



## RESEARCH ARTICLE

**COMPARATIVE STUDY OF PULMONARY TUBERCULOSIS SPECTRUM IN ELDERLY AND YOUNG :  
A PROSPECTIVE STUDY**\*Dr. Mamta R. Heda<sup>1</sup>, Dr. Subodh K. Nawal<sup>2</sup><sup>1</sup>Associate Professor, Dept. of Tuberculosis and Chest Diseases, L.N. Medical College & Research Center, Bhopal. India.<sup>2</sup>Assistant Professor, Dept. of Tuberculosis and Chest Diseases, Srinivas Institute of Medical Sciences, Mangalore. India.

Received 15 June 2013; Revised 05 July 2013; Accepted 12 July 2013

**ABSTRACT**

**Background:** Tuberculosis is one of the oldest diseases known to affect humans. TB in the elderly may differ from disease presenting in younger patients and it is suggested be classified as a separate entity. Immunity, co morbidities, local environment and other factors influence incidence and manifestations of TB in older and younger patients.

**Objective:** The purpose of our study was to evaluate the differences in clinical characteristics, presentation and treatment outcomes between older and younger tuberculosis (TB) patients coming to our hospital.

**Material & method:** A prospective study on 236 patients, coming to medicine OPD between February 2011 to January 2012. Two groups are made as younger (of 18-55 years) and older (55-85 years). Detail history taking, clinical examination and microscopic and radiological investigation done and differences are evaluated.

**Results:** - Typical signs and symptoms like cough, fever, weight loss, night sweat etc are common in younger patients. Hemoptysis is also seen more in younger patients. Anorexia is more common presenting complaint in older group patients. Hepatotoxicity in older and skin reaction in younger patients is common drug reaction.

**KEYWORDS:** Miliary Tuberculosis, hemoptysis, Pleural effusion, Hepatotoxicity

**INTRODUCTION:**

Tuberculosis is one of the oldest diseases known to affect humans. It is chronic bacterial disease caused by *Mycobacterium tuberculosis*. It is highly prevalent infection in our country. Prevalence is also increasing in western countries it is likely that infection with human immunodeficiency virus (HIV) is largely responsible for this increase<sup>1,2</sup> and is also accounting for significant increases in developing countries<sup>3</sup>. The increase in the number of elderly people due to improved life expectancy presents special challenges to the control of tuberculosis (TB) in our country.

In the early stages of infection, bacilli are usually transported by macrophages to regional lymph nodes, from which they disseminate widely to many organs and tissues. The extra pulmonary sites most commonly involved in tuberculosis are the lymph nodes, pleura, genitourinary tract, bones and joints, meninges, peritoneum, and pericardium. However, virtually all organ systems may be affected (miliary tuberculosis).<sup>4</sup>

*Mycobacterium tuberculosis* is most commonly transmitted from a patient with infectious pulmonary tuberculosis to other persons by droplet nuclei, which are aerosolised by coughing, sneezing, or speaking. The tiny droplets dry rapidly; the smallest (<10 µm in diameter) may

remain suspended in the air for several hours and may gain direct access to the terminal air passages when inhaled. There may be as many as 3,000 infectious nuclei per cough.<sup>5</sup> Once *Mycobacterium tuberculosis* has been transmitted, the risk of developing disease depends largely on endogenous factors<sup>6</sup>. These include the individual's innate susceptibility to disease and level of function of cell-mediated immunity. Therefore there is difference in presentation of disease in old and young patients.

Although infection with HIV is the single greatest risk factor for the development of TB<sup>7</sup>, the elderly are also particularly at high risk for the development of disease<sup>8</sup>, as are aboriginal populations<sup>9</sup>, immigrants from high prevalence countries<sup>10</sup>. Extra-pulmonary tuberculosis was included as an AIDS-defining illness in 1987 and pulmonary tuberculosis was added later in an expanded case definition of AIDS.

It has recently been suggested that TB in the elderly may differ from disease presenting in younger patients and that it should be classified as a separate entity<sup>11, 12</sup>. Although several studies have described the differences between older and younger TB patients, there were some discordant findings on clinical presentation, radiological findings, laboratory features, and treatment outcomes<sup>12-15</sup>.

In an effort to clarify this issue, here we described the differences between older and younger TB patients concerning their presenting symptoms, diagnostic findings, radiological findings, treatment outcomes, and adverse drug reactions.

**MATERIAL AND METHOD:**

A prospective study done in our medical college and associated hospital on 236 patients, coming to medicine OPD between February 2011 and January 2012. The definition of active TB included disease proved by microscopic examination of patient’s sputum and disease diagnosed by clinical and radiologic criteria with an appropriate response to therapy but without bacteriologic confirmation.

Detail patient history is taken with special emphasis on co-morbidities, previous disease history, drug history and family history.

Out of total 236 patients, 140 patients were included in young group (of age 18 to 55 years) and 96 patients in older group (55-85 years).

**Inclusion criteria:** Patient with detail history, with age group from 18-85 years. Patients who had shown compliance and regular follow up.

**Exclusion criteria:** Patients died during study time, patients under long term immunosuppressive drugs, children with tubercular meningitis, patient with already diagnosed cancer, and patients not shown compliance.

Detail history was taken of patients suspected of TB. Proper family history, drug history, personal history was taken with special emphasis on previous disease history and co-morbidities, and thereafter patient was properly investigated by conventional three sample sputum examination by experienced technician under pathologist guidance. Also x-ray chest P-A view was done and report was prepared by radiologist (unaware of patient condition, to avoid bias) so as to help in diagnosis and follow up.

Mantoux skin test was done so as to access previous exposure and immunological status of patient. 0-9

mm reaction was considered as negative and >10 mm as positive reaction.

Clinical examination was done and involvements of various systems were noted. Meticulous respiratory examination was done by physician so as to avoid any clinical finding. After all investigation, clinical examination and history, disease was categorized under category I, category II and category III and accordingly treatment started as per DOTS (except patients with resistant TB), under our hospital supervision. Regular follow-up was done and sputum examination performed at regular interval according to prescribed guidelines.

Various presenting complaints of patients like cough, hemoptysis night sweat, fever, dyspnea, chest pain, weight loss, malaise & anorexia etc were noted. Adverse reactions observed were documented and were reported as such by the primary physicians and were further analyzed with regard to the need to stop treatment with a particular drug. Drug side effects were accessed by clinician and accordingly symptomatic treatment was given or drug was replaced by another.

**RESULTS:**

There were significantly more complaints like hemoptysis, fever, night sweats, and cough in young adult patients compared with older patients (table 1). There was no significant difference in duration of symptoms between both groups. Incidence of hemoptysis in young patients was 17% and in older patients it is 8%. Anorexia was more common in older patients (21%). Mantoux test (table 2) found positive more in younger patients (89%) than in older one (59%). Also changes in upper lobe of lung were more apparent in young patients (70%) whereas parenchymal changes were more common in older patients. All old patients showed one or the other changes in their x-ray while 6% of young TB patients had shown normal x-ray finding without any changes (table 3). Hepatotoxicity was most common drug reaction in older patients whereas skin reaction found more common in younger patients (table 4).

Symptom	Young n=140(%)	Old n=96(%)
Cough	78(55.71%)	44(45.83%)
Hemoptysis	24(17.14%)	8(8.33%)
Fever	50(35.71%)	23(23.95%)
Weight loss	62(44.28%)	31(32.29%)
Anorexia	24(17.14%)	21(21.87%)
Night sweat	45(32.14%)	13(13.54%)
Chest pain	38(27.14%)	16(16.66%)
Dyspnea	29(20.17%)	24(25.00%)

Table 1: Presenting complaints of patients coming to OPD showing that cough and weight loss is commonest presenting complaint in young patients followed by fever. Night sweat is more common in younger patients. Anorexia and dyspnea is more common in older patients

	Negative reaction	Positive reaction(%)	Total
Young	09	71(89%)	80
Old	18	26(59%)	44

Table 2: mantoux skin test (0-9 mm as negative, >=10 as positive) done in 124 patients.

Finding	Young 140 (%)	Old 96 (%)
Upper lobe changes	98(70%)	58(60.41%)
Pleural effusion with parenchymal disease	17(12.14%)	22(22.96%)
Miliary tuberculosis	1(0.7%)	7(7.29%)
Normal x-ray	6(4.28%)	-
Isolated pleural effusion	13(9.28%)	6(6.25%)

Table 3: chest x-ray finding (PA view) showing that upper lobe changes in x-ray is more apparent in younger patients while pleural effusion and miliary TB is common in older patients

Reaction	Young140 (%)	Old96 (%)
Hepatotoxicity	15(10.71%)	14(14.58%)
Skin reaction	20(14.28%)	8(8.33%)
Gastric upstate	16(11.42%)	12(12.50%)
Other reaction	13(9.28%)	10(10.41%)

Table 4: adverse drug reaction in both age groups: - showing commonest drug reaction is skin reaction in younger and hepatotoxicity in older group.

**DISCUSSION:**

Cough is considered to be the most common presenting complaint in patients of pulmonary tuberculosis. We found cough as presenting complaint in 78(55.71%) young patients and 45.83% in older patients, Maria et al<sup>16</sup> found similar results in 57% and 45% respectively. Yong et al<sup>17</sup> found cough in 59% of younger patients and 68% of older patients. Productive cough of chronic nature (more than 2 weeks) not responding to antibiotics given for respiratory tract infection raises suspicion of tuberculosis and demands sputum examination.

We recorded hemoptysis in 17% young and 8% old patients. Maria et al<sup>16</sup> found 18% and 6% respectively, while Yong et al<sup>17</sup> found in 19 % and 12% respectively in young and old patients. Cause of hemoptysis in tuberculosis is erosion of bronchial artery. Overall hemoptysis is found in 8% of patients by Mattox et al<sup>18,19</sup>.

In our study, chest pain was found in 27.14% and 16.66% young and old patients, Maria et al<sup>16</sup> found it in 46% and 38% respectively.

On x-ray chest PA view, we found upper lobe changes in 70% and 58% of younger and older patients respectively. Maria et al<sup>16</sup> found it in 69% young and 54% old patients. We found pleural effusion in 12.14% and 22% young and old patients respectively. Maria et al<sup>16</sup> found it in 11% and 20% respectively. X-ray changes are noticed classically in upper lobe of the lung because there is high

oxygen tension in the apex (right lung affected more than left).

Skin reactions were found to be the most common drug related side effect (in 14.28% young and 8% old) followed by gastric upset (11.42% and 12%) and hepatotoxicity (10.71% and 14%).Yong et al<sup>17</sup> found skin reaction in 9% and 8% respectively, and gastric upset in 4% and 10% respectively. Maria et al<sup>16</sup> found skin reaction as most common drug reaction in 15.8% and 8.7% young and old patients followed by hepatotoxicity in 10.15 and 14.5 % and gastric upset in 7.9% and 5.8% respectively. Steven-Johnson syndrome is rare but potentially fatal complication of ATT<sup>20</sup> found in 0.27% by Mathur et al. Exfoliative dermatitis is caused by rifampsin, ethambutol, pyrazinamide, streptomycin. Skin reaction (morbilliform rashes, urticaria, erythema multiforme syndrome, lichenoid eruption found in 5.7% of patients by Tan et al<sup>20</sup>.

We found miliary tuberculosis in 0.7% young patients and 7% old patients. Maria et al<sup>16</sup> in their study found this ratio as 0.7% and 6.7% respectively. Yong et al<sup>17</sup> found incidence in 5% and 2% respectively. Miliary disease occurs when organisms drain through lymphatics and blood vessels to different organs of the body resulting in yellow-white consolidated lesions. It is found more in older patients as immunity is weak and co-morbidities aid in the dissemination of the bacteria.

Normal x-ray findings were observed in 4.28% young patients in our study. Maria et al<sup>16</sup> found 2.2%

normal x-ray in young patients in their study. While almost all older TB patients showed one or another changes in their x-ray chest PA view. Primary TB results in Ghon's complex formation which heals in most of patients without leaving any radiologically visible sign. On reactivation of latent primary lesion there occur the typical TB manifestations (secondary TB). It is classically localized in the upper lobe of the lungs (mostly right) because of high oxygen tension in apices. In young TB patients sometimes x-ray is found normal, most probably because of better immunological responses.

11.25% of young patients showed negative and 88.75% had shown positive mantoux test. 40.90% old patients showed negative and 59.09% showed positive reaction. Maria et al<sup>16</sup> found 86.2% positive reaction and 13.8% negative reaction in young patients, and 62.6% & 37.4% in older patients. Probable reasons for false negative mantoux test could be malnutrition, immunosuppression, and Sarcoidosis, Hodgkins disease. While false positive results could be due to previous BCG vaccination or infection with atypical Mycobacteria.

#### CONCLUSION:

Tuberculosis still remains important cause of mortality and morbidity in our country. Presentation in older and younger patient is different as older patients present most commonly with dysnea and chest pain, whereas hemoptysis and cough is more common in younger ones. Pleural effusion with parenchymal disease and miliary tuberculosis found more common in older patients. Normal x-ray finding can be seen in young patients while almost all older TB patients show changes in their x-ray. Drug side effects like hepatotoxicity and gastric upset are more common in older patients while skin reaction is more common in younger one. Mantoux test is found negative in 40.90% of old patients while only 11% young patients shown negative reaction, showing weakening of immunity in older patients.

As presentation and outcome varies in different age groups therefore tuberculosis should be considered as separate entity in elderly patients and to be managed accordingly.

#### REFERENCES:

1. FitzGerald JM, Grzybowski S, Allen EA. The impact of human immunodeficiency virus infection on tuberculosis and it's control. *Chest* 1991; 100:191-200.
2. Korzeniewska-Kosela M, FitzGerald JM, Vedal S, et al. The spectrum of tuberculosis in HIV infected patients: a report of 40 cases. *Can Med Assoc J* 1992; 146:1927-34.
3. Schulzer M, FitzGerald JM, Enarson DA, Grzybowski S. A mathematical model to predict the future impact of HIV infection on tuberculosis in sub-Saharan Africa. *Tuber Lung Dis*.1992;73:52-8.
4. Metcalf EP, Davies JC, Wood F, Butler CC. Unwrapping the diagnosis of tuberculosis in primary care: a qualitative study. *Br J Gen Pract* 2007;57(535):116-22.
5. Cegielski JP, Chin DP, Espinal MA, Frieden TR, Rodriquez Cruz R, Talbot EA, et al. The global tuberculosis situation. Progress and problems in the 20th century, prospects for the 21st century. *Infect Dis Clin North Am* 2002;16(1):1-58.
6. Sumbal Tariq, Abdul Rauf, Saqib Malik, Abdul Rashid. *J Ayub Med Coll Abbottabad* 2010;23(1).
7. Rieder HL, Cauthen GM, Comstock GW, Snider DE. Epidemiology of tuberculosis in the United States. *Epidemiol Rev* 1989; 11:79-98.
8. Stead WW, Lofgren JP. Does the risk of tuberculosis increase in old age? *J Infect Dis* 1983; 147:951-55.
9. Enarson DA, Grzybowski S. Incidence of active tuberculosis in the native population of Canada. *Can Med Assoc J* 1986;134:1149-52.
10. Wang JS, Allen EA, Chao CW, Enarson DA, Grzybowski S. Tuberculosis in British Columbia among immigrants from five Asian countries: 1982-85. *Tubercle* 1989; 70:179-86
11. Morris CDW. The radiography, hematology and biochemistry of pulmonary tuberculosis in the aged. *Q J Med* 1989; 71:529-35.
12. Morris CDW. Pulmonary tuberculosis in the elderly: a different disease? [editorial]. *Thorax* 1990; 45:912-13.
13. Morris CD: The radiography, haematology and biochemistry of pulmonary tuberculosis in the aged. *Q J Med* 1989, 71(266):529-36.
14. Perez-Guzman C, Vargas MH, Torres-Cruz A, Villarreal-Velarde H: Does aging modify pulmonary tuberculosis?: a meta-analytical review. *Chest* 1999,116(4):961-7.
15. Davies PD: TB in the elderly in industrialised countries. *Int J Tuberc LungDis* 2007, 11(11):1157-9.
16. Maria Korzeniewska-Kosela, Joseph Krysl, Nestor Miller, William Black, Edward Allen and J. Mark FitzGerald. Tuberculosis in Young Adults and the Elderly A Prospective Comparison Study; *Chest* 1994; 106:28-32
17. Y.Soo, S.Young, I.Jae, K.Sik, Y. Kim,S.Lim,Y.Kim: Clinical characteristics and treatment outcomes oftuberculosis in the elderly: a case control study : *BMC Infectious Diseases* 2013, 13:121
18. Mattox K,Guinn G; Emergency resection for massive hemoptysis. *Ann Thorax Surg* 17:377-89.

19. John R Middleton; Pernendu Sen; Michel Lange, MD; Jack Salaki; Rajendra Kapila; and Donald B. Louria. Chest. 72:5 Nov-1977 601-4.
20. Mathur KC. Steven-Johnson Syndrome amongst patients undergoing anti-tubercular treatment (a series of 25 patients). Indian J Tuberc;1978: 25(3):141:3