



PATTERN OF RADIOLOGICAL SEQUELAE IN NEW PULMONARY TUBERCULOSIS CASES- A PERIPHERAL HOSPITAL'S EXPERIENCE

Dr Amit Bajpai

Dept of Radiodiagnosis Military Hospital Mathura UP- 281001

Dr Samar Chatterjee*

HoD, Dept of Radiodiagnosis Armed Forces Medical College, Pune-411040*Corresponding Author

ABSTRACT

India contributes to almost 27% of global load of TB. Radiographs remain the mainstay of imaging for Pulmonary TB. **Aim:** In this study, we describe the pattern seen at a peripheral hospital during the Xray follow up of newly detected TB cases following completion of treatment. **Methodology:** A retrospective observational study carried out at a peripheral hospital of North India. Chest x-rays of patients were studied prior to starting the treatment and at the end of their treatment during Oct 2016- May 2018. **Results:** A total of 173 new cases of pulmonary, pleural, and mediastinal tuberculosis were included. Residual x-ray lesions were observed in 72 cases (41.6%); 52 (72.2%) of the residual lesions were parenchymal in nature, 18 were (25%) pleural lesions, and 2 (2.8%) were mediastinal lesions. Complete radiological resolution was seen in 102 (58.9%). **Conclusion:** A significant proportion of patients having clinical improvement and successful completion of treatment show residual sequelae on radiographs.

KEYWORDS : Pulmonary TB.

INTRODUCTION

Globally, TB is one of the top 10 causes of death. In 2017, TB caused approx. 10.0 million people developed TB disease with 1.3 million deaths globally. Of these, two thirds were in eight countries: India (27%), China (9%), Indonesia (8%), Philippines (6%), Pakistan (5%), Nigeria (4%) & Bangladesh (4%).[1]

The causative agent of Tuberculosis is Mycobacterium tuberculosis which spreads mainly through the inhalation route. On reaching the alveoli, the immune response is initiated with macrophages. In case of suboptimal immunity, the bacilli multiplies and spreads further through draining lymphatics. If the host has a competent immunity, the bacilli is limited and the person remains asymptomatic. In these cases, often the lesions heal with sequelae of fibrosis and calcification. Immunocompromised patients may exhibit progression of disease with loco-regional or systemic spread.(2,3) Some bacilli can remain dormant and reactivate causing post primary tuberculosis. Therefore, various residual lesions and complications can occur following tubercular infection at any of the points later in life.

Various complications can occur in both treated and untreated cases of pulmonary tuberculosis. They can be classified as: (a) Parenchymal lesions, which include tuberculoma, cavity, fibrosis, lung destruction, aspergilloma, and bronchogenic carcinoma; (b) airway lesions, such as, bronchiectasis, tracheobronchial stenosis, and bronchiolitis; (c) vascular lesions: Pulmonary or bronchial arteritis and thrombosis, and Rasmussen aneurysm; (d) mediastinal lesions, which include node calcification, constrictive pericarditis, and fibrosing mediastinitis; (e) pleural lesions, such as, chronic empyema, fibrothorax, pleural calcification, and pneumothorax; and (f) chest wall lesions, which include rib tuberculosis, tuberculous spondylitis, and malignancy associated with chronic empyema.(4)

In this study, we describe the pattern seen at a peripheral hospital during the Xray follow up of newly detected Pulmonary Tuberculosis following completion of treatment.

MATERIALS AND METHODS

It was a retrospective observational study conducted at a peripheral hospital of north India. The records of patients who were diagnosed and treated with ATT at a peripheral hospital in Mathura were studied. Chest x-rays of patients were studied prior to starting the treatment and at the end of their treatment during Oct 16- May 18.

Patient characteristics

Inclusion criteria: Patients with symptoms of cough or fever,

hemoptysis, weight loss or loss of appetite and other complains like, chest pain and breathlessness were all evaluated with a chest x-ray. Those who were suspected of pulmonary tuberculosis based on history or a chest x-ray were subjected to at least two sputum examinations for acid fast bacilli. Patients were diagnosed as suffering from tuberculosis either based on history and sputum examination positive for acid fast bacilli or based on history and radiological lesions.

Treatment regimens were oral medications according to the Revised National Tuberculosis Control Program of India (RNTCP) recommendations.(5)

All patients who were declared cured, as evidenced by their records citing stopping treatment after an adequate duration due to improvement of symptoms and sputum conversion in case of sputum-positive tuberculosis, were included in the study.

Exclusion criteria: Patients with a previous history of antitubercular treatment; or those who had X-ray picture suggestive of previous tuberculosis were excluded.

Also, those who did not respond to initial anti-tubercular treatment and required further workup for treatment failure and MDR tuberculosis were excluded.

Patients presenting with other concomitant respiratory diseases, such as, chronic obstructive pulmonary diseases, interstitial lung disease, and bronchiectasis were excluded.

METHODS

Radiological lesions were classified into parenchymal, pleural, and mediastinal, depending on the dominant x-ray picture visualized on a posterior-anterior plain x-ray film. At the end of the treatment, the chest x-rays were studied for the remaining sequelae.

RESULTS

A total of 173 new cases of pulmonary, pleural, and mediastinal tuberculosis were included in the study. Males comprised of 75.7% of the total and 24.3% cases were females. 51 cases (29.4%) were sputum-positive and 122 cases (70.5%) were sputum-negative tuberculosis. (Fig 1)

DISCUSSION

The study shows that a significant number of patients i.e. 72 (41.6%) show residual changes despite adequate chemotherapy and clinical response. Amongst these residual lesions, maximum were parenchymal changes (72.2%) in the form of fibrosis, cavitary

changes, calcification and bronchiectasis. As such, pulmonary form of involvement is the commonest form of tuberculosis. (1)

The fibrotic sequelae were found in 35 cases (67.3%) and they were in the form of atelectasis of the involved lobe with features of volume loss viz. ipsilateral tracheal and mediastinal shift, elevation of hilum and compensatory hyperinflation of the remaining lung lobes. This is consistent with similar studies. (6, 7,8)

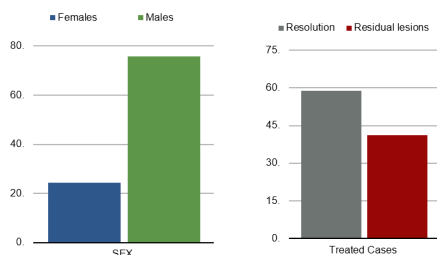
The cavitory changes were found in 17.3% of cases. The cavity was mostly amidst the fibrotic changes. Changes of residual calcified granuloma and bronchiectasis were seen in approx. 7-8% of cases. These changes were mostly seen in upper lobes. Studies have shown a variable range of these findings esp bronchiectasis (4-60%) in cases of active and inactive stage of disease. (6,8) But mostly the higher percentage is on the studies using high resolution CT which offers significantly high sensitivity for calcification as well as bronchiectatic changes. (9)

The residual pleural involvement was seen in 18 cases (25%), the majority (16 cases- 88.9%) had pleural thickening. This was seen as blunting of costophrenic angle and was confirmed on ultrasound which ruled out persistent effusion. Again, the sensitivity of detecting pleural thickening is higher on CT. (10) In our study pleural calcification was seen in 02 cases which was observed in the basal pleural regions. No features of fibrothorax was observed. Pleuritis in tuberculosis usually resolves without residual lesions. However, in some patients, chronic complications occur in the form of pleural thickening, pleural calcification, and fibrothorax during the healing of the tuberculosis lesions or as late sequelae. (11,12)

In our study, the mediastinal involvement as seen in just 02 cases (2.8%), in the form of calcified mediastinal nodes adjacent to fibrotic changes. The incidence of mediastinal lymphadenopathy decreases with age and our cases were ranging from 20-60 yrs, majority (71.6%) being >50 yrs of age. The nodes in mediastinum usually disappear with treatment; if persist they may form a residual mass of calcified fibrotic tissue. (13)

Few reasons that can contribute in the increased frequency of residual lesions can be as follows. The majority of the patients were from rural areas with distances often > 20-30 kms. This led to delay in starting of treatment. Studies have shown delay in initiation of treatment can lead to more residual damage. (14) Another factor could be higher bacterial load in the patient as evidenced by the higher proportion of sputum positive patients (70.5%) showing residual lesions vis-a-vis sputum negative patients (32.7%). Similar findings have been seen in other studies. (6). Irregular compliance of medication and loco-regional host and environmental factors could also be contributing. This study was limited in that exploration. Other limitation of the study was smaller sample size, non-availability of in-house CT facility and advance biochemical/bronchoscopic investigative modalities. However, the available resources at a peripheral hospital were optimally utilised in the study. Future exploration of the study remains a viable vision.

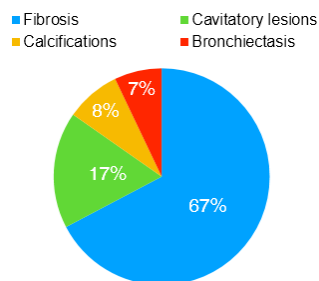
Fig 1



Residual x-ray lesions were observed in 72 cases (41.6%) of tuberculosis. Complete radiological resolution was seen in 102 cases (58.9%); 72.2% of the residual lesions were parenchymal in

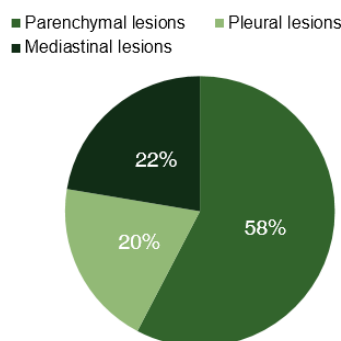
nature, 25% of total were pleural lesions, and 2.8% were mediastinal lesions. (Fig 2)

Fig 2



Out of a total 52 cases with residual pulmonary lesions, 67.3% were suggestive of fibrosis, 17.4% were cavity-related, 8.2% were pulmonary calcifications, and 7.1% were cases of bronchiectasis. (Fig 3)

Fig 3



18 cases (25%) had residual pleural lesions; 88.8% had pleural thickening, and 11.2% showed pleural calcification. Mediastinal opacities were observed in two (2.7%) cases, with residual lesions that consisted of partially resolved mediastinal lymph nodes.

Out of 51 sputum-positive cases, 36 (70.5%) had residual lesions. Out of 122 sputum-negative cases 40 (32.7%) had radiological residual lesions.

CONCLUSION

A significant proportion of patients showing clinical improvement and successful completion of anti tubercular treatment show residual sequelae on radiographs. Plain radiographs still remains an important modality of follow up in a resource limited peripheral hospital set up. Further studies are required to evaluate factors for susceptibility towards residual lesions in treated patients of pulmonary tuberculosis.

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