

# VERTEBRAL TUBERCULOSIS IN A HOSPITAL IN RECIFE – PE: EPIDEMIOLOGICAL PROFILE

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CRISTIANO ALMEIDA BASTOS<sup>1</sup> , RAFAELA CAVALCANTE DE ABREU<sup>2</sup> , GIOVANI DELA BIANCA ATAIDE<sup>1</sup> , TULIO ALBUQUERQUE DE MOURA RANGEL<sup>1</sup> ,

MARCUS ANDRE COSTA FERREIA<sup>1</sup> 

1. Hospital Getúlio Vargas, Recife, PE, Brazil.

2. Faculdade de medicina de Olinda, Olinda, PE, Brazil.

## ABSTRACT

**Objective:** To analyze the epidemiological profile of vertebral bone tuberculosis (TBO) in a public tertiary hospital in Recife, PE, from 2018 to 2023. **Methods:** Retrospective epidemiological study with a descriptive and quantitative approach. Medical records of patients reported with vertebral tuberculosis between 2018 and 2023 were evaluated. **Results:** 14 cases were found treated as vertebral tuberculosis. The sample was predominantly composed of male individuals, with an average age of 49 years, residing in the metropolitan region of Recife. The majority had the diagnosis established by clinical radiological criteria and surgical treatment for decompression and arthrodesis, which occurred in 11 (78.5%) of the cases. **Conclusion:** It concludes that the profile of patients with vertebral tuberculosis is made up of men of working age, and that clinical-radiographic diagnosis predominates mainly in endemic areas. **Level of Evidence II. Retrospective study.**

**Keywords:** Mycobacterium tuberculosis; Discitis; Health Profile; Diagnosis.

## RESUMO

**Objetivo:** Analisar o perfil epidemiológico da tuberculose óssea vertebral (TBO) em um hospital Terciário da rede pública na cidade de Recife, PE, no período de 2018 a 2023. **Métodos:** Estudo epidemiológico retrospectivo com abordagem descritiva e quantitativa. Foram avaliados prontuários de pacientes notificados com tuberculose vertebral entre 2018 e 2023. **Resultados:** Foram encontrados 14 casos tratados como tuberculose vertebral. A amostra foi composta predominantemente de indivíduos do sexo masculino, com idade média de 49 anos, residentes na região metropolitana de Recife. A maioria teve o diagnóstico estabelecido por critérios clínicos radiológicos e o tratamento cirúrgico para descompressão e artrodesise ocorreu em 11(78,5%) dos casos. **Conclusão:** Conclui-se que o perfil de pacientes com tuberculose vertebral é formado por homens em idade produtiva, e que o diagnóstico clínico-radiográfico prepondera principalmente em áreas endêmicas. **Nível de Evidência II. Estudo retrospectivo.**

**Descritores:** Mycobacterium tuberculosis; Discite; Perfil de Saúde; Diagnóstico.

## RESUMEN

**Objetivo:** Analizar el perfil epidemiológico de la tuberculosis ósea vertebral (TBO) en un hospital público terciario de la ciudad de Recife, PE, en el período de 2018 a 2023. **Métodos:** Estudio epidemiológico retrospectivo con abordaje descriptivo y cuantitativo. Se evaluaron las historias clínicas de pacientes reportados con tuberculosis vertebral entre 2018 y 2023. **Resultados:** Se encontraron 14 casos tratados como tuberculosis vertebral. La muestra estuvo compuesta predominantemente por individuos del sexo masculino, con edad promedio de 49 años, residentes en la región metropolitana de Recife. La mayoría tuvo el diagnóstico establecido por criterios clínico radiológicos y el tratamiento quirúrgico por descompresión y artrodesis se produjo en 11 (78,5%) de los casos. **Conclusión:** Se concluye que el perfil de los pacientes con tuberculosis vertebral está conformado por hombres en edad laboral, y que el diagnóstico clínico-radiográfico predomina principalmente en zonas endémicas. **Nivel de Evidencia II. Estudio retrospectivo.**

**Descriptores:** Mycobacterium tuberculosis; Discitis; Perfil de Salud; Diagnóstico.

## INTRODUCTION

Some infectious and contagious diseases have been known since antiquity, but they still represent a public health problem, requiring worldwide efforts to eradicate them. One of these diseases is tuberculosis, caused by *Mycobacterium tuberculosis*, which typically affects the lungs but can also affect other organs and tissues such as the musculoskeletal system.<sup>1</sup>

According to the WHO, it is estimated that 10.6 million people fell ill with tuberculosis in 2021, which is equivalent to 134/100,000 inhabitants, with Southeast Asia and Africa accounting for around 67% of cases.<sup>2</sup> In Brazil, between 2018 and 2022, more than 470,000 tuberculosis cases were diagnosed, with 2020 as the year with the lowest number of reported cases, with 86,414, and 2022 with the highest number, 101,806 cases. In the same period, Pernambuco accounted

Study conducted by the Hospital Getúlio Vargas, Av. Gen. San Martin, s/n - Cordeiro, Recife, PE, Brasil, 50630-060. Recife, PE, Brazil.

Correspondence: Cristiano Almeida Bastos. Rua Carlos Gomes, N. 83, Ap: 02, Recife, PE; Brazil, CEP 50720-110. cristianoabastos@gmail.com



for around 6.5% of tuberculosis cases in Brazil. As for bone tuberculosis cases in Brazil, 539 cases were reported in the same period (2018-2022), of which 9.4% were found in Pernambuco (51 cases).<sup>3</sup>

It is estimated that bone involvement accounts for around 10% of extrapulmonary tuberculosis, with half of these cases manifesting as lesions in the spine, with varying degrees of damage.<sup>4,5</sup>

In the spine, the disease most often manifests with non-specific symptoms, such as back pain and low back pain; laboratory tests for diagnosing the disease are not easy and have low performance, so vertebral tuberculosis can be confused with other pathologies.<sup>6,7</sup> As described in an article published in 2022, sometimes the diagnosis of this type of tuberculosis is made by excluding other infections and by the therapeutic response to empirical treatment.<sup>8</sup>

Considering the importance of bone tuberculosis, this study aims to evaluate the epidemiological profile of patients with vertebral tuberculosis treated at a tertiary public hospital in the city of Recife-PE. In addition, the aim is to compare the patients' findings with the descriptions in the literature and analyze the criteria adopted for diagnosis and therapeutic measures, including the need for surgical intervention.

## METHOD

This work consists of a quantitative, retrospective, descriptive, and cross-sectional study. The epidemiological profile of patients with tuberculous spondylodiscitis treated at the Getúlio Vargas Hospital (HVG) in Recife, in the state of Pernambuco, over the last five years was evaluated. The sample was selected from the hospital's compulsory notification database, with the selection criteria being patients notified of extrapulmonary tuberculosis of the bone type affecting the spine. Cases were excluded if, despite being notified, they had another diagnosis to explain the spondylodiscitis, if their TB treatment had been interrupted, or if they had another type of extrapulmonary bone tuberculosis other than vertebral tuberculosis. After selecting the patients, each electronic medical record was evaluated using a semi-structured form drawn up by the authors, assessing social, demographic, clinical, and radiographic parameters and the interventions carried out on these patients, which are available in the respective medical records. The data was tabulated in an Excel spreadsheet and presented in aggregate form. In addition, there were no interventions or changes in the treatment of the participants included in the study, so there were no added risks or harm to their well-being.

The CAAE Ethics Committee approved project 76930324.3.0000.0362 in compliance with CNS Resolution No. 466/2012 and Resolution No. 510/2016. The study did not require an informed consent form, as it was retrospective in design and analyzed the data in aggregate form, thus posing no risk to the participants.

## RESULTS

Fourteen cases of vertebral tuberculosis were found between 2018 and 2023: 11 men (78.5%), mean age 49 years (SD: 17,14); twelve patients from the greater Recife area, only two patients from the interior; all self-declared as brown. Most of the patients had some comorbidity or risk situation, the most common being smoking and alcoholism (four patients); two were HIV-positive (Table 1).

The most common symptoms were back and lower back pain (10 cases, 71.4%). Six patients (42%) had records of their complaints going back more than six months. The lumbar region was the most affected site (7 cases), followed by the thoracic region (4 cases) and the cervical region (3 cases). According to the records, six patients had neurological alterations, with severe alterations such as lower limb plegia (ASIA B) in two cases.

Patients were assessed with laboratory tests, but we could not access inflammatory tests such as C-reactive protein and erythrocyte sedimentation rate due to internal issues at the service. As for the leukogram, there was a mean leukocytosis, which was higher in patients where the etiological agent was not isolated (Table 2).

**Table 1.** Characterization of the clinical and demographic data of patients diagnosed and treated for tuberculous spondylodiscitis at the Getúlio Vargas Hospital (HGV). Recife (PE), Brazil, 2023.

Biological sex	N (%)
Men	11 (78.5)
Women	3 (21.5)
Race/color	
Brown	14(100)
Age (years)	
20- 40	4 (28.5)
41- 60	7 (50)
61-80	2 (14.3)
> 81	1 (7.2)
Patient's origin	
Metropolitan region	7 (50)
Recife	5 (35.7)
Other	2 (14.3)
Comorbidities*	
Alcoholic	4 (28.5)
Smoking	4 (28.5)
Other drugs	1 (7)
DM	3 (21.4)
SAH	3 (21.4)
CRD	2 (14.3)
HIV	2 (14.3)

\*Multiple answers. Source: Authors.

**Table 2.** Leukocyte/monocyte ratio in patients with and without isolation of genetic material for tuberculosis.

	N	Leukocytes (Average)	Leukocytes (SD)	Monocytes (Average)	Monocytes (SD)	Monocyte to leukocyte ratio
Mic. not isolated	11	10255	6145	524	398	0.048
Mic. Isolated	3	9303	4865	758	613	0.07

Source: Authors.

All the patients had material collected and sent for culture and pathology. However, no growth was observed in the culture of mycobacteria. Three cases were diagnosed by molecular testing (real-time PCR), and one was diagnosed based on histopathology. In addition, most of the sample did not have an isolation test for the etiological agent of tuberculosis.

In this sample, eleven patients required surgical treatment to stabilize the spine, debridement, and decompression. The predominant surgical treatment adopted was debridement and posterior pedicle fixation, and the main criteria adopted for surgical indication were neurological alterations followed by bone destruction.

Finally, in the postoperative period, only one of the patients with deficits showed an improvement reported in their records, evolving from ASIA B to ASIA D (lumbar level lesion). It was not possible to establish whether the time between symptoms and the approach was related. Two patients had multiple surgical approaches due to re-collection with neurological worsening (Table 3).

## DISCUSSION

As mentioned above, the HGV found 14 notified cases of spinal tuberculosis between 2018 and 2023. In agreement with the literature and data from the Unified Health System (DATASUS),<sup>9</sup> most cases described in this study were male. The most frequent symptom, sometimes the only one, was pain. Fever was reported in only two cases. This finding is similar to what is described in the literature, which reports back pain as the most common symptom, sometimes the only one in more than 60% of those affected.<sup>9,10</sup> Nowadays, the diagnosis is established within a shorter time from symptom onset,

**Table 3.** Description of the clinical and radiographic aspects of patients diagnosed with tuberculous spondylodiscitis at the Getúlio Vargas Hospital (HGV). Recife (PE), Brazil.

<b>Symptoms*</b>	
Pain	10 (71.4)
Fever	2 (14)
<b>Location of Injury</b>	
Lumbar	6 (42.8)
Thoracic	5 (35.7)
Cervical	3 (21.4)
<b>Diagnosis</b>	
Clinical and radiographic	10 (71.4)
Molecular biology (PCR -T. real)	3 (21.4)
Anatomopathology	1 (7)
<b>Radiographic aspects (X-ray)</b>	
Destruction of the vertebral body	8 (57.1)
Lytic lesions	2 (14)
Other	4 (28.5)
<b>Treatment</b>	
Arthrodesis	11 (78.5)
Conservative	2 (14)
Abscess drainage	1 (7)
<b>Indication for surgery</b>	
	<b>11</b>
Segmental instability	5 (45.4)
Neurological changes	6 (54.6)
Preoperative neurological changes	6 (42.8)
Post-surgical neurological changes	6 (42.8)

\* Multiple answers. Source: Authors

but it can still reach six months or more, which is in line with our findings. Still, in this context, it requires a high degree of suspicion.<sup>11</sup>

It was observed that most of the cases notified for bone tuberculosis did not have positive tests, and treatment was indicated due to a lack of response to previous treatment or suggestive images, such as calcified abscesses or partially spared vertebral discs, given that the area is endemic for tuberculosis. Other studies have also reported difficulties in diagnosing extrapulmonary forms of tuberculosis due to the paucibacillary nature found in the tissue and the fact that the samples for analysis are small in most cases.<sup>5,7,12</sup> According to the DATASUS database, in the same period, only 25% of the patients notified with bone tuberculosis were confirmed by positive laboratory tests. Due to these difficulties in diagnosis, treatment is often based on epidemiological, clinical, and radiological findings.<sup>7,13</sup>

Agashe<sup>14</sup> et al. found that 80.9% of patients started treatment without a tissue diagnosis. In addition, starting empirical antibiotic therapy was considered a fateful decision and not advisable, given the risk of drug resistance.<sup>14</sup> Ten (71.4%) patients in this study were treated empirically based on clinical and radiographic findings. Only three cases were confirmed by genetic material evaluation (gene expert); one was diagnosed by suggestive histopathological evaluation (granuloma). Agashe<sup>14</sup> et al. concluded that every attempt should be made to establish a pattern of drug sensitivity before starting treatment.

To establish the etiology of the lesion, imaging, and laboratory tests are used, with culture also being the gold standard in the literature. However, several difficulties are inherent in the method, as it has low yields for mycobacteria. No culture-positive samples were found; other studies have reported high specificity but low sensitivity in culture for vertebral tuberculosis (100% and 11.1%), respectively.<sup>12,15,16</sup>

In a study published by Zanon IB, Meves R, Klautau GB.<sup>17</sup> studying a population of 26 patients, it was observed that a higher lymphocyte count and a lower monocyte/lymphocyte ratio may be

related to the difficulty in isolating *Mycobacterium Tuberculosis*. Our study showed similar results, with a mean leukocytosis of 10255/mm<sup>3</sup> (SD:6145) in the group that did not isolate the agent and 9303/mm<sup>3</sup> (SD: 4865) in which the agent was isolated.

Among the diagnostic options is the Ziehl-Neelsen (ZN) stained smear, a rapid method for detecting acid-fast bacilli (BAAR). However, the number of bacilli required for detection is considered to be 10,000 per slide or ml, and the sensitivity is low, especially (5% to 20%); we had only one case with a diagnosis established through the smear.

Molecular tests, which have been indicated by the WHO since 2011; polymerase chain reaction tests, the best-known of which is the Xpert MTB/RIF test (Cepheid, Sunnyvale, CA, USA), lend themselves to the rapid diagnosis of tuberculosis, and also identify resistance to rifampicin. The result is considered quick and released in around two hours. The test's sensitivity in sputum samples from adults is approximately 90%. For rifampicin resistance, its sensitivity is 95%.<sup>13,18</sup> The hospital where this study was carried out and the majority of public services do not have genetic tests within their unit, making it necessary to send their samples to specialized centers, leading to worse culture yields and an increased risk of sample deviations. In this study, three cases were diagnosed using the molecular test.

Imaging tests can suggest the diagnosis, especially in endemic areas. MRI findings suggestive of spinal tuberculosis are a combination of spinal edema, paravertebral collection with subligamentous and epidural extension, involvement of the vertebral body, relative preservation of the disc space, epidural involvement, intraosseous abscess, and septated paravertebral shadows.<sup>19</sup> Computed tomography visualizes the abscess in the spinal canal and is also used to assess bone destruction and sequestration. Dystrophic calcification of an abscess is suggestive of TB. CT can also be used to guide biopsies.<sup>20</sup> In this study, radiographic images were essential for deciding on empirical treatment, given the failure to identify *M. tuberculosis* in culture or other tests, equivalent to 71.4% of the cases in this study. This failure may have been caused by various factors, such as the transportation and storage of the sample to the laboratory and the paucibacillary nature found in the tissue, as already discussed.

Concerning differential diagnosis, the radiographic manifestation may suggest lymphoma, multiple myeloma, metastatic tumors, osteoporotic fractures, or other infectious lesions of the spine.<sup>21,22</sup> Two cases were found in this study in which the images suggested a tumoral lesion: one case with multiple lytic lesions in the sacrum and lumbar spine (L5), in which case the diagnosis was established by anatomy pathology and the presence of granulomas was observed in the histopathology; the other, a patient with multiple lytic lesions in the cervical-thoracic transition, with signs of instability due to bone destruction, undergoing surgical treatment for stabilization, the diagnosis was established through genetic material.

## CONCLUSION

This was a retrospective study that presented the epidemiological profile of patients with tuberculous spondylodiscitis treated at a tertiary hospital in the city of Recife, Pernambuco. It was observed that the predominant profile of these patients was male, brown, with an average age of 49, and who presented back pain as the predominant symptom. The majority of diagnoses were clinical-radiological; posterior column arthrodesis associated with decompression was the most common surgical treatment, similar to what has been reported in the literature.

All authors declare no potential conflict of interest related to this article.

**CONTRIBUTIONS OF THE AUTHORS:** Each author contributed individually and significantly to the development of this article. Bastos C.A: writing, data analysis and editing; Rangel, T.A and Ferreira M. A. C.: Methodology and supervision; Ataíde G.D.B and Abreu, R. C.: writing review.

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