Original Article

Clinical aspects of pulmonary tuberculosis in elderly patients from a university hospital in Rio de Janeiro, Brazil*

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Abstract

Objective: To evaluate clinical aspects and the diagnosis of pulmonary tuberculosis (PT) in the aged. **Methods:** We compared 117 patients over 60 years of age (elderly group) and 464 patients aged 15 to 49 years old (nonelderly group) treated at the Thoracic Diseases Institute of the Federal University of Rio de Janeiro, from 1980 to 1996. **Results:** Previous history of PT was predominant in the elderly group (OR = 2.09; 95% CI = 1.26-3.45; p = 0.002), whereas household contact with PT was predominant in the nonelderly group (OR = 0.26; 95% CI = 0.10-0.66; p = 0.002). Mean time for diagnosis was 90 days in the elderly group and 60 days in the nonelderly group. In the elderly group, dyspnea (OR = 1.64; 95% CI = 1.06-2.53; p = 0.018) and weight loss (OR = 1.66; 95% CI = 1.01-2.82; p = 0.047) were predominant. In the nonelderly group, hemoptysis (OR = 0.51; 95% CI = 0.32-0.81; p = 0.002), chest pain (OR = 0.62; 95% CI = 0.40-0.97; p = 0.027) and fever (OR = 0.55; 95% CI = 0.35-0.86; p = 0.006) were more common. The most common radiological abnormalities were infiltrates and cavitations. Bilateral involvement was more common in the elderly patients (OR = 1.76; 95% CI = 1.12-2.78; p = 0.009). There were no differences between the two groups regarding positivity for *Mycobacterium tuberculosis* identified through tuberculin skin testing, sputum smear microscopy and culture. **Conclusions:** There are few clinical and laboratory differences between the age groups. The delayed diagnosis in the elderly group can be explained by the low clinical suspicion in these patients.

Keywords: Tuberculosis, pulmonary; Aged; Signs and symptoms, respiratory; Diagnosis.

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Introduction

It is estimated that, between 2002 and 2020, *Mycobacterium tuberculosis* will infect 1 billion individuals worldwide, of whom 150 million will develop active tuberculosis (TB) and 36 million will die, making TB the principal cause of death by infectious diseases in adults in developing countries. The World Health Organization identified a group of 22 countries that, together, account for 80% of TB cases worldwide. Among those 22 countries, Brazil ranks 15th, with 116,000 new cases.[1] In old age, the signs and symptoms of TB presentation are difficult to measure, due to the frequent coexistence with other respiratory, cardiovascular or systemic diseases of similar clinical profiles, as well as to their lack of specificity, if compared to nonelderly patients. Therefore, constitutional complaints (fever, appetite loss and weight loss) and nonspecific respiratory symptoms (dry cough, dyspnea and chest pain) can be isolated manifestations of the disease.[2-4] Some authors also emphasize the difficulty of the elderly in reporting their complaints, due to memory deficit, confusional states, senility and speech impairment, as well as to the fact that elderly individuals occasionally attribute such symptoms to other diseases.[3,5,6] As a result of this combination of factors, there is greater delay in clinical suspicion and consequent worsening of general health status.[2] Diagnostic methods for the elderly are not as efficient as are those for the nonelderly:[2,3] sputum smear microscopy and sputum culture can be negative; radiological findings can be nonspecific;[2,5] and the role of tuberculin testing is extremely controversial.[7-10] The few studies conducted in Brazil, despite emphasizing the technical difficulties involved in managing pulmonary TB in the elderly, have not revealed significant clinical and radiological differences such as those reported in the majority of studies in the literature.[11-13] Those studies conducted in Brazil refer to specific populational groups, and there have been no other comprehensive studies on this subject. In the state of Rio de Janeiro, due to the worrisome epidemiological situation of TB and the demographic characteristics of the population,[14] the differences in the presentation of the disease take on added importance. A few studies have addressed this subject: in Niterói, the participation of elderly individuals among the cases of TB has been estimated at 7.6%;[15] and, in Campos dos Goytacazes, the incidence rate among the elderly was found to have increased from 1997 to 2000, always higher than that found in the general population.[16] The present study was motivated by the epidemiological profile of pulmonary TB in Brazil, which presents an increased elderly population,[14] simultaneously with the maintenance of endemic pulmonary TB. The objective of this study was to increase the body of knowledge regarding the principal clinical and diagnostic aspects of pulmonary TB in elderly patients: to describe the clinical and radiological presentation of the disease; to determine the positivity frequency of diagnostic methods; and to analyze the biological and social aspects of pulmonary TB in different age brackets.

Methods

This study adopted a retrospective case-control model and was developed based on a review of the clinical charts entered into the nosological database of the *Instituto de Doenças do Tórax da Universidade Federal do Rio de Janeiro* (IDT-UFRJ, Thoracic Diseases Institute of the Federal University of Rio de Janeiro) between January of 1980 and December of 1996. A total of 117 cases (elderly patients aged 60 or older) and 464 controls (nonelderly patients ranging in age from 15 to 49 years) were selected, totaling 581 patients, ensuring a ratio of 4 controls per case. Controls were selected in the 30-day period prior to or after the occurrence of each case, without any other type of matching.

In this study, we included patients with pulmonary TB who met the following criteria: confirmed or probable diagnosis of pulmonary TB, in accordance with the norms of the National Ministry of Health,[17] although we also considered histopathological findings consistent with pulmonary TB, such as granulomatous chronic inflammatory process with caseous necrosis and histiocytic infiltrate of multinucleated giant cells; exclusive clinical monitoring at the IDT-UFRJ; and use of regimen I (two months of rifampicin+isoniazid+pyrazinamide followed by four months of rifampicin+isoniazid).[17-19]

The following exclusion criteria were defined in order to ensure homogeneity of the sample studied: change of diagnosis; initial suspicion of nontuberculous mycobacteriosis or multidrug resistance; HIV co-infection; and age bracket from 50 to 59 years. We opted for the exclusion of this age bracket, since the highest incidence of the disease in the Brazilian

population is in the age brackets up to 49 years.[20] In addition, this exclusion allows a clear distinction to be drawn between elderly and nonelderly, with a 10-year gap between the two groups. All of the information was collected from clinical charts, according to reports of the clinical and surgical teams of the hospital, in addition to reports from the Departments of Bacteriology, Radiology and Pathological Anatomy. The following variables were studied: gender (male, female); age (years); race (white, mulatto, black or unknown); state of origin; residence (cities classified as state capital, metropolitan region, rural or out-of-state); history of pulmonary TB; contact with pulmonary TB; respiratory symptoms (cough, expectoration, dyspnea, hemoptysis and chest pain); constitutional symptoms (fever, adynamia, sweats, appetite loss and weight loss), time since symptom onset (in days, from symptom onset until diagnosis), direct microscopy (Ziehl-Neelsen technique) of available specimens (sputum, bronchial lavage, bronchoalveolar lavage, pleural biopsy and pleural fluid); culture medium for mycobacteria (Löwenstein-Jensen medium); histopathological examination (hematoxylin and eosin staining); tuberculin test (reaction to the Mantoux test or to purified protein derivative RT-23); and radiological aspects of chest X-ray in anteroposterior and lateral incidences, including infiltrates, cavities and lung mass, as well as pleural alterations such as effusion, pleurisy and pneumothorax. The chi-square test or Fisher's test was used to compare categorical variables between the groups, and numeric variables were compared using Mann-Whitney test (time since symptom onset). Odds ratios and the respective 95% confidence intervals were used in order to compare the elderly and nonelderly groups in terms of exposure. The level of significance adopted was 5% ($p < 0.05$). The statistical analysis was made using SAS System software. The study was approved by the local ethics committee, in accordance with the guidelines put forth in Brazilian National Health Council Resolution nº. 196/96.

Results

Social and epidemiological characteristics of elderly and nonelderly patients were analyzed and are described in Table 1. Of the total 581 patients

Table 1 - Distribution of sociodemographic variables. IDT-UFRJ, 1980-1996.

Variable	Categories	Elderly		Nonelderly		Total	
		n	(%)	n	(%)	n	(%)
Gender (n = 581)	Male	92	(78.6)	299	(64.4)	391	(67.3)
	Female	25	(21.4)	165	(35.6)	190	(32.7)
Age bracket (n = 581)	15 to 19 years	-	-	40	(8.6)	40	(6.9)
	20 to 29 years	-	-	177	(38.2)	177	(30.5)
	30 to 39 years	-	-	145	(31.2)	145	(25.0)
	40 to 49 years	-	-	102	(22.0)	102	(17.6)
	60 to 69 years	81	(69.2)	-	-	81	(13.9)
	≥70 years	36	(30.8)	-	-	36	(6.1)
Race (n = 574)	White	65	(55.5)	208	(45.5)	273	(48.2)
	Mulatto	40	(34.2)	152	(34.4)	192	(33.0)
	Black	12	(10.3)	97	(20.1)	109	(18.8)
Region of origin (n = 571)	Southeast	77	(69.4)	357	(77.6)	434	(76.0)
	South	-	-	3	(0.7)	3	(0.5)
	Northeast	34	(30.6)	93	(20.2)	127	(22.2)
	North	-	-	5	(1.1)	5	(0.9)
	Central-west	-	-	2	(0.4)	2	(0.4)
Residence (n = 567)	State capital	78	(70.3)	278	(61.0)	356	(62.8)
	Metrop. Reg.[a]	31	(27.9)	165	(36.2)	196	(34.6)
	Rural	1	(0.9)	10	(2.2)	11	(1.9)
	Other states	1	(0.9)	3	(0.6)	4	(0.7)

[a]Metrop. Reg.: Metropolitan Region (cities in the Baixada Fluminense, Niterói and São Gonçalo).

with pulmonary TB, 391 (67.3%) were males and 190 (32.7%) were females. The mean age of population studied was 38.5 years (range, 15-87 years). The elderly group comprised patients ranging in age from 60 to 87 years (mean, 66.6 ± 16.5 years). The mean age in the nonelderly group was 31.4 ± 9 years (range, 15 to 49 years). In the elderly group, a history of pulmonary TB was found in approximately 31% of the patients and was approximately twice as common as in the nonelderly group. In the nonelderly group, 34% had had contact with pulmonary TB, and this difference was significant (p = 0.002). The remaining characteristics related to pulmonary TB are described in Table 2. Time since pulmonary TB symptom onset, which was determined in 566 patients, ranged from 0 to 720 days. The median time since pulmonary TB symptom onset was 90 days for the elderly group and 60 days for the nonelderly group, clearly demonstrating the significant difference between the groups (p = 0.0001). However, there were extreme cases in which elderly patients went undiagnosed for more than one year after symptom onset. Respiratory symptoms were studied in 578 patients and were identified in 561, translating to 112 (96.5%) of the elderly patients and 449 (97.2%) of the nonelderly patients. Table 3 shows the frequency and discrimination of these symptoms by group. In this analysis, cough was the equally most common symptom in the sample as a whole (>80%) and was found to present significant associations: with dyspnea in the elderly; and with hemoptysis and chest pain with the nonelderly. Dyspnea was reported in 153 (33.1%) of the nonelderly and 52 (44.8%) of the elderly (p = 0.018), whereas hemoptysis was reported in 216 (46.7%) and 36 (31%), respectively (p = 0.002), and chest pain was reported in 220 (47.6%) and 42 (36.2%), respectively (p = 0.027). Constitutional symptoms were common in both groups (Table 3). However, analyzing each symptom separately, we found that fever was statistically more common in the nonelderly group (p = 0.006), with 314 reports (69.3%), whereas weight loss was more common in the elderly patients (p = 0.047), with 87 reports (79.1%). There was no significant difference regarding the remaining items studied (adynamia, sweating and appetite loss).

Table 4 synthesizes the findings of the principal diagnostic methods for pulmonary TB. The frequency of positivity was high for all diagnostic methods and in both groups. Only 12 elderly patients (10.3%) and 34 nonelderly patients (7.3%) were diagnosed by probability. The others received bacteriological confirmation. The only bacteriological method with confirmed statistical significance in favor of the nonelderly was bronchial lavage microscopy, which was positive in 60 (47.6%) of the nonelderly patients versus 11 (28.2%) of the elderly patients (p = 0.032). Positivity in sputum smear microscopy was comparable in the two groups, ranging from 65.1% in the elderly group to 69.4% in the nonelderly group. Similarly, sputum culture presented high positivity in the sample as a whole (>72%), without statistical significance. The tuberculin test also showed similar reactivity between the groups (>75%), and the most frequently found chest X-ray alterations were infiltrates (>90%) and cavitations (>70%). Chest X-ray, however, did not reveal predominance of any of these findings in the groups studied (Table 4). Nevertheless, the extent of

Tabela 2 - Statistical analysis of personal characteristics and characteristics related to the disease between elderly and nonelderly groups. IDT-UFRJ, 1980-1996.

Variable	Categories	Elderly		Nonelderly		Odds Ratio (95% CI)	p
		n	(%)	n	(%)		
Gender (n = 581)	Male	92	(78.6)	299	(64.4)	2.03	0.003
	Female	25	(21.4)	165	(35.6)	(1.23-3.38)	
Race (n = 574)	White	65	(55.6)	208	(45.5)	1.50	0.052
	Non-white	52	(44.4)	249	(54.5)	(0.98-2.30)	
History of tuberculosis (n = 549)	Yes	33	(31.4)	80	(18.0)	2.09	0.002
	No	72	(68.6)	364	(82.0)	(1.26-3.45)	
Contact with tuberculosis (n = 331)	Yes	6	(11.8)	95	(33.9)	0.26	0.002
	No	45	(88.2)	185	(66.1)	(0.10-0.66)	

95% CI: 95% confidence interval.

Tabela 3 - Statistical analysis of respiratory and constitutional symptoms. IDT-UFRJ, 1980-1996.

Variable	Categories	Elderly		Nonelderly		Odds Ratio (95% CI)	p
		n	(%)	n	(%)		
Respiratory symptoms (n = 578)	Present	112	(96.5)	449	(97.2)	0.81	0.455
	Absent	4	(3.5)	13	(2.8)	(0.24-3.01)	
Cough	Yes	94	(81.0)	401	(86.8)	0.65	0.113
	No	22	(19.0)	61	(13.2)	(0.37-1.15)	
Expectoration	Yes	81	(69.8)	296	(64.1)	1.30	0.244
	No	35	(30.2)	166	(35.9)	(0.82-2.06)	
Dyspnea	Yes	52	(44.8)	153	(33.1)	1.64	0.018
	No	64	(55.2)	309	(66.9)	(1.06-2.53)	
Hemoptysis	Yes	36	(31.0)	216	(46.7)	0.51	0.002
	No	80	(69.0)	246	(53.3)	(0.32-0.81)	
Chest pain	Yes	42	(36.2)	220	(47.6)	0.62	0.027
	No	74	(63.8)	242	(52.4)	(0.40-0.97)	
Constitutional symptoms (n = 563)	Present	105	(95.4)	406	(89.6)	2.43	0.058
	Absent	5	(4.6)	47	(10.4)	(0.90-7.13)	
Fever	Yes	61	(55.4)	314	(69.3)	0.55	0.006
	No	49	(44.6)	139	(30.7)	(0.35-0.86)	
Adynamia	Yes	38	(34.5)	128	(28.3)	1.34	0.194
	No	72	(65.5)	325	(71.7)	(0.84-2.13)	
Sweats	Yes	16	(14.5)	100	(22.1)	0.60	0.080
	No	94	(85.5)	353	(77.9)	(0.32-1.10)	
Appetite loss	Yes	38	(34.5)	155	(34.2)	1.01	0.948
	No	72	(65.5)	298	(65.8)	(0.64-1.61)	
Weight loss	Yes	87	(79.1)	315	(69.5)	1.66	0.047
	No	23	(20.9)	138	(30.5)	(1.01-2.82)	

95% CI: 95% confidence interval.

the disease, as evaluated by quantifying unilateral and bilateral damage, presented a statistically significant difference, with 50% of the elderly patients presenting bilateral damage, compared with 36% of the nonelderly patients (p = 0.009). Pleural histopathology, which is rarely used in this population of patients, presented satisfactory performance in both groups, with 50% positivity in the elderly patients and 61% in the nonelderly patients.

Discussion

In the patient sample studied, the proportion of males (64.4%) and females (35.6%) among the nonelderly patients followed the pattern of the population with pulmonary TB treated at the public health clinics of Rio de Janeiro, as estimated by the Municipal Department of Health.[21] In the elderly, the male predominance suggests two hypotheses: greater predisposition to TB in males, due to biological mechanisms that remain unconfirmed; and greater exposure to *M. tuberculosis* when the members of this cohort were still young and had a more intense social life.[20,22] There were more black individuals (20%) in the nonelderly group. Although we recognize the fact that our patient sample is not representative of the general population, there is no reason to believe that this difference between the two groups in terms of their racial makeup influenced decisions regarding referral to the IDT-UFRJ. Although this difference was not statistically significant, it is plausible to consider that the greater proportion of white individuals in the elderly population reflects the fact that whites have historically enjoyed better socioeconomic conditions in Brazil. The description of the place of origin of the patients reflects the strong presence of individuals from the Northeast of Brazil in the city of Rio de Janeiro. Their origin, in large number, from the metropolitan area, suggests that it is more difficult for these individuals to access health care services near their

Tabela 4 - Statistical analysis of diagnostic methods. IDT-UFRJ, 1980-1996.

Variable	Categories	Elderly		Nonelderly		Odds Ratio (95% CI)	p
		n	(%)	n	(%)		
Tuberculin test (n = 311)	Positive	37	(75.5)	209	(79.8)	0.78	0.501
	Negative	12	(24.5)	53	(20.2)	(0.36-1.71)	
Sputum smear microscopy (n = 524)	Positive	68	(65.1)	290	(69.4)	0.81	0.396
	Negative	37	(34.9)	128	(30.6)	(0.50-1.31)	
Sputum culture (n = 493)	Positive	72	(72.0)	306	(77.9)	0.73	0.216
	Negative	28	(28.0)	87	(22.1)	(0.43-1.24)	
Bronchial lavage microscopy (n = 165)	Positive	11	(28.2)	60	(47.6)	0.43	0.032
	Negative	28	(71.8)	66	(52.4)	(0.18 - 0.99)	
Bronchial lavage culture (n = 157)	Positive	20	(57.1)	88	(72.1)	0.52	0.092
	Negative	15	(42.9)	34	(27.9)	(0.22-1.20)	
Culture of pleural biopsy sample (n = 51)	Positive	2	(40.0)	18	(39.1)	1.04	0.660
	Negative	3	(60.0)	28	(60.9)	(0.11-8.83)	
Histopathology of pleural biopsy sample (n = 47)	Positive	3	(50.0)	25	(61.0)	0.64	0.465
	Negative	3	(50.0)	16	(39.0)	(0.09-4.68)	
Radiological location (n = 527)	Bilateral	52	(50.0)	153	(36.2)	1.76	0.009
	Unilateral	52	(50.0)	270	(63.8)	(1.12-2.78)	
Pulmonary infiltrate (n = 527)	Yes	97	(93.3)	407	(96.2)	0.54	0.147
	No	7	(6.7)	16	(3.8)	(0.20-1.51)	
Radiological cavitation (n = 527)	Yes	73	(70.2)	301	(71.2)	0.95	0.819
	No	31	(29.8)	122	(28.8)	(0.58-1.57)	

95% CI: 95% confidence interval.

place of residence. However, it is of note that the IDT-UFRJ is a referral facility, and that its contingent of patients has always included cases that were more complex and that primary health care facilities were unable to solve. Therefore, it is to be expected that it would treat patients from other cities and even from other states. In the present study, a history of pulmonary TB was found to be more common in the group consisting of elderly patients, 31% of whom were being retreated. There is a relative consensus in the literature that endogenous infection is the principal pathogenic mechanism of pulmonary TB in the elderly, as it has been shown to be in up to 95% of cases.[23] However, most of the studies addressing this issue were carried out in countries of low prevalence, whereas Brazil presents a hyperendemic epidemiological profile. The contribution of exogenous infection in Brazil remains unclear. Nearly 70% of the elderly patients who contract pulmonary TB have no history of the disease. How many of those individuals represent cases of recent infection remains a topic of debate. Contact with TB in the home, which was confirmed in a good part of the nonelderly patients (34%), suggests that exogenous infection can be an important mechanism in this age group. Since few of the elderly patients mentioned this risk factor, the transmission might have been preferentially endogenous or might not have been properly determined, due to an information bias.

The principal symptoms of pulmonary TB, such as cough and expectoration, were present in approximately 80 and 65%, respectively, of the elderly and nonelderly patients studied. This finding is relevant in that it suggests that there is no distinction between the presentation of the disease in the elderly and that seen in the nonelderly. The only respiratory symptom that was more common in the elderly was dyspnea, which was identified in 45% of the elderly patients. Whether dyspnea can be attributed exclusively to pulmonary TB is debatable, since it can be caused by various concomitant conditions, such as heart disease and other lung diseases. In contrast, hemoptysis and chest pain, although more common in the nonelderly, were present in more than 30% of the elderly. The hemoptysis might have been related to the fact that the IDT-UFRJ is a referral center for the treatment of massive hemoptysis. Regarding chest pain, it could be a typical characteristic of the nonelderly population. Regarding symptomatology,

weight loss was the most common constitutional symptom in the two groups, although it was statistically more common in the elderly. The other significant constitutional symptom was fever, which was more common in the nonelderly. This finding is consistent with the fact that many elderly patients do not present fever. Nevertheless, more than half of the patients in the elderly group reported pulmonary TB-related fever. The remaining constitutional symptoms evaluated were very similar between the elderly and nonelderly. Clinically, pulmonary TB symptoms in the elderly group resembled the traditional respiratory symptomatology. However, only constitutional complaints of little specificity, such as weight loss and fever, were more often observed in the elderly, increasing the importance of clinical suspicion in making an accurate diagnosis. The literature shows that nonspecific symptoms predominate,[24] and respiratory findings vary from study to study.[24,25] The median duration of clinical symptoms in the elderly (90 days) was greater than that observed in the nonelderly (60 days), which can reflect the low clinical suspicion of pulmonary TB in the elderly, especially in those with predominant nonspecific symptoms and atypical X-ray findings.[25] Other potential explanations include the difficulty that the elderly have in expressing their complaints and the presence of accompanying diseases with similar symptoms, which can mask the symptomatic profile of pulmonary TB for weeks or months. However, there have been studies in which the symptomatic period did not differ among age brackets but did differ in relation to radiological findings.[25,26] In the present study, there was no difference between the two groups in terms of the infiltrates and cavitations seen on chest X-rays. Therefore, we can conclude that, radiologically, suspicion of the disease in the sample observed was possible in the two groups, and no atypical radiological forms (lesions in lower lobes, masses, atelectasis, etc.) were found in the elderly group, as has been reported in other countries whose general prevalence in the population is considerably lower than that seen in Brazil.[25] The extent of pulmonary TB, evaluated by quantifying unilateral and bilateral injury, revealed that bilateral damage was more common in the elderly. This is consistent with the higher immunological susceptibility and longer symptomatic period observed in this group, suggesting that diagnostic delay allows greater progression of pulmonary TB. This observation was confirmed in the subgroup of patients over 70 years of age. The proportion of those patients presenting bilateral disease was even greater. The tuberculin test, despite its lack of diagnostic power, revealed that the majority (>75%) of pulmonary TB patients are reactive, regardless of age, which is in agreement with the findings of other authors, who demonstrated that up to 80% of elderly patients present sensitivity on the tuberculin test.[27] In contrast, other authors have reported that younger patients present greater sensitivity on the same test.[28]

Regarding bacteriological methods, culture for mycobacteria produced positive results more often than did direct microscopy, regardless of the specimen type. In the case of sputum, its high positivity was equivalent in the two groups, >70%, showing it to be a good specimen for the diagnosis of pulmonary TB in the elderly as well. These data are in accordance with those obtained for other countries with different epidemiological profiles, which also showed similar direct microscopy and culture results for elderly and younger patients.[29] The only material that revealed predominance of age bracket was bronchial lavage, with a higher rate of positivity in the nonelderly. However, it is a method that has fallen into disuse and is generally replaced by induced sputum or bronchoalveolar lavage in patients with little expectoration. Although pleural biopsy presented good positivity, it was rarely used in the elderly group, which hinders an analysis of this age bracket. In the nonelderly, the culture was positive in 39%, and the histopathology was suggestive in 61% of the slides. The percentage of probability diagnoses was low in the two groups studied. This suggests that, when requested by the medical team, bacteriological, radiological or histopathological confirmation of TB was not difficult, even in the elderly individuals, suggesting that usual methods for the diagnosis of pulmonary TB are reliable in this age group. This study and others in the Brazilian literature[12,13] confirm a relatively similar symptomatic profile between elderly and nonelderly individuals. The rate of positivity on conventional bacteriological tests was similar in the two groups. However, diagnostic delay was the rule for most elderly patients, probably because pulmonary TB is typically associated only with the younger, impoverished population. Although this phenomenon is also seen in developed countries,[23] it is inexplicable in a high prevalence country such as Brazil, where the diagnostic hypothesis of pulmonary TB should always

be considered in elderly individuals with respiratory and constitutional symptoms.

The present study presents methodological limitations due to the retrospective model adopted and the possibility of information bias which results from the use of secondary data. Nevertheless, the existence of biological and epidemiological aspects related to pulmonary TB in the elderly, such as male gender and history of pulmonary TB was clear. Regarding the clinical aspect, it was possible to see that there were no differences between the groups in terms of the overall symptomatology (respiratory and constitutional symptoms taken together). Taking these symptom groups separately, however, it was possible to establish some interesting associations: dyspnea and weight loss were more common in the elderly, whereas hemoptysis, chest pain and fever were more common in the nonelderly. Chest X-ray did not reveal atypical forms in the presentation of the elderly or predominant images in either of the groups. Bilateral disease, however, was more common in the elderly and seems to be related with the delay in diagnosis. Since there are few differences in the clinical presentation and positivity of the principal diagnostic methods, this finding suggests low clinical suspicion of pulmonary TB in this age group.

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