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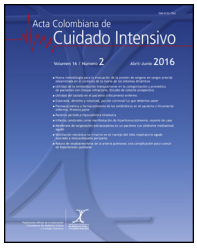

ORIGINAL ARTICLE

Clinical presentation and outcome of patients diagnosed with active tuberculosis in a critical care unit

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KEYWORDS
Tuberculosis;
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Abstract
Background: Tuberculosis is one of the infectious diseases with the highest mortality worldwide, and also results in high costs and periods of disability. Thus, it is a priority to make timely diagnoses at the Primary Care level, with the aim of initiating early treatments and reducing transmission.
Method: This descriptive observational study included a series of cases of 43 patients with a confirmed diagnosis of tuberculosis after admission to intensive care unit (ICU) between 2012 and 2016. The objective of this study was to describe the sociodemographic, epidemiological, and clinical characteristics of this group of patients.
Results: The age range was between 21 and 80 years; there was a predominance of male gender (53.5%), those affiliated to the subsidised health regime (90.7%), homeless people (18.6%), and those with drug dependence (35%). The main cause of admission was respiratory failure (65.2%), followed by neurological deterioration (18.6%). Almost two-thirds (65%) of the cases had pulmonary tuberculosis exclusively, and 35% had extrapulmonary tuberculosis. Furthermore, 76.7% of patients had co-infection, with human immunodeficiency virus (HIV) being the most frequent (48.8%), followed by pneumonia (34.9%). Moderate to severe malnutrition was documented in 79% of cases, and anemia was found in 95.3%. The mortality rate during the stay in ICU was 46.5%, with prevalence of male gender and prolonged stay (an average of 19 days).

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Conclusions: In this case series, there was a predominance of the active working population, those with drug dependence, homeless people, those who were co-infected with HIV, and those with hypoalbuminaemia, anemia, and malnutrition. In addition, around half of the patients died during hospital admission. They had septic shock, an ICU stay and ventilatory support greater than or equal to 8 days. This reflects the need to carry out studies evaluating public health strategies for the early detection of cases in groups of patients with the described characteristics, as well as the importance of always considering tuberculosis as a diagnostic possibility in the ICU.

PALABRAS CLAVE
Tuberculosis;
Retraso en el diagnóstico;
Cuidado crítico;
VIH;
Prueba de tuberculina

Presentación clínica y desenlaces de pacientes diagnosticados con tuberculosis activa en una unidad de cuidado crítico

Resumen
Antecedentes: A nivel mundial la tuberculosis es una de las enfermedades infecciosas que genera la mayor mortalidad, lo que causa altos costos y períodos de discapacidad. Por esta razón, es una prioridad realizar diagnósticos oportunos en el nivel de atención primaria, con el objetivo de iniciar tratamientos tempranos y reducir la transmisión.
Método: Estudio observacional descriptivo de una serie de casos con 43 pacientes. Se incluyeron pacientes con diagnóstico de tuberculosis confirmado después del ingreso en la unidad de cuidados intensivos (UCI) entre 2012 y 2016. El objetivo de este estudio fue describir las características sociodemográficas, epidemiológicas y clínicas de este grupo de pacientes.
Resultados: El rango de edad fue entre 21 y 80 años, con predominio del género masculino (53,5%), afiliación al régimen de salud subsidiado (90,7%), habitantes de la calle (18,6%) y farmacodependencia (35%). La principal causa del ingreso fue la insuficiencia respiratoria (65,2%) seguida del deterioro neurológico (18,6%). El 65% correspondió a pacientes con tuberculosis exclusivamente pulmonar, y el 35% a tuberculosis extrapulmonar. El 76,7% tuvo coinfección, de los cuales el VIH fue la más frecuente (48,8%), seguido por neumonía (34,9%). La desnutrición moderada a severa se documentó en el 79%, y se encontró anemia en el 95,3% de los sujetos. La mortalidad durante la estancia en la UCI fue del 46,5%, en quienes predominó el género masculino y la estancia prolongada (promedio de 19 días).
Conclusiones: En nuestra serie de casos se evidenció un predominio de la población laboralmente activa, farmacodependencia, habitantes de la calle, coinfección con VIH, hipoalbuminemia, anemia y malnutrición. Además, alrededor de la mitad de los pacientes fallecieron durante la hospitalización, presentaron *shock* séptico, estancia en la UCI y soporte ventilatorio mayor o igual a 8 días. Esto refleja la necesidad de realizar estudios que evalúen estrategias de salud pública para la detección temprana de casos en grupos de pacientes con las características descritas, así como la importancia de considerar la tuberculosis en la UCI siempre como una posibilidad diagnóstica.

Introduction

Tuberculosis (TB) is a public health problem, which has the traits of a pandemic that has not been controlled and results in large high costs, high mortality, and sequelae. In 2017, the World Health Organization (WHO) estimated 10 million new TB cases worldwide (range: 9–11.1 million), of which 9% cases had human immunodeficiency virus (HIV).

It is estimated that 23% of the world population (1.7 billion people) has latent infection, of which 10% can develop TB throughout their lives, under conditions such as stress, migration, malnutrition, as well as having a compromised immune system or some comorbidities (diabetes, chronic obstructive pulmonary disease and cancer) and steroid use.[1]

In Colombia, the incidence rate of all forms of TB has increased from 24 cases per 100,000 inhabitants in 2014 to 26.3 cases per 100,000 inhabitants in 2017. In the department of Valle del Cauca, Colombia, the incidence rate was 39.2 per 100,000 inhabitants, which was well above the national rate. Out of the 14,480 cases of TB of all forms reported in Colombia in 2017, 11.1% were co-infected with HIV.[2]

In recent years, the number of patients with TB requiring care in the intensive care unit (ICU) has increased, indicating a poor prognosis and a substantial financial burden for healthcare systems.[3] In the United Kingdom, the cost of treating a patient with complicated TB (multidrug resistant TB or TB–HIV co-infection) ranges from 50 to 70,000 euros, which is >10 times the cost of treating a patient with uncomplicated TB,[4] considering that this is precisely the group of patients that has the highest risk of requiring management in the ICU.

Individuals with latent TB have a reactivation risk of 5–10%,[5] but in people with HIV, the annual risk of progressing to active TB is 3–16% per year.[6] Interestingly, the highest risk of TB disease begins almost immediately after HIV infection when the CD4 cell count is still high.

Early diagnosis of TB is essential to achieve adequate treatment, decrease in the spread of infection, and decrease in mortality. The WHO has proposed to reduce TB deaths by 95% and to cut new cases by 90% between 2015 and 2035 and to ensure that no family is burdened with catastrophic expenses due to TB. This goal will be difficult to achieve while TB is diagnosed late in tertiary hospitals or in ICU.

Several studies have been conducted in patients with TB diagnosed prior to admission to ICU; however, very few studies have assessed patients with a diagnosis of TB after admission to ICU.[3]

Materials and methods

Subjects and study design

A descriptive observational study of a series of cases of adult patients diagnosed with TB during their stay in ICU was performed in a highly complex clinic in Santiago de Cali, Colombia, which primarily handles population with no-surgical health conditions of the subsidized regime from various municipalities in the department of Valle del Cauca. It has two adult ICU, intermediate care unit, hospitalization service, clinical laboratory and diagnostic images, with an average of 85 patients per month in ICU.

This study aimed to describe the sociodemographic, epidemiological, and clinical characteristics of this group of individuals, considering that they were patients who could be diagnosed earlier and thus have avoided admission to ICU.

The sampling performed was nonprobabilistic for convenience. The case definition was performed according to the protocol of surveillance in public health of the National Institute of Health, where the case is confirmed by laboratory results, using a positive bacilloscopy for acid-alcohol-resistant bacilli as criteria, or a positive culture or positive molecular test that recognizes the Mycobacterium tuberculosis complex.[7]

The inclusion criteria were patients aged >18 years and corresponding to the case definition, who had been admitted from January 1, 2012 to December 31, 2016. Six patients with clinical suspicion of TB without laboratory confirmation were excluded; similarly, 40 patients diagnosed with this condition prior to admission to ICU were excluded.

The information was collected in an institutional database created for the follow-up of patients diagnosed with TB after admission to intensive care. In patients with confirmed diagnosis of TB in the ICU, the clinical history was consulted and the variables to be considered in the investigation were extracted.

TB was classified as pulmonary or extrapulmonary according to the location of the infection. TB was denominated as disseminated when *Mycobacterium tuberculosis* was isolated from blood or bone marrow or was identified in specimens from ≥2 noncontiguous organs.[8]

Laboratory tests and diagnostic images

The following laboratory data were recorded: hemoglobin (g/dL), serum creatinine level (mg/dL), serum albumin level (g/dL), arterial oxygen pressure (mmHg), and antibodies to HIV. The radiological patterns were based on the radiographic readings by the institutional radiologist. No routine computed tomography of the chest was performed as part of the diagnostic process. For the evaluation of the nutritional status, the Subjective Global Evaluation (SGE) scale was used, which assesses nutritional status based on features of the history and physical examination, where the patients are classified as well fed, with moderate or severe malnutrition.[9] In the present study, the malnutrition variable included individuals who had moderate or severe malnutrition.

Tuberculin skin test (TST) was performed with the objective of assessing the trend in patients with a history of HIV and malnutrition. The Sokal technique was used, applying 0.1 cc (5 UT) to the flexor surface of the left forearm, evaluating the reaction 48–72 h after the injection. Positive TST was considered when an induration of ≥10 mm was developed in patients without HIV and of ≥5 mm in patients with HIV.[10] At the time of admission to the institution, a simple chest X-ray was performed on all patients, and in most of them radiographic control was performed, but only the initial radiological finding were described in this study.

Statistical analysis

A descriptive analysis of the sociodemographic and clinical characteristics of the study population was performed; proportions were calculated for the qualitative variables and measures of central tendency and dispersion for the quantitative variables. Age was categorized according to the life cycle of ≤40 years (young adult), 41–64 years (mature adult), and ≥65 years (older adult). At the time of onset of symptoms prior to admission to ICU, the range of ≤15 days was considered to identify symptomatic respiratory patients according to the definition of the national health institute, followed by the range of 16–30 days and ≥31 days. Hypoxemia was identified using the arterial oxygen pressure index on the inspired fraction of oxygen (PaO_2/FIO_2) with a cut-off point of <200.

Ethics statement

The protocol was developed based on the ethical principles of the Declaration of Helsinki and resolution 8430 of 1993 from the Ministry of Health of Colombia. It was evaluated

Table 1 Sociodemographic characteristics ($N = 43$).

Variables	N	(%)
Age		
≤40 years	19	44.2%
41–64 years	18	41.9%
≥65 years	6	13.9%
Average ± SD	45.5 ± 15.6	
Sex		
Female	20	46.5%
Male	23	53.5%
Type of user		
Contributor	4	9.3%
Subsidized	39	90.7%
Homeless people		
Yes	8	18.6%
No	35	81.4%
Origin		
Santiago de Cali	37	86.1%
Other municipalities in Valle del Cauca	6	13.9%

SD: standard deviation.

and approved by the research committee of the health institution, considered as a risk-free study (Act 22/07/2016).

Results

During the observation period of stay in the ICU, 43 patients diagnosed with TB were documented; 84% of patients were concentrated in the last 3 years of the study (2014–2016). The age range was between 21 and 80 years, with an average of 45.5 years; there was a predominance of male sex (53.5%) and affiliation to the subsidized regime (90.7%). Furthermore, 18.6% of the individuals were homeless people and 86.1% came from Santiago de Cali. The sociodemographic information is presented in Table 1.

Within the clinical and epidemiological characteristics presented in Table 2, the main cause of admission was respiratory failure (65.2%), followed by neurological deterioration (18.6%). In one-third of the patients, the diagnosis of TB was previously suspected, and in 44.2% cases, the symptoms began 15 days before admission to the ICU, with an average of 26 days (8–90 days).

Moreover, 65% of the patients had pulmonary TB exclusively and 35% had extrapulmonary TB. Disseminated TB corresponded to 40% of extrapulmonary TB cases, highlighting that pulmonary and lymph node involvement were the most frequent in this group of patients. Despite the fact that in the majority of the subjects, TB compromised a single organ, it should be noted that 16.2% cases had >1 organ involved.

In two thirds of the population, smear microscopy was used as a diagnostic method for TB, only 9.3% used >1 method (histopathology, smear microscopy, polymerase chain reaction, Gene Xpert, and culture). TST was performed in 80% of patients, of which only 15.4% were positive. The adenosine deaminase test (ADA) was performed in 28% of the patients, and this was done in the cerebrospinal or

Table 2 Clinical and epidemiological characteristics ($N = 43$).

Variables	N	(%)
Reason for admission to the ICU		
Respiratory failure	28	65.2%
Neurological deterioration	8	18.6%
Hypotension	3	7%
Another cause	4	9.2%
Previous suspicion of tuberculosis diagnosis		
Yes	14	32.6%
No	29	67.4%
Symptoms start time		
≤15 days	19	44.2%
16–30 days	16	37.2%
≥31 days	8	18.6%
Type of tuberculosis		
Pulmonary	28	65.0%
Extrapulmonary	15	35.0%
Number of organs involved		
One	36	83.7%
Two	6	14.0%
Four	1	2.3%
Diagnostic method		
Bacilloscopy	27	62.8%
PCR	9	20.9%
GeneXpert	3	7.0%
Various diagnostic methods	4	9.3%
TST (N = 34)		
Positive	5	15.4%
Negative	29	84.6%
Antecedents		
HIV/AIDS	21	48.8%
COPD	9	20.9%
Neoplasia	4	9.3%
Diabetes mellitus	3	7.0%
Malnutrition	34	79.0%
Smoking	23	53.5%
Drug dependence	15	34.9%
Contact with patients with tuberculosis	4	9.3%
Co-infection		
Yes	33	76.7%
No	10	23.3%
Paraclinical		
Albumin		
<2.5 g/dL	36	83.7%
≥2.5–3.0 g/dL	7	16.3%
Hemoglobin		
>13 g/dL	2	4.7%
10–13 g/dL	14	32.6%
8.0–9.9 g/dL	9	20.8%
6.0–7.9 g/dL	16	37.2%
<6.0 g/dL	2	4.7%

Table 2 (*Continued*)

Variables	*N*	(%)
PaO_2/FIO_2		
≥200	24	55.8%
<200	19	44.2%

ICU: intensive care unit.
PCR: polymerase chain reaction.
TST: tuberculin skin test.
HIV: human immunodeficiency virus.
AIDS: acquired immune deficiency syndrome.
COPD: chronic obstructive pulmonary disease.

Table 3 Characteristics of patients with pulmonary tuberculosis disease (*N* = 28).

Variables	*N*	(%)
Predominant radiological pattern		
Consolidation	6	21.4%
Interstitial	5	17.9%
Cavitary	3	10.7%
Nodular	5	17.9%
Miliary	1	3.6%
Mixed	8	28.5%
Number of committed quadrants		
One	5	17.9%
Two	12	42.9%
Three	2	7.1%
Four	9	32.1%

pleural fluid, which was above the cut-off point in all individuals.

Malnutrition was the comorbidity associated with immunosuppression more frequently (79%), followed by HIV (48.8%); however, diabetes mellitus and neoplasms occurred in 7% and 9.3%, respectively.

Furthermore, 76.7% of the population had co-infection, wherein HIV was the most common, followed by pneumonia (34.9%). In all of the individuals, moderate to severe hypoalbuminemia was observed, but the latter was the most predominant (83.7%). The 95.3% of the subjects presented with anemia, with an average of 8.7 g/dL (range: 5.4–14.2 g/dL), whereas 44.2% presented with hypoxemia.

In patients with pulmonary TB, the predominant radiological pattern was consolidation, followed by the interstitial and nodular pattern; data is included in Table 3. The miliary pattern was observed only in one patient, in whom AFB ++ was found in the smear microscopy, and the tomography of thorax showed extensive micronodular infiltrate of diffuse distribution in both pulmonary fields; diagnostic image is presented in Fig. 1. The most frequent mixed radiological pattern was interstitial-nodular.

To rule out TB, in those patients with disseminated TB without pulmonary involvement, and those who presented expectoration, three serial smears were performed. Fig. 2 presents the location of extrapulmonary TB. The most frequent location was meningeal and disseminated, the latter had 83% pulmonary involvement.

The mortality rate during the stay in ICU was 46.5%, with a predominance of male sex (60%), with an average age of 50.5 years, and prolonged stay (17 vs 10 days in survivors). In those patients in whom the diagnosis of TB at ICU admission (32.6%) was suspected, the diagnosis was confirmed on average at 3.4 days, and 57% died; whereas in those who were not suspected of diagnosis at admission (67.4%), the diagnosis was confirmed on average at 5.7 days, and 41.4% died. Regarding complications, septic shock and acute kidney injury were more frequent, with hospital mortality of 80% and 83%, respectively. The information of the outcomes is presented in Table 4.

Table 4 Outcomes of patients diagnosed with tuberculosis in intensive care (*N* = 43).

Variables	*N*	(%)
Hospital mortality		
Yes	20	46.5%
No	23	53.5%
Time of stay in ICU		
≤2 days	11	25.6%
3–7 days	9	20.9%
≥8 days	23	53.5%
Average ± SD		12.9 ± 15.4
Mechanical ventilation time (N = 33)		
≤2 days	4	12.1%
3–7 days	11	33.3%
≥8 days	18	54.6%
Average ± SD		12.9 ± 11.1
Complications		
Tracheostomy requirement	12	27.9%
MODS	9	20.9%
AKI	12	27.9%
Septic shock	20	46.5%

SD: standard deviation.
ICU: intensive care unit.
MODS: multiple organ dysfunction syndrome.
AKI: acute kidney injury.

In patients with HIV (48.8%), the diagnosis of *de novo* HIV infection was 38%, the male sex prevailed (57%), with an average age of 39 years and average serum albumin level lower than that in patients without HIV (2.2 vs 1.9 mg/dL, $p = 0.021$). Although the mean time to onset of symptoms was higher in this group of patients (32 vs 21 days, $p = 0.059$), the difference was not statistically significant. These individuals with HIV presented with extrapulmonary TB more frequently (47.6% vs 22.7%); however, in patients with HIV and pulmonary TB, more radiological involvement was observed, evidenced by a greater number of quadrants involved. Higher average days of mechanical ventilation were also found (17.3 vs 8.9 days) along with prolonged stay in ICU (15 vs 11 days).

Discussion

The delay in the diagnosis of TB is the result of personal factors, health services, and proper implementation of public health policies focused on the detection and timely treatment of this condition. The increase in diagnosis time has been especially associated with unemployment, low

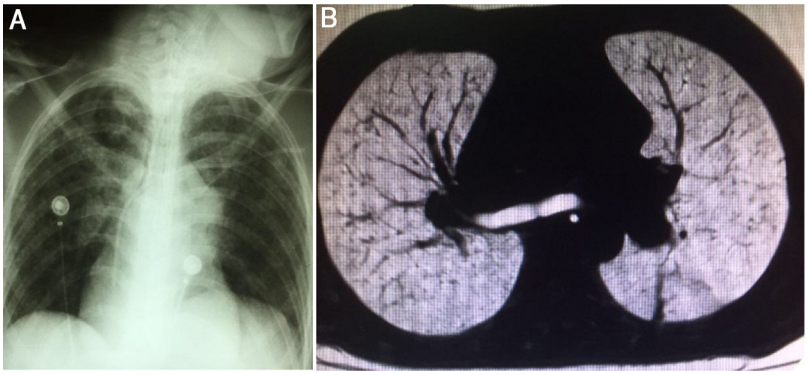

Figure 1 Chest X-ray (1a) and computerized axial tomography (1b) of HIV patient (—) with miliary tuberculosis.

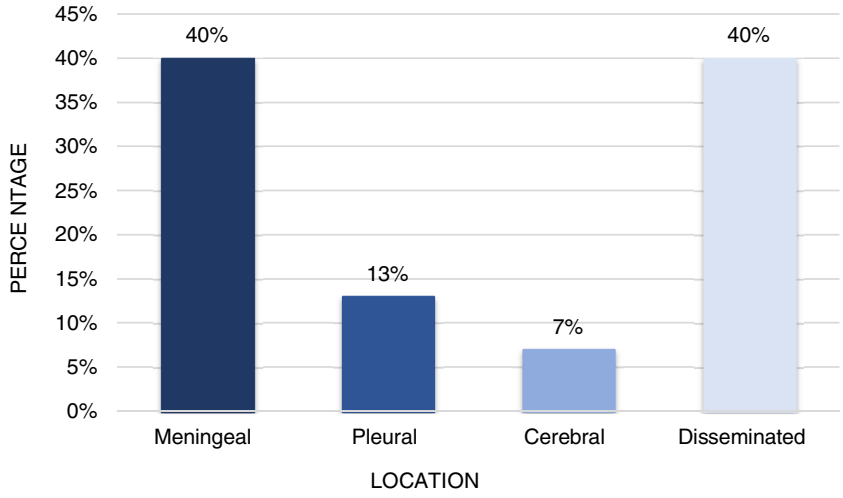

Figure 2 Location of extrapulmonary tuberculosis ($N = 15$).

income, rural residence, lack of social security affiliation, ignorance of HIV status, age > 60 years, low educational level, food security, limited availability of resources to perform a rapid diagnosis, lack of qualified health personnel, and geographical barriers,[11–13] aspects that visualize the social determination of TB. The present study evidences this problem, where patients with symptoms and concurrent epidemiological factors for this health condition were diagnosed late at a high complexity level, despite having visited the basic health network. Late diagnosis is associated with higher mortality in patients with TB,[14] as well as delay in the start of treatment and enhancement of transmission by contact with TB.[11]

According to the reports of the Public Health Surveillance System of Colombia-SIVIGILA, the late identification of TB is expressed in the high proportion of diagnoses performed in hospitalized patients (50%) and smear diagnoses (69%) and the low proportion of diagnosis by culture or molecular tests (9.6%).[15] This aspect had a similar behavior in this investigation, where the main diagnostic method corresponded to smear microscopy (62.8%); however, molecular tests (polymerase chain reaction and GeneXpert) were used more frequently (27.9%).

A study in eight major cities of Colombia reported that the time between onset of symptoms and treatment was variable, with 51 days on average (27–101 days) and times greater than 30 days in 72% of cases.[11] In this study, the delay in the diagnosis of TB attributed to health service providers was 26 days on average, possibly related to the factors already described.[16]

One of the epidemiological variables cited regularly is the condition of being homeless, often 4.3% of patients with TB nationwide.[2] It is highlighted in this research that the prevalence of this factor was four times higher, probably attributed to the fact that 90.7% of the population belonged to the subsidized regime, considering that this institution mainly manages this health regime. Homeless people live in extreme conditions that increase the risk of being infected by the tubercle bacillus, estimating that they are 10–85 times more likely to contract the disease compared with the general population.[17]

Simultaneously, a 35% prevalence of drug dependence was found among the group of patients, bearing in mind that drug-dependent patients have a high prevalence of latent TB infection, which has been reported in ranges from 10% to 59%, whereas those patients who use injected drugs and are older are the most commonly affected.[18] Barriers to treatment, including lack of adherence and limited access to attention, propose unique challenges to drug users.

The radiological pattern most frequently reported in pulmonary TB is consolidation,[19] similar antecedent was

observed in this study. This radiological finding led several patients to receive antibiotic treatment for community-acquired pneumonia without a suspected TB infection. In the diagnosis of suspected pulmonary TB, simple chest radiography should be used, and despite not showing specific findings, a suspicious diagnosis can be made. Tomography is useful in extrapulmonary forms of TB as well as in cases where there is clinical suspicion and results of simple radiography and microbiology do not allow the diagnosis to be determined.

This research found positive TST in <20% of patients with TB. Associated to this, the literature has reported that in patients with TB who are HIV positive, anergy appears more frequently than in those who are HIV negative. In a study with 991 individuals with pulmonary TB, 24.6% of anergy was reported in patients who were HIV positive versus 3.3% HIV negative.[20] About one third of patients with HIV infection and >60% of patients with AIDS have a tuberculin reaction of <5 mm, despite being infected with *M. tuberculosis*.

The proportion of positive TST in HIV-positive individuals differs according to the CD4 count, as reported in the systematic review by Kerkhoff et al., where the positive TST differed in three groups, those with CD4 count of <200 cells/μL, 200–499 cells/μL, and ≥500 cells/μL, reported positive TST with medians of 12.4%, 28.4%, and 37.4%, respectively.[21] Among the multiple factors that contribute to anergy are HIV infection, use of immunosuppressant drugs, neoplasms, and malnutrition.

When assessing the nutritional status of patients using the SGE scale, 79% of malnutrition was documented in moderate to severe degrees, similar to a multinational study in Latin America that included >1000 patients in critical care in 116 hospitals, which showed a prevalence of 74.1% of moderate or severe malnutrition using the same scale.[22]

The main factors associated with mortality of patients with TB treated in ICU have been documented, such as hypoalbuminemia, immunosuppression, high APACHE 2, support with mechanical ventilation, ventilator-associated pneumonia, multiple organ dysfunction syndrome (MODS), delay in diagnosis, multilobular compromise, CD4 count of <200 cells/mm^3, among others.[23,24] Patients with TB who require intensive care have higher mortality than patients who do not require it, which is generally >50% with a range between 20% and 70%[3,24,25] as observed in this investigation, with a mortality of 46.5% and related factors such as hypoalbuminemia, immunosuppression, late diagnosis, and MODS.

In this study, patients in whom the diagnosis of TB was suspected at the time of admission at ICU died more frequently than those in whom it was not suspected. This finding is probably related to the most critical condition of the patients in whom diagnosis was suspected.

Most studies of patients with TB in intensive care involve patients with pulmonary TB, with acute respiratory insufficiency and multiorgan failure as the main reasons for admission.[26] In our case, the first causes were acute respiratory failure and neurological deterioration, the latter associated with the prevalence of central nervous system (CNS) involvement in 21% of individuals.

In patients treated in ICU, TB locations similar to those observed in this series of cases are reported, in which the lung was the most frequently involved organ. Disseminated TB responds to up to 30% of patients with TB in ICU, and to a greater degree than pulmonary TB seems to predispose individuals to acute respiratory distress syndrome.[27] In this type of TB, the lung, liver, spleen, meninges, and kidneys are affected primarily. In turn, meningeal TB is the site of the most commonly involved CNS (up to 20% of patients with TB in ICU).[25]

In the present study, in patients with TB diagnosed in ICU, HIV co-infection was found in half of the individuals. Accordingly, the scientific literature reports a frequency of TB in 68.7% and 40% of admissions to ICU, in regions with high and low burden of disease, respectively.[28]

About 90% of patients with TB who enter intensive care require support with invasive mechanical ventilation, which has been associated with in-hospital mortality.[23,25] In our population, 31 patients (72%) received invasive ventilatory support, with a mortality rate of 65%. Otherwise, the stay time of patients with TB in ICU ranges between 1 and 2 weeks,[29] similar to that reported in this study (12 days).

The delay in the diagnosis of TB can lead to an increase in the period of infectivity, delay in the start of treatment, and increase in the severity of the disease, which makes it imperative to always consider TB as a diagnostic probability in ICU.[30]

Conclusions

The present study included patients diagnosed with TB after admission to ICU, which corresponded mainly to the subsidized regime, in whom respiratory failure was observed as the main cause of admission, with predominance of the male sex, actively working population, those with drug dependence, and those with pulmonary TB and co-infection with HIV, which was identified *de novo* in a high proportion. In addition, moderate to severe hypoalbuminemia was documented in all patients, with a high frequency of anemia and malnutrition. The predominant radiological finding was consolidation. Extrapulmonary TB prevailed in patients who were HIV positive, with meningeal and disseminated TB being the most common location. The high prevalence of malnutrition and HIV probably contributed to the presence of negative TST.

Although molecular tests were used for the diagnosis of TB, it should be noted that sputum smear associated with clinical criteria and epidemiological link was the main diagnostic method, which evidences the need to strengthen public health strategies for the early detection of cases.

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Conflicts of interest

No potential conflict of interest relevant to this article was reported.

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