ABSTRACT

Background. There is scarcity of published literature on manifestations of pulmonary tuberculosis (PTB) among elderly patients in India. The aim of the present study was to compare the clinical, radiological and laboratory manifestations of PTB among young and elderly patients.

Methods. This prospective study involved 100 human immunodeficiency virus (HIV) negative patients with PTB. The demographic, clinical, radiological and laboratory manifestations were compared between young (n=50; under 60 years of age) and elderly (n=50; aged 60 years and above) with PTB.

Results. Elderly patients, in comparison to younger patients, tended to be heavier smokers and had more co-morbidities (40% vs 8%; p < 0.05). They presented more frequently with constitutional symptoms (except fever) and less frequently with respiratory symptoms. The mean duration of symptoms and rate of sputum smear-positivity for acid-fast bacilli was similar in both groups. Both the groups were similar with respect to physical examination and chest radiograph findings. Median values of erythrocyte sedimentation rate and total leukocyte count were significantly higher and lower respectively in the elderly patients.

Conclusions. The presentation of PTB in elderly patients differs from that of younger patients by the predominance of constitutional rather than respiratory symptoms. A high index of suspicion is required to make a timely diagnosis of tuberculosis in the elderly. [Indian J Chest Dis Allied Sci 2008; 50: 263-267]

Key words: Constitutional, Elderly, Pulmonary, Respiratory, Symptoms, Tuberculosis.

INTRODUCTION

Tuberculosis (TB) remains a major challenge for health-care workers throughout the world despite major progress in the development of new strategies for its diagnosis and treatment. In elderly patients, the clinical and radiological presentations are often nonspecific, leading to a delay in diagnosis and in initiating appropriate treatment, which often results in a significant proportion of cases being discovered at autopsy only. There is scarcity of published literature on manifestations of PTB among elderly patients from India. The aim of the present study was to compare the clinical, radiological and laboratory manifestations of PTB among elderly patients (above the age of 60 years) with those in young patients (below the age of 60 years).

MATERIAL AND METHODS

This prospective study involved a total of 100 human immunodeficiency virus (HIV) negative patients with PTB. Elderly (n=50; Group I; aged 60 years and above) and young (n=50; Group II; under 60 years) patient were selected from those being treated as out-patients (at the Chest Clinic) or in-patients (admitted to any of the wards) at Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh. Patients with PTB in whom sputum smear revealed acid-fast bacilli (AFB) and/or culture grew Mycobacterium tuberculosis were included. Patients who were sputum smear-negative for AFB and in whom the diagnosis of PTB was established on the basis of clinical and radiological features consistent with TB and a good clinical response to antituberculosis treatment (ATT) were also enrolled in the study. The study also included patients with PTB who had concomitant evidence of extrapulmonary TB (EPTB). The diagnosis of EPTB was based on clinical and radiological features suggestive of TB concerning the involved site with supportive evidence in the form of demonstration of AFB and/or granulomas/caseous necrosis from specimens obtained from the affected site.
Patients who were HIV seropositive, those on immunosuppressive drugs or with underlying haematological malignancies, were excluded from the study. All patients underwent a detailed clinical evaluation. Details noted included history of fever, constitutional or respiratory symptoms, duration of symptoms, duration and quantity of tobacco smoking, past medical and treatment history. Tobacco smoking was further categorised after calculation of smoking index (the product of the number of cigarettes/bidis smoked per day and the number of years for which they had been smoked). All patients underwent haematological (complete hemogram) and biochemical (liver and renal function tests, fasting and post-prandial blood sugar testing) laboratory tests and a chest radiograph. Serological testing for HIV was conducted at the Voluntary Counselling and Testing Centre (VCTC) located within PGIMER, Chandigarh after taking informed consent from the patients. All patients had three consecutive sputum smears examined for the presence of AFB using Ziehl-Neelsen technique. This was done as per recommendations of the Revised National Tuberculosis Control Programme (RNTCP), Government of India at the Designated Microscopy Centre (DMC) located within PGIMER, Chandigarh. Sputum induction was attempted in patients who were not producing sputum spontaneously. The study was cleared by the ethics committee of the Institute. Informed consent was taken for each subject.

**Statistical Analysis**

Quantitative and qualitative data are expressed as median [inter-quartile (IQ) range] and percentages respectively. Quantitative variables were compared using Mann-Whitney U test while qualitative variables were compared using Pearson Chi-square test. A ‘p’ value of less than 0.05 was considered significant.

**RESULTS**

The demographic characteristics of patients in the two groups are shown in table 1. Although male predominance was seen in both the groups, there was no difference in the gender distribution. Patients in Group I tended to be heavier smokers compared to those in Group II; the percentage of patients having a smoking index of more than 300 being 30% and 2% respectively (p<0.05). A significant percentage of elderly patients (40%) had chronic diseases and were on long-term medication for the same (32%); the most common co-morbid illness being diabetes mellitus (16%).

Isolated PTB was the most common presentation (86% and 82% in Groups I and II respectively). Among patients with PTB who also had EPTB, the most common site of extra pulmonary involvement was lymph nodes (n=3, in Group I; n=5 in Group II). None of the observed differences (Table 2) between the two groups with respect to extrapulmonary involvement were statistically significant.

Comparison of the clinical features among patients in both groups is presented in Table 2. Elderly patients, in comparison to younger patients, presented more frequently with constitutional symptoms and less frequently with respiratory symptoms. The duration of symptoms prior to diagnosis was similar (median 2; IQ range 1-5 weeks) in elderly and young patients. Rate of sputum smear-positivity for AFB was also similar in Groups I and II [29/41 (70.7%) vs 35/48 (72.9%) respectively]. Seven patients in Group I and five in Group II who did not report with sputum production initially could provide an adequate sample for testing following sputum induction. There was no significant difference in the two groups with respect to findings on the chest radiograph (Table 3).

Elderly patients (Group I), in comparison to younger patients (Group II), had higher median (IQ range) values of erythrocyte sedimentation rate (ESR) [49 (35-64) vs 32 (16-55) mm at the end of the first hour] and lower mean values of total leucocyte count (TLC) [7000 (6000-8800) vs 8100 (6200-11600) mm/µL]. Other haematological and biochemical results were similar in both the groups.

**DISCUSSION**

Tuberculosis is becoming increasingly common in the elderly and burden of the disease in them is likely to continue to increase substantially. More, with increasing age, a state of relative deficiency develops as...
a result of a reduction in the number and function of the T-helper lymphocytes and an increase in the presence of T-suppressor cells. This decline in natural immunity enhances the possibility of endogenous reactivation of infection by *Mycobacterium tuberculosis* bacilli and the development of active TB. Pulmonary tuberculosis is the most common form of TB even in the elderly although EPTB is more frequently seen than in the young.

Presentation of PTB in the elderly often differs from that in younger patients and some authors have even suggested that PTB in the elderly may even be considered as a distinct disease entity. These differences can lead to a delay in the diagnosis of TB in the elderly, which, in turn, can lead to an increase in the morbidity and mortality in them.

A recent meta-analysis of 12 published studies sought to compare the clinical, radiological and laboratory features of PTB among older and younger patients. This meta-analysis did not reveal any significant difference between the two groups with respect to male preponderance, evolution time before diagnosis, prevalence of certain respiratory symptoms (cough, sputum production), presence of upper lobe lesions on chest radiographs, detection rate of AFB in sputum, haemoglobin levels and serum aminotransferases. However, several other clinical manifestations differed significantly between the younger and older patients. Fever and sweating were observed less frequently among the older patients and this was attributed to the reduced pyrogenic response with ageing. Dyspnoea was more prevalent in the elderly and this could be explained in part by the decline in pulmonary function that occurs with ageing. Haemoptysis was less common among the elderly and this could be explained in part by the reduced pyrogenic response with ageing. Dyspnoea was more prevalent in the elderly and this could be explained in part by the decline in pulmonary function that occurs with ageing. Haemoptysis was less common among the elderly and correlated with the lower prevalence of cavitary disease. Lower levels of serum albumin and blood leucocytes were noticed among older patients. A higher prevalence of co-morbid conditions like diabetes mellitus, cardiovascular disorders and chronic obstructive pulmonary disease was seen in the elderly TB patients. These differences in the presentation of PTB among the elderly can thus be explained by well known physiological changes that are known to occur with ageing and hence must be kept in mind during the diagnostic evaluation of elderly patients.

Several findings of the current study are in accordance with the results of this meta-analysis. In the present study, male preponderance, mean duration of symptoms prior to diagnosis, rates of sputum smear AFB positivity and chest radiograph findings were similar in both the age groups. Lower frequency of respiratory symptoms and fever, lower mean values of TLC as well as higher prevalence of chronic co-morbid illnesses in the elderly patients were also observed in the current study.

However, certain findings of the current study differed from those of the meta-analysis and included
a higher frequency of constitutional symptoms (other than fever) in the elderly patients. It is well known that the clinical presentation of TB can often be atypical and subtle in the elderly and that symptoms like unexplained weight loss, “failure to thrive,” weakness or a change in cognitive status may be the sole manifestation of the disease. Recent retrospective studies from Korea and Hong Kong have found similar observations regarding an increase in the presence of constitutional symptoms in elderly patients with TB. This results in a delay in the presentation of the elderly to health care facilities, thereby resulting in a delay in the commencement of ATT. The delay in presentation among elderly patients with TB has also been documented previous study by Arora et al. from Himachal Pradesh. In that study, only 36.9% of patients presented within three months of onset of symptoms, while 41.2% presented after six months of onset of symptom. Most of the patients (78.1%) had advanced disease radiologically at the time of diagnosis.

In the current study, a higher percentage of elderly patients were heavy smokers (SI > 300). By virtue of age, it is expected that elderly patients would have smoked more. However, heavy smoking is associated with a relative risk of 2 to 4 for developing TB. Current smokers, in comparison with never-smokers, have a higher risk of developing PTB but not EPTB. Furthermore, patients who develop TB tend to have smoked more cigarettes per day than those who do not. Leung and colleagues had observed that older people with TB were more likely to smoke than younger people with the disease. Arora and colleagues had also found that almost two thirds of their elderly patients with TB were smokers (13.43 ± 8.76 vs 10.96 ± 7.87, p=0.01). A statistically significant dose-response relationship was observed with respect to smoking and active TB (p < 0.05) and culture-confirmed TB (p < 0.05).

A recent review that looked at the available evidence on the association between smoking and various TB outcomes stated that there is considerable evidence to suggest that tobacco smoking is associated with TB. The evidence was stronger for TB disease than for TB infection or for mortality related to TB. But since the magnitude of both TB and tobacco exposure is phenomenal, even a modest effect of the latter on the former is likely to have substantial effect in terms of absolute numbers and thus for epidemiological purposes, TB control programs should start addressing tobacco control as a potential preventive intervention.

We did not find any significant difference in the radiological findings between the two groups and this observation is in variance with results from some of the previous studies. However, it is not unusual for the elderly and the young to have significant differences in symptomatology and yet have similar radiological presentation of PTB since the two aspects of the disease do not necessarily correlate linearly. Therefore, it is not surprising that both elderly and young patients with PTB can manifest characteristic radiological findings (infiltrates with or without cavitation in the apicoposterior segments of one or both upper lobes or in the apical segment of the lower lobes) as well as less typical findings (atelectasis, basal infiltrations, nodules, miliary pattern or diffuse infiltrates). Moreover, we also did not find any difference between the two groups in terms of past history of TB, physical findings or sputum AFB positivity rate. Similarly, differences in the median values of ESR and TLC between the two groups, although statistically significant, may not be clinically relevant. We feel that the differences in the manifestations of TB between the elderly and young patient groups were predominantly with respect to symptomatology. This feature may be the result of epidemiological differences reflecting the prevalence and infection rates of tuberculosis. It also has to been emphasised that considering TB as a diagnostic possibility is the most important and crucial step for preventing a diagnostic delay while evaluating elderly patients. Indeed, TB is often not even considered in the differential diagnosis by treating physicians and an incorrect initial diagnosis of TB is associated with the potential risk of delay in the institution of ATT and there by facilitates silent spread of the disease.

The current study had certain limitations. First, the number of patients enrolled was relatively small. Secondly, no distinction was made between out-patients and in-patients since the authors had felt that it would have been difficult to bring out any meaningful conclusions for out patients and in-patients separately in view of the small numbers involved. Moreover, the study was not primarily aimed at detecting a difference between out-patients and in-patients; rather it was an attempt to detect differences between the young and the elderly irrespective of their admission status. For the same reason all patients admitted with active PTB were included and this was true whether they were admitted for problems related to the disease under study (PTB) or for other illnesses and had PTB as a co-morbidity. Future prospective studies should, however, attempt to compare the characteristics and detect differences, if any, between out-patient and in-patient subgroups also. Thirdly, since the enrollment was by means of enrollment of fixed number (n = 50) of consecutive patients with PTB in each group rather than by consecutive enrollment of all patients with PTB, the current study cannot provide data about the actual contribution of elderly patients to the overall burden of PTB in patients visiting healthcare facilities or in the community as a whole.

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