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Tuberculosis in elderly patients in the city of Cali, Colombia: a hospital-based cohort study

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TO THE EDITOR:

Elderly patients are at an increased risk of tuberculosis because of immune system alterations affecting cell-mediated responses.[1] Several studies have shown that tuberculosis incidence and mortality rates are significantly higher in patients over 80 years of age than in those in any other age group.[2] Elderly patients are also at an increased risk of developing age-related diseases such as cancer and cardiovascular disease.[3] In Colombia, tuberculosis remains a public health problem, and, with the increase in life expectancy, it has become an issue in the elderly population. In addition, data on tuberculosis treatment outcomes and adverse reactions in patients over 65 years of age are limited.

Here, we report 108 cases of tuberculosis in elderly patients treated at Fundación Valle del Lili, a university hospital located in the city of Cali, Colombia, where the tuberculosis notification rate in 2015 was 40 cases per 100,000 population. All cases were recorded in the institutional tuberculosis database between January 1st, 2011 and December 31st, 2016. The inclusion criteria were as follows: being 65 years of age or older and having been diagnosed with tuberculosis on the basis of an AFB-positive sputum smear, a positive culture for *Mycobacterium tuberculosis*, or a positive GeneXpert result. Cases of nontuberculous mycobacterial infection were excluded, as were suspected but unconfirmed cases of tuberculosis.

Descriptive statistics were calculated for all variables. The chi-square test or Fisher's exact test was used in order to compare categorical variables, and a t-test was used in order to compare continuous variables. A subanalysis was performed on patients in the 65- to 79-year age bracket (the non-octogenarian group) and on those ≥ 80 years of age (the octogenarian group). Patients for whom there was information regarding treatment outcomes were evaluated and divided into two groups, namely, treatment success and treatment failure. Survival analysis was performed with the Kaplan-Meier method. Differences in survival between the two age groups were assessed by the log-rank test. A value of $p < 0.05$ was considered significant for all statistical analyses. All analyses were performed with the Stata statistical software package, version 14.0 (StataCorp LP, College Station, TX, USA).

Patient clinical and sociodemographic characteristics, as well as comorbidities, risk factors for tuberculosis, and treatment outcomes, are summarized in Table 1. The most common comorbidities in the non-octogenarian group were diabetes, in 36%; COPD, in 23%; and malignancy, in 21%. In the octogenarian group, the most common comorbidities were COPD, in 46%; malignancy, in 14%; and diabetes, in 7%. Diabetes was less common in the octogenarian group than in the non-octogenarian group, whereas COPD was more common in the former than in the latter. There was a significant difference between the two groups regarding diabetes ($p = 0.004$) and COPD ($p = 0.017$). With regard to tuberculosis presentation, there were no differences between the two groups.

Of the sample as a whole, 25 (23%) had a diagnostic delay of 31-90 days and 39 (36%) had a diagnostic delay of more than 90 days. In the treatment success and treatment failure groups, respectively, 10 (22%) and 7 (32%) had a diagnostic delay of 31-90 days, whereas 15 (33%) and 4 (18%) had a diagnostic delay of more than 90 days.

Of the 108 patients included in the study, 106 were started on antituberculosis therapy and 2 died before receiving treatment. Thirty-six patients (34%) were lost to follow-up, and 20 (18%) died after treatment initiation. Forty-one patients were excluded from our analysis because they did not complete tuberculosis treatment at our institution or because they were lost to follow-up. There were no significant differences between the treatment success and treatment failure groups regarding risk factors for tuberculosis, the exception being malignancy ($p = 0.013$).

At five years of follow-up, 24 (21.77%) had died, the remaining 84 being censored at follow-up. Five-year overall survival for tuberculosis was 78.23%. There were no differences in survival between the non-octogenarian and octogenarian groups ($p = 0.5936$).

Twenty patients (18%) died after tuberculosis treatment initiation. Of those 20 patients, 10 (50%) died of tuberculosis. Of those, 1 died of central nervous system tuberculosis. Other causes of death included lung cancer, in 10%; hepatocellular carcinoma, in 5%; gastrointestinal bleeding, in 15%; intra-abdominal bacterial infection,

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Table 1. Descriptive statistics and univariate analysis results in tuberculosis patients in the 65- to 79-year age bracket (the non-octogenarian group) and in those ≥ 80 years of age (the octogenarian group).[a]

Variable	Total sample (N = 108)		Non-octogenarian patients (n = 80)		Octogenarian patients (n = 28)		p
	n	%	n	%	n	%	
Age, years[b]	74.0 (65.0-91.0)		72.0 (67.5-76.0)		84.0 (81.0-86.0)		
Male sex	64	59	50	63	14	50	0.247
Ethnic group[c]							
Hispanic American	71	66	58	68	17	61	
Afro-Colombian	7	6	6	8	1	3	1
European ancestry	6	6	3	3	3	11	
Native South American	3	3	3	3	-	-	
Comorbidities							
Diabetes	31	29	29	36	2	7	0.004
COPD	31	29	18	23	13	46	0.017
Malignancy	19	18	17	21	4	14	0.451
End-stage renal disease	5	5	4	5	1	3	1
HIV infection	4	4	4	5	-	-	0.571
Chronic hepatitis C	2	2	2	3	-	-	
Bariatric surgery	1	1	1	1	-	-	1
Solid organ transplantation	1	1	1	1	-	-	1
Risk factors for TB							
Cigarette smoking	36	33	30	38	9	32	0.648
Previous TB treatment	14	13	10	13	4	14	0.811
Household contact	8	7	6	8	2	7	1
Positive tuberculin skin test	2	2	2	3	-	-	0.487
Drug abuse	2	2	2	3	-	-	1
Duration of symptoms prior to TB diagnosis, days[d]							
≤ 30	38	35	18	23	7	28	0.302
31-90	25	23	32	42	6	24	
≥ 91	39	36	27	35	12	48	
TB presentation							
Pulmonary	87	81	64	80	23	82	0.805
Extrapulmonary	21	19	16	20	5	18	
Pleural	4	4	4	5	-	-	0.571
Central nervous system	3	3	3	4	-	-	0.567
Osteoarticular	3	3	2	3	1	4	1
Genitourinary	3	3	2	3	1	4	1
Disseminated	3	3	3	4	-	-	0.567
Spinal	2	2	1	1	1	4	0.453
Gastrointestinal	1	1	-	-	1	4	0.259
Lymph node	1	1	1	1	-	-	1
Cutaneous	1	1	-	-	1	4	0.259
Treatment outcomes							
Treatment success	45	42	33	41	12	43	
Loss to follow-up	37	34	25	31	9	32	0.618
Death	20	18	15	19	5	18	
Transfer	4	4	4	5	-	-	
Treatment failure	2	2	3	4	2	7	

TB: tuberculosis. [a]Data expressed as n (%), except where otherwise indicated. [b]Data expressed as median (interquartile range). [c]Missing data for 21 patients. [d]Missing data for 6 patients.

in 10%; cryptococcosis/HIV coinfection, in 5%; and stroke, in 5%. Case-fatality rates were similar between the non-octogenarian and octogenarian groups (19% vs. 18%).

Tuberculosis carries a high disease burden and a high morbidity in Colombia and across Latin America, where elderly individuals, who constitute approximately 3% of the Colombian population, are at risk of acquiring the disease. This is due to the epidemiological transition and several other factors, including immunosenescence, malnutrition, comorbidities, polypharmacy, and concurrent socioeconomic disparities.[1]

The clinical presentation of tuberculosis in elderly patients can be atypical, meaning that the classic symptoms (fever, sweating, weight loss, and cough) are either not present or, if present, due to decompensated comorbidities.[4] A high index of suspicion should therefore be maintained. In elderly patients, the most common presentation of tuberculosis is pulmonary tuberculosis, and there is a low prevalence of

cavitary disease.[5] Although there is no difference in the recommended tuberculosis treatment regimen between elderly patients (over 65 years of age) and younger patients, there is a higher risk of drug-drug interactions in the former, especially between rifampin and antihypertensive or hypoglycemic agents.[6] These drug-drug interactions can reduce tuberculosis treatment success rates.

In a meta-analysis published in 2018, moderate-quality evidence showed an association of pulmonary tuberculosis with comorbid malignancy and an increased risk of in-hospital mortality (OR = 1.85; 95% CI, 1.01-3.40).[7] These results are consistent with our findings that there were more cases of malignancy in the treatment failure group.

Most of the elderly patients in the present study had pulmonary tuberculosis and experienced a diagnostic delay. They had unfavorable treatment outcomes, with high case-fatality rates, and some were lost to follow-up.[8-10] These losses could be attributable to limitations of program coordination, with patients being transferred to and treated in different hospitals and health care centers, which is a constant problem in Latin America.

Tuberculosis control programs should evaluate care models to improve tuberculosis treatment success rates and health care coordination. The results of the present study can form the basis for future studies and contribute to changes in health policies related to tuberculosis control programs, including cost-effectiveness studies and more frequent follow-up of this population.

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