Telangana, India.**

ABSTRACT

Background: Pulmonary Tuberculosis is caused by Mycobacterium, Tuberculosis. Even though main stay of diagnosis is by sputum examination, chest radiograph plays major role in diagnosis. Tuberculosis is a major public health problem in developing countries. In 2006, globally, there were an estimated 9.2 million cases. Majority of these cases (55%) were in Asia and sub-Saharan Africa (31%). In 2019 an estimated 10 million people were affected worldwide. And a total of 1.4 million people died of TB in 2019 Worldwide. The leading countries are India, China, Indonesia, Pakistan, Nigeria and South Africa. In India total number of cases in 2019 were 2.64 millions and total deaths due to tuberculosis were 4,36,000.

Aim of the study: To know the role of (radiograph) X-ray chest in diagnosing pulmonary tuberculosis and its importance.

Materials and Methods: This study has been conducted in Bhaskar Medical College, in the department of radiology in Collaboration with pulmonology department for 1 year from March 2020 to February 2021. We have included 250 Cases in this study out of these 250, males were 138 in number and females were 112in number. The age group is between 20 to 60 years.24% cases are involved bilaterally.

Conclusion: Pulmonary tuberculosis is a major public health problem in India and Worldwide also. Drug resistance cases are also increasing. So early diagnosis with X-ray chest helps in healing the cases and drug resistance cases can also be reduced.

Key words: Pulmonary Tuberculosis, Cavity, Mycobacterium, X-Ray Chest, Sputum Examination.

*Correspondence to:

Dr. Saitejas M,
Senior Resident,
Department of Radiodiagnosis,
Bhaskar Medical College,
Hyderabad, Telangana, India.

INTRODUCTION

Tuberculosis is caused by mycobacterium tuberculosis bacilli. It affects mainly in lungs and bones, joints, CNS and gastrointestinal system and other organs in the body. Pulmonary tuberculosis is a major public health problem worldwide. In 2019, nearly 10 million people are affected. In India nearly 2.6 million people are affected. And 4,36,000 patients died in 2019.[1]

The history of TB is at least as old as the mankind over the years not only the medical implications but also the social and economic impact of TB has been enormous. In 1882 Robert Koch announced the discovery of tuberculous bacillus. And with the advent of Wilhelm Conrad Roentgen, the technique of radiological imaging available.[2] Tuberculosis infection has been classified into primary TB; progressive primary TB; and post primary TB. Different lesions in Tuberculosis are seen, Ghons focus which includes lymphadenitis, nodular lesions and Fibro caseous with cavity and without cavity. The infiltrative lesions known as Assmenns Foci.[3]

The most important diagnostic methods are sputum examination by Ziehl-Neelson Technique, X-ray chest, and other tests includes Nitric acid, probes, polymerase chain reaction. In a patient suspected to have pulmonary TB, posterio anterior view of the chest in first imaging modality and is mostly adequate for diagnosis and subsequent follow up of such patients. Apicogram of chest in needed if lesion is partially obscured by medial end of the clavicle and the nearby ribs in a PA view of the chest.[4] Primary Tuberculosis accounts for 23% to 34% of all adult cases of TB. A positive tuberculosis skin test and an abnormal chest radiograph are the only clues to the diagnosis in this group. Radiographic features in primary pulmonary tuberculosis are parenchymal consolidation, tuberculoma, miliary TB, pleural effusion.

MATERIALS AND METHODS

We have conducted this study in Bhaskar Medical College from March 2020 to February 2021 in the Radiology Department. We have included 250 patients, newly diagnosed cases only. Out of these 250, Males were 138, and Female patients were 122. After taking careful History we have excluded Old TB patients and patients who are on anti-tuberculosis drugs. We have excluded pregnant women also because of radiation Hazards. We have examined all the patients in detail, and we have advised the following investigations, CBP, RBS, Blood urea, Sputum for culture sensitivity and X-ray Chest PA regular follow up with pulmonology department, regarding sputum examination and for follow up. We have collected the data systemically and computerized by using MS office.
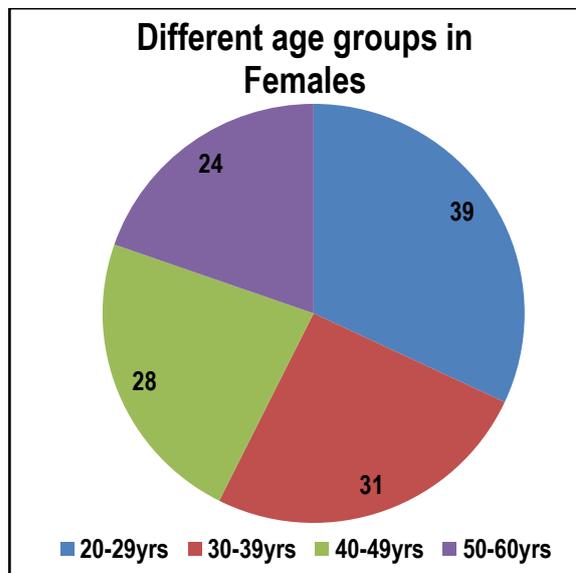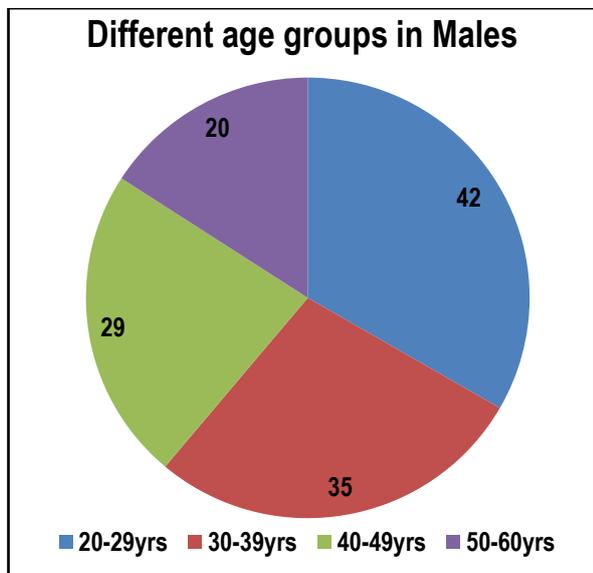
Different age groups in Males

Different age groups in Females

Table 1: Different Age Groups

S.No.	Age in years	No. of patients (M) 138	No. of patients (F) 122
1.	20-29 years	42 (30-43%)	39 (31.95%)
2.	30-39 years	35 (25.36%)	31 (25.4%)
3.	40-49 years	29 (21.01%)	28 (22.95%)
4.	50-60 years	20 (14.5%)	24 (19.6%)

Table 2: Clinical Features

S.No.	Symptoms	No. of patients (M) 138	No. of patients (F) 122
1.	Cough	130 (94.2%)	118 (92.3%)
2.	Fever	125 (89.5%)	114 (91.9%)
3.	Shortness of Breath	96 (70.2%)	91 (76.4%)
4.	Loss of Weight and others	93 (69.2%)	88 (72.8%)

Table 3: Different X-Ray findings

S.No.	Findings on X-ray	No. of patients (M) 138	No. of patients (F) 122
1.	Infiltrative	51 (39.8%)	41 (33.6%)
2.	Cavitory lesions	58 (44.6%)	53 (43.4%)
3.	Fibro cavitory lesions	82 (59.42%)	78 (63.9%)
4.	Consolidation	11 (7.9%)	8 (6.3%)
5.	Pleural affusion	10 (7.5%)	7 (6.1%)
6.	Normal	6 (4.38%)	5 (5.2%)

RESULTS AND DISCUSSION

Tuberculosis screening is the process of system identification for apparently healthy people with suspected active TB by history taking, clinical examination, and investigations like sputum examination and chest radiograph. The common symptoms includes in tuberculosis are cough, fever, fatigue, shortness of breath, heamoptysis, loss of weight. In our study we have included 250 patients, out of these 250, 138 are male patients 62% and 122 are female patients 38%. The age group involved in between 20 years and 60 years. The common age group is between 20 to 40 years. The study conducted by Al Ubaidi BA shows almost same results.[5] Among clinical features cough is seen in more than 92% patients, Fever in 87.5% patients loss of weight 85%. These findings are correlating with the studies conducted by Corbett E. Golubj et al.[6]

Computed tomography is superior to chest radiography in demonstrating parenchymal lesions. In our study we noticed different radiological features like, Infiltrative lesions, Fibrocavitory

Lesions, consolidation and pleural effusion. Infiltrative lesions usually affects right upper lobe. In males it is 39.8% and in females 33.6% among cavitory lesions. Singe large size cavity and small multiple cavities are noted. Multiple cavities are common (54-76%) than single cavity. The cavitary disease usually involves apical and/or posterior segments of upper lobes in 83 to 85% and superior segments of lower lobes in 11 to 14%. The study conducted by Choyke et al shows that 77% are having multiple cavities.[7]

In patients with dense fibrosis consolidation or architectural distortion, cavity may not be visible on chest radiograph. Endobrachial spread is seen in chest radiograph in 9 to 24%, in our study it is seen 2.4%. Patients and it appears as Tree in bud appearance. Pleural effusion is noted in 7.5% cases and 5% patients had normal chest radiography. Miliary tuberculosis was noted in 2 cases in males, 2 cases in females and lung abscess in 2 cases. In case of miliary tuberculosis HRCT plays important role in the diagnosis. In more than 15% patients the lesions are bilateral.

Pulmonary tuberculosis is a Global Health Problem. Every year nearly 10 million people will be affected worldwide. More than 90% cases are from Asian and African Countries Only. In India 4 million people affects every year. Main stay of diagnosis is by sputum examination and chest radiography. Radiologically, the lesions of pulmonary tuberculosis divided into 2 types (1) Primary TB (2) Post Primary TB. Radiographic features of primary TB are parenchymal consolidation, tuberculoma, miliary, tuberculosis, pleural effusion and lymphadenopathy – And the features of post primary TB are, Tuberculoma, Cavitation, Fibrosis, plural effusion.[8] Typical exudative lesions on a chest radiography may remain active even on adequate therapy and the patients may still be sputum negative. A typical fibrocavitory lesion may look but show active granulomatous inflammation and contains viable bacilli, pneumonic consolidation may manifest as homogeneous dense opacity or opacification mostly in the middle and lower lobes. Inactive findings on X-ray chest are, fibrosis, persistent calcification (Ghon's Focus) and tuberculoma (persistent mass like opacities.)

The lesions of active post primary tuberculosis are ill defined patchy consolidation with cavitary lesion or fibro proliferative disease involves posterior segment of upper lobe, or superior segment of lower lobes.[9] The end sequele of secondary TB are either fibrocalcific scar, fibronodular scar with lobar collapse, tracheal bronchiectasis, pleural thickening and pleural calcification.[10] Active pulmonary TB features on chest radiography are lobar pneumonia hilar lymphadenopathy. Ghon's Complex, pleural effusion, cavitary lesion inactive lesion are hilar calcification, scar fibrosis.

CONCLUSION
Early diagnosis and early treatment of tuberculosis may prevent the complications. Diagnosis of Tuberculosis by X-ray chest can be used as screening program. Clinicians should be trained for early diagnosis of active TB should be able to differentiate active and inactive radiological signs. Tuberculosis algorithms should be simplified and updates regularly.

REFERENCES
1. World Health Organization world health report 2020; changing history, Geneva, World Health Organization, 2020.
2. Tuberculosis, 2nd Edi by K. Sharma, 2009; Chap:1. PP: 1-16.
3. Moose EH. Mycobacterium infection in the lungs. Radiological diagnosis. Radiology 1993; 187: 777-82.
4. Schluger. Rom WN. Current approaches to the diagnosis of native pulmonary tuberculosis. Am J. Respi. Care Med. 1994; 144:264-7.
5. Al Ubaidi-BA. Tuberculosis screening among expatriate in Bahrain Institute J. Med. Intern. 2015; 3: 282-88.
6. Corbett E. Golu. J et al. Systemic Screening for active tuberculosis definitions and critical considerations. Intern. J. Tuberc Lung Dis.2013; 17: 289-98.
7. Choke PL Curtis AH, Ravince et al. Adult on set pulmonary tuberculosis radiology 1983; 148: 357 – 62.
8. Crofton J, Millar F, Clinical tuberculosis. New Delhi: CBS publishers and distributors; 1996. P.1-194.
9. Williams. CJ, BainG et al. Tuberculosis; a radiographic review radiographics 2007; 27: 1255-73.
10. radiopaidoa.org/artictes/postprimary.pulmonarytuberculosis