

Tanaffos (2008) 7(1), 52-57

©2008 NRITLD, National Research Institute of Tuberculosis and Lung Disease, Iran

Pulmonary Tuberculosis in the Elderly

Mohammad Towhidi¹, Azita Azarian², Amir Asnaashari¹

¹ Department of Internal Medicine, Pulmonary Division, ² Department of Radiology, Ghaem Hospital, Mashhad University of Medical Sciences, MASHHAD - IRAN.

ABSTRACT

Background: Despite the increased rate of tuberculosis (TB) in the elderly, few publications have presented the clinical characteristics of TB in this specific age group in our country. This study aimed to compare the clinical features, predisposing factors and imaging findings of pulmonary TB in the elderly and in young adults, and to determine if any difference exists between the two groups.

Materials and Methods: We retrospectively reviewed the records of all patients with the diagnosis of pulmonary TB at Ghaem Hospital and outpatient clinics during a 6-year period. Ninety-five patients were studied and divided into two groups, 33 patients were in the young group (mean age, 29.3 yrs.) and 40 patients in the elderly group (mean age, 69.6 yrs.). Patients aged 46-64 were excluded from the study.

Results: Predisposing factors were more prevalent in the elderly who had a significantly higher frequency of chronic obstructive pulmonary disease, ischemic heart disease, congestive heart failure, malignancy and diabetes mellitus. Pregnancy and postpartum status were the predisposing conditions in young females. The classic symptoms and signs of TB were noted in a higher proportion of the younger group. Fever (78% vs. 57.5%), and weight loss (94% vs. 80%) were significantly higher ($p < 0.05$), while night sweats (24% vs. 22.5%), cough (100% vs. 92.5%) and hemoptysis (30% vs. 15%), were seen more in the younger group but with no significant differences. Lower lung infiltrates were higher in the elderly; whereas, cavitation was seen significantly more in the young age group (63% vs. 25%, $p < 0.05$).

Conclusion: To prevent delay in diagnosis and treatment, TB should be considered among the differential diagnosis of any type of pulmonary infiltrates seen in the elderly, even when the clinical presentation is atypical. (*Tanaffos* 2008; 7(1): 52-57)

Key words: Pulmonary Tuberculosis, Young, Elderly

INTRODUCTION

Today, tuberculosis (TB) remains one of the world's most lethal diseases. An estimated one-third of the world's population is infected with

Mycobacterium tuberculosis and 7-8 million people develop TB each year (1). Despite the steady decline in the rate of TB cases resulting from the overall implementation of effective TB control programs, directly observed treatment short course (DOTs), and efforts to control the human immunodeficiency virus / acquired immunodeficiency syndrome (HIV/AIDS)

Correspondence to: Towhidi M

Address: Department of Internal Medicine, Ghaem Hospital, Mashhad, Iran.

Email address: dr_mtowhidi@yahoo.com

Received: 6 May 2007

Accepted: 26 Nov 2007

epidemics, preventive and control strategies among other high-risk populations (such as the elderly) remains a clinical and epidemiological challenge. Although infection with human immunodeficiency virus (HIV) is the greatest risk factor for development of TB, the elderly are particularly at risk for development of this disease (2). The geriatric population represents the largest reservoir of TB infection particularly in developed countries (1). Twenty-six percent of TB cases diagnosed were 65 years and older, but 60.3% of TB cases diagnosed at death were in this age group (3).

It has been suggested that TB in the elderly may differ from TB presenting in younger patients, and that it should be classified as a separate entity (4,5). These differences might account for delay in diagnosis, which in turn leads to morbidity and mortality in this age group (6,7). Few publications have presented clinical and radiological characteristics of pulmonary TB in the elderly in our country (8,9).

We aimed to study all patients with pulmonary TB diagnosed at Ghaem Hospital and outpatient clinics and to compare clinical characteristics, roentgenographic findings and predisposing factors between the young and elderly patients.

MATERIALS AND METHODS

We reviewed the records of all patients with the diagnosis of pulmonary TB documented by positive smear and/or culture of sputum for *Mycobacterium tuberculosis*, positive smear and/or culture of bronchial washing and positive biopsy specimen for granuloma with or without caseation necrosis who were admitted to Ghaem Hospital or visited at the outpatient clinics of Mashhad University of Medical Sciences during a 6-year period.

A total of 95 patients were included in the study. For the analysis of clinical features, the patients were divided into two groups: Patients aged 45 or younger

and patients aged 65 or older. Patients aged 46 -64 were excluded from the study. Thirty-three patients were included in the younger group and 40 patients in the elderly group. Whenever sputum smear for acid fast bacilli (AFB) was negative or the patient had no sputum, he or she underwent fiberoptic bronchoscopy with bronchial washing and bronchial biopsy if an endobronchial lesion was seen.

The collected data included demographic characteristics, history of previous TB, symptoms, presence of conditions predisposing to pulmonary TB, bacteriologic status, and results of histopathologic examination.

Statistical analysis: Statistical analysis was done using SPSS software; differences between the means were compared using one way analysis of variance. To determine the significance of correlations between the measurements, the Chi-square test was used.

RESULTS

The characteristics of the patients are summarized in Table 1.

Table 1. Pulmonary TB in the elderly: Patients' characteristics.

Characteristics	Young(n =33)	Elderly(n =40)
Age(year) (mean \pm SD)	29.3 \pm 10.1	69.6 \pm 6.1
Male/Female	12/21	21/19
Afghan immigrant	1	1
Duration of symptoms (days prior to diagnosis) Range	3-360	21-720
Mean	82	103

During the study period, there were 95 cases of TB, 40 cases included in the elderly group with the age range of 65-90 years (mean age, 69.6 yrs.) and 33 cases included in the young group with the age range of 15-45 years (mean age, 29.3 years). There were only 2 Afghan immigrants among our patients, one in each group. Underlying diseases were more prevalent in the elderly patients. The elderly had

higher frequency of chronic obstructive pulmonary disease (COPD), ischemic heart disease (IHD), congestive heart failure (CHF), malignancy (2 cases of bronchogenic carcinoma and 1 gastric carcinoma), and diabetes mellitus (Table 2); whereas, pregnancy and postpartum state were the predisposing conditions in young females. Classic symptoms described for TB such as fever (78% vs. 57.5%) and weight loss (94% vs. 80%), were noted in a significantly higher proportion among the younger group ($p < 0.05$) than in the elderly. Although night sweats (24% vs. 22.5%), cough (100% vs. 92.5%) and hemoptysis (30% vs. 15%) were seen more in the younger age group, the differences were not statistically significant (Table 3).

Table 2. Pulmonary TB in the elderly: Underlying diseases.

Underlying disease	Young (n = 33)	Elderly (n = 40)
	Number (%)	Number (%)
COPD (chronic bronchitis)	-	3 (7.5)
IHD, CHF	-	2 (5)
Diabetes mellitus	1 (3)	3 (7.5)
Malignancy	-	3 (7.5)
Pregnancy and postpartum	5 (15)	-
CVA	-	1 (2.5)
Pulmonary hydatid cyst	1 (3)	-
History of previous TB	1 (3)	2 (5)
Total	8 (24)	14 (35)

COPD : Chronic obstructive pulmonary disease.

IHD : Ischemic heart disease.

CHF : Congestive heart failure.

CVA : Cerebrovascular accident.

Table 3. Pulmonary TB in the elderly: Clinical features.

Clinical features	Young (n = 33)	Elderly(n = 40)	P value *
	Number (%)	Number (%)	
Fever	26 (78)	23 (57.5)	0.046
Weight loss	31 (94)	32 (80)	0.049
Night sweats	8 (24)	9 (22.5)	0.508
cough	33 (100)	37 (92.5)	0.297
Hemoptysis	10 (30)	6 (15)	0.156
Abnormal mentation	-	2 (5)	0.277

* $p < 0.05$ was considered as significant.

Upper lobe infiltrations were noted significantly more in the younger group (54.5% vs. 15%) ($p < 0.05$), whereas lower lung field infiltrations were seen more in the elderly group (35% vs. 24%), but differences were not statistically significant. Cavitation was present significantly more in the younger group compared to the elderly (63% vs. 25%, $p < 0.05$) (Table 4).

Table 4. Pulmonary TB in the elderly : Radiological findings.

Radiological findings	Young (n = 33)	Elderly (n = 40)	P value *
	Number (%)	Number (%)	
Upper lobe infiltration	18 (54.5)	6 (15)	0.001
Lower lung field infiltration	8 (24)	14 (35)	0.1
Cavitation	21 (63)	10 (25)	0.001
Miliary	-	1 (2.5)	-

* $p < 0.05$ was considered as significant.

Sputum was the most common source for the diagnosis of pulmonary TB in both groups. Nine patients in the elderly and one patient in the younger group underwent fiberoptic bronchoscopy for the diagnosis of pulmonary TB.

DISCUSSION

TB is still a major cause of morbidity and mortality worldwide. Recent studies have suggested that even in the developed world, its incidence in the elderly is increasing (10). Prior to onset of HIV-associated TB, the elderly, newly arrived immigrants and minority population, were the groups in the North America whose rate of disease continued to rise (7,11). The elderly have documented very high rates of disease particularly in nursing homes (12). From the public health point of view, unrecognized pulmonary TB specially among the elderly is of greater importance, because it often may lead to premature death as well as unrecognized transmission of infection in the community (3). Twenty-six percent of cases diagnosed alive were

among those of 65 years and older, but 60.3% of TB cases diagnosed at death were in this age group. These data indicate that TB often remains unrecognized and to prevent continuing deaths due to this curable disease, a high index of suspicion of TB remains important particularly among the elderly and those with extrapulmonary sites of disease (3). Delay in diagnosis of TB causing avoidable morbidity and mortality has often been assumed (particularly in the elderly) to be associated with atypical clinical and radiological features (13). One feature of TB among the elderly was the frequent association of other comorbid conditions such as malignancy, diabetes mellitus, ischemic heart disease and chronic bronchitis (14,15). In our patients, the elderly group had higher number of underlying diseases than the younger group (35% vs. 24%). Concurrent diagnosis of TB and malignancy was seen in 3 out of 40 elderly patients (7.5%). Two patients had bronchogenic carcinoma and one had gastric carcinoma who underwent gastrectomy.

In Alvarez series, 3 out of 29 (10.3%) young patients and 11 out of 35 (31%) elderly patients had an underlying malignancy (14). In our patients, pregnancy and postpartum state were seen in 5 out of 33 (15%) of the young group as the underlying risk factors. Our data suggested that younger patients were more likely to have fever, night sweats, weight loss and hemoptysis than the elderly. Similar to our patients, these differences in symptoms have been reported previously in hospital-based retrospective series (14), which consisted only of male subjects selected among the hospitalized patients.

In a prospective comparative study, Korzeniewska-Kosela (11) concluded that although younger patients were more likely to have fever, night sweats and hemoptysis, there was no significant difference in most symptoms between the two groups. In their study, small but significant minority of patients were asymptomatic, probably in part

related to the fact that it was a registry -based series and therefore, a number of cases would have been diagnosed in the process of contact evaluation.

In contrast to others, in a study from Strasbourg (19) comparison of the clinical and radiological features of TB showed no significant difference between the young and elderly patients. In another study from Tehran (8), the authors reached the same conclusion.

Our study confirmed the findings of Alvarez (14), Rizvi (16), Zamarron (17), Chan(18), Khan(20) and Leung(29) that the elderly patients had higher number of underlying disease than young patients and had less fever, hemoptysis and more non-specific complaints. Chest radiograph in the elderly patients with TB had atypical appearance and these patients were less likely to have upper lobe infiltration and more commonly had extensive infiltration of both lung fields and lower lobes infiltration.

Our data confirmed the previous reports that a relatively high proportion of patients with pulmonary TB in all age groups had atypical radiological findings (20,21). In our series, the only exception regarding radiological features was that the frequency of cavitation was significantly lower in the elderly patients (63% vs. 25%, $p < 0.05$). This was similar to the radiological findings of Perez-Guzman (22, 23), Yamaguchi (24) and Lee (27).

In another study done by Liaw et al. (28), radiographic presentation as mass lesions was more frequently encountered in elderly patients (10.5% vs. 2.1%, $p < 0.05$).

It has been stated that Mantoux skin testing with 5 TU PPD was a relatively inefficient adjunct in the diagnosis of active TB. But in a population-based study by Korzeniewska-Kosela (11) skin test responses to 5 TU PPD were positive in 86.2% of young adults and 67.6% of elderly patients.

In our patients, diagnosis of pulmonary TB was confirmed by fiberoptic bronchoscopy (FOB) in 9

elderly patients (22.5%) who had either no sputum or negative sputum smear. The usefulness of fiberoptic bronchoscopy in diagnosis of smear negative pulmonary TB has been reported in our previous study (25).

We have previously suggested that elderly patients suspected to have TB with lower lung field infiltration are those who will more likely benefit from FOB, bronchial washing and biopsy to reach an early diagnosis. This is due to the fact that patients with lower lung field TB are more likely to have endobronchial TB (25,26).

In conclusion, we showed that TB in the elderly was associated less often with classic symptoms of fever, weight loss, night sweats and hemoptysis and more often with non-specific symptoms. Underlying conditions are more often present in the elderly than in young adults.

Roentgenographic appearance of TB in the elderly is associated more often with lower lung infiltration, but cavitation is significantly less often seen in the elderly patients. A high index of suspicion must be maintained to identify the disease in the elderly in order to prevent transmission of infection to others.

REFERENCES

1. Rajagopalan S, Yoshikawa TT. Tuberculosis in the elderly. *Z Gerontol Geriatr* 2000; 33 (5): 374- 80.
2. Stead WW, Lofgren JP. Does the risk of tuberculosis increase in old age? *J Infect Dis* 1983; 147 (5): 951- 5.
3. Rieder HL, Kelly GD, Bloch AB, Cauthen GM, Snider DE Jr. Tuberculosis diagnosed at death in the United States. *Chest* 1991; 100 (3): 678- 81.
4. Morris CD. The radiography, haematology and biochemistry of pulmonary tuberculosis in the aged. *Q J Med* 1989; 71 (266): 529- 36.
5. Morris CDW. Pulmonary tuberculosis in the elderly: a different disease? (Editorial), *Thorax* 1990; 45: 912-13.
6. Stead WW, Dutt AK. Tuberculosis in the elderly. *Semin Respir Infect* 1989; 4 (3): 189- 97.
7. Rieder HL, Cauthen GM, Comstock GW, Snider DE Jr. Epidemiology of tuberculosis in the United States. *Epidemiol Rev* 1989; 11: 79- 98.
8. Yekani F, Samar G, Amoli K. Tuberculosis presentation in young and elderly patients. *Iranian journal of Infectious diseases & Tropical Medicine* 1999; 11(4): 57-60.
9. Aminzadeh Z, Gachkar L, Ghorbani G. Relationship of age to clinical and radiographic manifestations of tuberculosis. *Pejouhandeh* 1999; 15(4): 273-7.
10. Packham S. Tuberculosis in the elderly. *Gerontology* 2001; 47 (4): 175- 9.
11. Korzeniewska-Kosela M, Krysl J, Müller N, Black W, Allen E, FitzGerald JM. Tuberculosis in young adults and the elderly. A prospective comparison study. *Chest* 1994; 106 (1): 28- 32.
12. Stead WW, Lofgren JP, Warren E, Thomas C. Tuberculosis as an endemic and nosocomial infection among the elderly in nursing homes. *N Engl J Med* 1985; 312 (23): 1483- 7.
13. Katz I, Rosenthal T, Michaeli D. Undiagnosed tuberculosis in hospitalized patients. *Chest* 1985; 87 (6): 770- 4.
14. Alvarez S, Shell C, Berk SL. Pulmonary tuberculosis in elderly men. *Am J Med* 1987; 82 (3 Spec No): 602- 6.
15. Kaplan MH, Armstrong D, Rosen P. Tuberculosis complicating neoplastic disease. A review of 201 cases. *Cancer* 1974; 33 (3): 850- 8.
16. Rizvi N, Shah RH, Inayat N, Hussain N. Differences in clinical presentation of pulmonary tuberculosis in association with age. *J Pak Med Assoc* 2003; 53 (8): 321- 4.
17. Zamarrón C, Salgueiro M, Alvarez JM, Otero Y, Rodríguez Suárez JR. The clinical characteristics of pulmonary tuberculosis in the elderly. *An Med Interna* 1997; 14 (4): 167- 9.
18. Chan CH, Woo J, Or KK, Chan RC, Cheung W. The effect of age on the presentation of patients with tuberculosis. *Tuber Lung Dis* 1995; 76 (4): 290- 4.
19. Kaltenbach G, Grunenberger F, Schlienger JL, Berthel M, Imler M, Kuntzmann F. Influence of age on presentation and prognosis of tuberculosis in internal medicine. *Presse Med* 2001; 30 (29): 1446- 9.

20. Khan MA, Kovnat DM, Bachus B, Whitcomb ME, Brody JS, Snider GL. Clinical and roentgenographic spectrum of pulmonary tuberculosis in the adult. *Am J Med* 1977; 62 (1): 31- 8.
21. Hadlock FP, Park SK, Awe RJ, Rivera M. Unusual radiographic findings in adult pulmonary tuberculosis. *AJR Am J Roentgenol* 1980; 134 (5): 1015- 8.
22. Pérez-Guzmán C, Vargas MH, Torres-Cruz A, Villarreal-Velarde H. Does aging modify pulmonary tuberculosis?: A meta-analytical review. *Chest* 1999; 116 (4): 961- 7.
23. Perez-Guzman C, Torres-Cruz A, Villarreal-Velarde H, Vargas MH. Progressive age-related changes in pulmonary tuberculosis images and the effect of diabetes. *Am J Respir Crit Care Med* 2000; 162 (5): 1738- 40.
24. Yamaguchi Y, Kawabe Y, Nagayama N, Tamura A, Nagai H, Akagawa S, et al. A study on the clinical features of pulmonary tuberculosis in elderly patients. *Kekkaku* 2001; 76 (6): 447- 54.
25. Towhidi M. Rapid diagnosis of suspected pulmonary tuberculosis by flexible fiberoptic bronchoscopy and transbronchial biopsy. *Iran J Med Sci* 1991; 16: 74- 7.
26. Keshmiri M, Towhidi M. Roentgenographic and bronchoscopic findings in sputum smear-negative pulmonary tuberculosis. *M J IRI* 1994; 7: 239- 43.
27. Lee JH, Han DH, Song JW, Chung HS. Diagnostic and therapeutic problems of pulmonary tuberculosis in elderly patients. *J Korean Med Sci* 2005; 20 (5): 784- 9.
28. Liaw YS, Yang PC, Yu CJ, Wu ZG, Chang DB, Lee LN, et al. Clinical spectrum of tuberculosis in older patients. *J Am Geriatr Soc* 1995; 43 (3): 256- 60.
29. Leung CC, Yew WW, Chan CK, Chau CH, Tam CM, Lam CW, et al. Tuberculosis in older people: a retrospective and comparative study from Hong Kong. *J Am Geriatr Soc* 2002; 50 (7): 1219- 26.