



Comparative study of radiological manifestations of Pulmonary Tuberculosis in adults and elderly age group.

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Abstract

‘Tuberculosis among elderly’ is thought to be different from that in adults in terms of Symptomatology, radiological features, and hence in terms of ease of diagnosis. Among studies conducted across the world, some have reported predominance of constitutional symptoms & atypical x ray presentation in elderly, whereas others have reported the disease to be similar in both groups. We studied chest x rays of 50 adult and 50 elderly subjects diagnosed with Pulmonary Tuberculosis in a tertiary care teaching hospital from south India. We found that elderly subjects are more likely to present with advanced lesions than adult subjects.

Introduction: Tuberculosis has long been known as a disease with predilection for young people. Much of the classical description of Tuberculosis (TB) was derived when it was a highly prevalent disease in young adults. With the decreasing death rate and increasing life expectancy, the aged population pool is increasing worldwide¹. Given the age-associated physiological, immunological, psychological, and social changes

compounded by high prevalence of chronic degenerative diseases among the elderly population, it is expected that TB in elderly subjects may exhibit a different course. Some reports have described a delay in the diagnosis of TB in elderly subjects due to atypical clinico-radiological presentation which is attributed mainly to weak immunologic response involving TH1 lymphocytes. Diagnostic delay leads to increase in morbidity, mortality and uninterrupted transmission of the disease in the society².

Methodology: We retrospectively analyzed chest x ray features of consecutive 50 subjects each from adult group aged 25-64 years and elderly group aged 65 years and above. Subjects included in the study were diagnosed with Pulmonary Tuberculosis based on clinico-radiological and bacteriological evaluation and favorable response to standard anti-tubercular treatment. Non consenting individuals and subjects with HIV co-infection were excluded. Study period was from December 2010 till August 2013.

Results: More than 75% of the subjects in both groups were male. Among adults, the age group 45 – 54 years had maximum subjects -17 (34%). Among the elderly, the age group 65 – 74 years had maximum subjects -43 (86%).

We found no difference in terms of laterality of the lesions in chest x ray. In adult age group 17 (34%) subjects and in elderly age group 15 (30%) subjects had unilateral lesions whereas, 33 (66%) subjects in adults group and 34 (68%) subjects in elderly group had bilateral lesions without any statistical significance. Only one subject in the elderly age group had normal chest-x-ray. (Table 1)

We analysed the zonal distribution of the lesions and found that elderly subjects were more likely to have multizonal involvement when compared to the adults who had predilection for upper zone involvement. In adult group 12 (24%) subjects had upper zone involvement compared to only four (8%) elderly subjects, whereas 41 (82%) of elderly subjects had multizonal involvement compared to 35 (70%) of the adults. (Table 2)

We compared character of the lesions such as infiltrates, cavitary lesions, miliary shadows, consolidation, collapse, fibrosis, pleural effusion and pneumothorax. Most common type of lesion was infiltrates (in 70% of adults and in 72% of elderly) followed by cavitary lesion (in 32% of subjects in both groups), with no inter-group statistical significance. However, pneumothorax was found only in two (4%) elderly subjects, whereas pleural effusion was found in 10 (20%) adult subjects and in five (10%) elderly subjects. (Table 3)

We studied extent of lesions as per the classification proposed by the national tuberculosis association of the USA³ as following:

Minimal-The total extent, regardless of distribution, should not exceed the volume of lung on one side that occupies the space above the second chondro-sternal junction and the spine of the fourth or the body of the fifth thoracic vertebra. There should not be cavitation.

Moderately Advanced-The total extent should not exceed the following limits:

- A. disseminated lesions of slight to moderate density that may extend throughout the total volume of one lung or the equivalent in both lungs.
- B. Dense and confluent lesions limited in extent to one-third the volume of one lung.
- C. Total diameter of cavitation, if present, must be less than 4cm.

Far Advanced: Lesions more extensive than moderately advanced lesions.

In adult group eight (16%) subjects had minimal lesions whereas in elderly group only four (8%) had such lesions. Moderately advanced lesions were found in 19 (38%) adult subjects and in 16 (32%) of elderly subjects. Elderly patients were found to have more frequency of far advanced lesions- 30 (60%) against 23 (46%) in adults. (Table 4)

We compared extent of lesions in chest x ray of those subjects who were sputum AFB positive in both groups. In adult group 34 (68 %) subjects and in elderly group 32 (64%) subjects were sputum AFB positive. Among them, in adult group 18 (53%) subjects and in elderly group 20 (63%) subjects had far advanced lesions in chest x ray. We found that far advanced lesions were more likely to yield sputum AFB positivity in both groups. (Table 5)

Discussion: In India, Tuberculosis continues to be a major health hazard with approximately 40% of its population being infected with the TB bacillus. Constantly increasing geriatric population which is more susceptible to develop active Tuberculosis, acts as an additional challenge in achieving the goal of zero TB deaths by the year 2025 set by the Government of India. When it comes to the diagnosis of TB, it is well known that sputum smear AFB is more specific than sensitive and chest x ray is more sensitive than specific. Also, sputum positivity depends on the bacillary load which in turn depends on the nature of

lesions. Hence, chest x ray is an indispensable tool in timely diagnosis and management of sputum negative TB. With this background, we conducted this study to compare radiological features of TB between elderly and adult subjects.

We found no difference between the two groups in terms of laterality of the lesions in chest x ray. However, in terms of the radiological character of the lesions, in both the groups, infiltration was most common followed by cavitory lesions. While SK Das & RS Mukherjee et al⁴ and Salvador Alvarez et al⁵ have observed similar findings; our study differs from that of Dheeraj Gupta et al⁶ who have reported equal percentage of these two types of lesions in both the groups.

Interestingly, multizonal involvement was more common among elderly, whereas the classical predilection for upper zone involvement was more common in adults. Also, more than half (60%) of the elderly subjects had far advanced lesions, whereas, comparatively lesser adults (46%) had far advanced lesions. This observation hints towards the possible late presentation of the elderly subjects to health care facilities.

Far advanced chest x ray involvement accounted for most number of sputum AFB positive cases in both the groups. Supportive evidence can be found in the studies of Jamalludin Ab Rahman et al⁷ and T McWilliams et al⁸. But, between the groups, interestingly, adults with far advanced lesions were more likely to produce positive sputum - 18 out of 23 (78%) than the elderly - only 20 out of 30 (66%) even after sputum induction. In other words, one third of the elderly remained sputum negative in spite of having extensive chest x ray involvement. One reason could be the presence of non cavitory lesions in such cases. This has two implications. First, presence of extensive non cavitory lesions in elderly need not be a point against tuberculosis just because the sputum is negative. It is worth remembering that, owing to debility,

malnutrition and poor muscle strength, cough is less vigorous and less efficient in elderly subjects akin to the situation in diseases like HIV-AIDS. Secondly, elderly patients may need advanced diagnostic procedures like bronchoscopy in order to establish the microbiological diagnosis and there should be low threshold to advocate such procedures.

Conclusion: We found that there is no difference in character of the lesions in adult and elderly age group subjects. Elderly age group had multizonal involvement and more frequent far advanced lesions on the chest radiograph.

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Tables:

Table 1: Unilateral V/S Bilateral Lesions

	Adults		Elderly	
	No.	(%)	No.	(%)
Unilateral Lesions	17	34	15	30
Bilateral Lesions	33	66	34	68
Normal X Ray	0	0	1	2
Total	50	100	50	100

Table 2: Location of the Lesions

	Adults		Elderly	
	No.	(%)	No.	(%)
Upper Zone/S Only	12	24	4	8
Middle Zone/S Only	1	2	1	2
Lower Zone/S Only	2	4	4	8
Multiple Zones	35	70	41	82
Total	50	100	50	100

Table 3: Character of the Lesions

	Adults		Elderly	
	No.	(%)	No.	(%)
Infiltrations	35	70	36	72
C0avity	16	32	16	32
Consolidation	8	16	7	14
Col0lapse	1	2	2	4
Miliary	2	4	3	6
SPN	0	0	1	2
Fibrosis	6	12	9	18
Calcification	1	2	4	8
Pleural Effusion	10	20	5	10
Pneumothorax	0	0	2	4

Table 4: Extent of the Lesions

	Adults		Elderly	
	No.	(%)	No.	(%)
Minimal	8	16	4	8
Moderately Advanced	19	38	16	32
Far Advanced	23	46	30	60
Total	50	100	50	100

Table 5: Distribution of Sputum Positive Status With Respect To Radiological Extent of the Lesions in Both Groups

Radiological Extent of The Lesions	Sputum AFB Positive Adults (N = 34)		Sputum AFB Positive Elderly (N = 32)	
	No.	(%)	No.	(%)
Minimal	3	9	2	6
Moderately Advanced	13	38	10	31
Far Advanced	18	53	20	63
Total	34	100	32	100