

SPINAL TUBERCULOSIS IN WESTERN MEXICO, 2008-2013

TUBERCULOSE DA COLUNA VERTEBRAL NO OESTE DO MÉXICO, 2008-2013

TUBERCULOSIS ESPINAL EN EL OCCIDENTE DE MÉXICO, 2008-2013

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ABSTRACT

Objective: To identify the prevalence, clinical features and postoperative outcome of patients with spinal tuberculosis at the Instituto Mexicano del Seguro Social, in Jalisco, Mexico from 2008 to 2013. **Methods:** Prevalence study of patients undergoing spine surgery due to tuberculosis. Clinical, surgical pre- and postoperative parameters were evaluated by analysis of 41 medical records. **Results:** Seventeen (41.4%) were women and 24 (58.6%) were men with a mean age of 47.7 years. The main diagnoses were tuberculous spondylitis in 14 (34.1%) patients; discitis in 13 (31.7%); infectious spondylitis in 9 (21.9%); chronic spondylitis in four (9.7%); abscess in one patient (2.4%). Only 22% of patients were positive for epidemiological study of tuberculosis contacts. The most affected region was the lumbar spine followed by the thoracic spine and the most affected vertebrae were L3-L4. The most used surgical instrumentation was by posterior approach with drainage on 29 occasions, anterior approach with drainage in nine, and the mixed approach in three. Twenty-nine patients were independent to perform daily activities after discharge. **Conclusion:** The discitis or infectious spondylodiscitis should be considered in any patient with localized pain at any level of the spine. Once solved the problem of infection and stability, patients respond favorably to the surgical procedure.

Keywords: Tuberculosis, spinal; Thoracic vertebrae; Surgical procedures, operative.

RESUMO

Objetivo: Identificar a prevalência, as características clínicas e a evolução pós-cirúrgica de pacientes com tuberculose vertebral do Instituto Mexicano del Seguro Social, em Jalisco, México, no período de 2008 a 2013. **Métodos:** Estudo de prevalência de pacientes submetidos a cirurgia de coluna vertebral devido à tuberculose. Foram avaliados os parâmetros clínicos, cirúrgicos, pré e pós-operatórios pela análise de 41 prontuários médicos. **Resultados:** Dezesete (41,4%) eram mulheres e 24 (58,6%) homens, com média de idade de 47,7 anos. Os principais diagnósticos foram: espondilite tuberculosa em 14 (34,1%) pacientes; discite em 13 (31,7%); espondilite infecciosa em 9 (21,9%); espondilite crônica em 4 (9,7%); abscesso em 1 paciente (2,4%). Somente 22% dos pacientes eram positivos para estudo epidemiológico de contatos tuberculosos. A região vertebral mais afetada foi a lombar, seguida pela torácica e as vértebras mais acometidas foram L3-L4. A instrumentação cirúrgica mais utilizada foi por via posterior com drenagem em 29 ocasiões, pela via anterior com drenagem em nove e pela via mista em três ocasiões. Vinte e nove pacientes apresentaram independência nas atividades diárias depois da alta hospitalar. **Conclusão:** A discite ou espondilodiscite infecciosa deve ser considerada em qualquer paciente com dor localizada em qualquer nível da coluna. Uma vez resolvido o problema infeccioso e da estabilidade, os pacientes respondem favoravelmente ao procedimento cirúrgico.

Descritores: Tuberculose da coluna vertebral; Vértebras torácicas; Procedimentos cirúrgicos operatórios.

RESUMEN

Objetivo: Identificar la prevalencia, las características clínicas y la evolución post quirúrgica de los pacientes con tuberculosis espinal del Instituto Mexicano del Seguro Social en Jalisco, México de 2008 a 2013. **Métodos:** Estudio de prevalencia con pacientes sometidos a cirugía de columna por tuberculosis. Se evaluaron aspectos clínicos, quirúrgicos, pre y post operatorios, mediante la revisión de 41 registros médicos. **Resultados:** Diecisiete pacientes (41,4%) fueron mujeres y 24 (58,6%) hombres, con una edad promedio de 47,7 años. Los diagnósticos principales fueron: espondilitis tuberculosa en 14 (34,1%) pacientes; discitis en 13 (31,7%); espondilitis infecciosa en 9 (21,9%); espondilitis crónica en 4 (9,7%) y absceso en 1 paciente (2,4%). Únicamente el 22% de los pacientes fueron positivos para la prueba epidemiológica de Combe. La región vertebral más afectada fue la lumbar seguida por la torácica y las vértebras más frecuentemente afectadas fueron L3-L4. La instrumentación quirúrgica más utilizada fue la vía posterior con drenaje en 29 ocasiones, la vía anterior más drenaje en nueve y vía mixta en tres. Veintinueve pacientes presentaron independencia en sus actividades diarias después de su alta. **Conclusión:** La discitis o espondilodiscitis infecciosa debe ser considerada en cualquier paciente con dolor localizado en la columna a cualquier nivel. Una vez resuelto el problema infeccioso y de estabilidad los pacientes responden favorablemente al procedimiento quirúrgico.

Descriptores: Tuberculosis de la columna vertebral; Vértebras torácicas; Procedimientos quirúrgicos operativos.

INTRODUCTION

Tuberculosis of the spine represents more than 50% of cases of osteoarticular tuberculosis, which in turn, represents 10% of cases of extrapulmonary tuberculosis, being the third cause of extrapulmonary tuberculosis, after pleural and ganglion tuberculosis. Its frequency ranges from 1% to 2%.¹⁻⁴ It is common in the first three decades of life, however, the highest frequency is in individuals aged between 40 and 45 years.⁵

Increased incidence is directly related to the increase in risk factors, namely: immunosuppressed patients, multimigration, development of treatment-resistant microbacteria, malnutrition, low socioeconomic level, age, and increase among healthcare professionals exposed to the disease. However, it is emphasized that nowadays, it is also appearing in apparently healthy patients from good social and cultural backgrounds, who have no epidemiological history of tuberculosis.^{6,7}

1. Spine Clinic of UMAE del CMNO, Guadalajara, Jalisco, Mexico.

Study conducted at the Spine Clinic of UMAE del CMNO, Guadalajara, Jalisco, Mexico.

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Ninety-eight percent of cases are caused by inflammation of the vertebrae, also involving destruction of the vertebral body and the anterior ligament, subsequently reaching the anterosuperior portion of the adjacent vertebrae, giving the typical image of a wedge, before the development of secondary kyphosis.^{6,8}

Spinal tuberculosis general has an insidious initial presentation. The symptoms may appear from two weeks to several years after the onset of the disease (average 12 months), depending on: the location of the lesion, secondary neurological deficit, abscesses, constitutional symptoms of weakness, loss of appetite, weight loss, increased temperature and night sweating, which usually appear before symptoms involving the spine. Severe kyphotic deformities are usually the result of disorders of the spine since childhood, and their radiological signs are useful for identifying children at risk of deformity.⁹

The main features of the spine with tuberculosis are: destruction of the intervertebral space adjacent to the parts of the vertebral body, collapse of the elements of the spine, anterior wedging of the vertebral body, and angulation of the spine. Spondylodiscitis is the result of destruction of the anterior and middle spine, with the resulting kyphosis deformity.^{10,11}

Conservative treatment is performed in patients without neurological involvement, surgical intervention only being required in special cases, particularly in patients with: neurological complication, paraspinal abscess, instability of the spine, kyphosis deformity, resistance to tuberculosis medications, prevention of neurological complications, severe destruction of the vertebral body, spinal compression, and chronic pain after medical treatment.^{12,13}

This procedure is indicated as an adjunct treatment to eradicate infection, maintain neurological function, and maintain or preserve the stability of the spine.¹⁴

The objective of this study was to identify the prevalence and clinical features seen in patients with spinal tuberculosis treated at the Spine Clinic of a High Specialty Medical Unit (UMAE) of the Centro Médico de Occidente del Instituto Mexicano del Seguro Social, during the period January 1, 2008 to December 31, 2013.

METHODS

A prevalence study was conducted, obtaining a total of 41 patients, who were registered over the 5-year period at the referred to in Spine Clinic of the UMAE of the CMNO (Guadalajara, Jalisco, Mexico).

Patients aged over 18 years, with a diagnosis of spinal tuberculosis diagnosed by paraclinical and clinical studies, and who underwent surgical treatment, were selected.

Variables such as history of infection-contagion, drug addiction, alcoholism, immunosuppression, overcrowding, presence of positive Combe test, diagnoses given, time since diagnosis, medical treatment, surgical treatment, and incorporation into normal life were considered.

The list of surgical procedures carried out in the spine clinic, on patients with diagnosis of spinal tuberculosis during the period January 2008 to December 2013, was reviewed.

An information search was carried out on the electronic records using the electronic system "VISTA", and a search was also carried out for complementary information, in the written records located in the general archive of the hospital.

To obtain the study variables, a search was performed on each of the records, analyzing the notes on clinical history, admission, pre-operative and surgical data, subsequent evolution, surgical intervention, discharge conditions, postoperative outcome on subsequent visits, and results of the laboratory and clinical tests.

In the statistical analysis of the variables, measurements of central trend and dispersion were used, as well as absolute and relative frequencies, for which the statistical program EPI INFO 2000 was used.

This study was conducted after approval from the Local Research and Ethics Committee in Health of the Centro Médico Nacional de Occidente del Instituto Mexicano del Seguro Social en Guadalajara, Jalisco, Mexico.

RESULTS

In the period January 2008 to December 2013, a total of 41 patients were identified, with an average age of 47.7 ± 2.48 years, with a minimum of 17 years and a maximum of 74; 17 (41.4%) females and 24 (58.6%) males.

The age groups were distributed into five (36.5%) patients under 40 years, 16 (39.1%) aged 41-60 years and 10 (24.4%) aged over 60 years.

In the distribution by study time, five (12.1%) patients were identified in 2008, three (7.5%) in 2009, nine (22.0%) in 2010, five (12.1%) in 2011, five (12.1% identified) in 2012 and 14 (34.2%) in 2013.

Of the risk factors associated with spinal tuberculosis, one (2.4%) patient had infection by the human immunodeficiency virus, and nine (24%) patients had renal terminal or a history of renal transplant disease.

Nine (21%) patients reported a history of positive Combe test, 30 (73.1%) patients reported a history of occasional alcohol use, and only four (9.7%) patients reported living in overcrowded homes.

The duration of symptoms prior to diagnosis was less than one year in 28 (68%) patients, 1-2 years in eight patients (19.5%), and more than two years in five (12%).

The most affected anatomic location was the lumbar spine in 17 (41.4%) cases, the thoracic spine in 16 (39.0%), the thoracolumbar region in six (14.6%) and lumbosacral area in one (2.4%) patient.

Regarding the spinal damage according to Daniel's classification, only one (2.4%) patient had damage in the anterior part, 22 (53.7%), in the anterior-middle region, and 18 (43.9%) showed widespread damage of the vertebral bodies (Table 1).

The symptoms presented by patients were classified into: general symptoms (pain, fever, malaise) in 17 (41.4%) patients and neurological symptoms, with data on neuronal damage (paresis and paresthesias, paralysis, decreased muscle strength, fasciculations) in 24 (58.5%) patients.

For the diagnostic approach to the patients, the auxiliary diagnoses shown in Table 2 were used.

The diagnoses presented before surgery were: tuberculous spondylitis in 14 (34.1%) patients, discitis in 13 (31.7%) patients, infectious spondylitis in nine (21.9%) patients, chronic spondylitis in four (9.7%) patients and a spinal abscess in one (2.4%) patient.

In terms of the treatment offered, 32 (80%) patients had medical treatment (quadruple regimen) before surgery, and the remaining patients had the same treatment after surgery.

For the surgical management of spinal lesions, 29 (70.7%) patients had posterior instrumentation and drainage of the abscess, nine (21.9%) patients had anterior instrumentation, and three (7.3%) had drainage, but with anterior and posterior instrumentation.

Regarding the post-intervention functional characteristics, 20 (48.7%) patients presented general symptoms and 21 (51.2%) patients had neurological symptoms. Independent movement was achieved in 29 (70.7%) patients, and notably, only 14 (34.1%) patients returned to work after being discharged from the service.

DISCUSSION

The High Specialization Unit of the Centro Médico de Occidente of the Instituto Mexicano del Seguro Social is located in western Mexico, in Guadalajara, in the state of Jalisco, and provides medical care to more than ten million inhabitants of the region.

Table 1. Location of the lesions by vertebrae.

Vertebral Body Affected	Frequency
T 1	2 (4.8%)
T 2	1 (2.4%)
T 4	1 (2.4%)
T 5	1 (2.4%)
T 6	2 (4.8%)
T 7	6 (14.6%)
T 8	8 (19.5%)
T 9	4 (9.7%)
T 10	1 (2.4%)
T 11	3 (7.3%)
T 12	9 (21.9%)
L 8	8 (19.5%)
L 2	8 (19.5%)
L 3	10 (24.3%)
L 4	13 (31.7%)
L 5	7 (17.0%)
S 1	2 (4.8%)

Table 2. Complementary diagnosis in the patients.

Finding	Frequency
Leukocytosis	18 (43.9%)
Elevated ESR	28 (68.3%)
CRP elevation	36 (87.8%)
Presence of PPD	24 (58.5%)
Positive biopsy	24 (58.5%)
Suggestive data in computed axial tomography	22 (53.6%)
Suggestive data in magnetic resonance imaging	41(100%)

Demographic data showed a predominance of males, aged over 30 years; some with comorbidities were observed, such as the presence of human immunodeficiency virus, and diabetes mellitus; another factor included in demography/demographic data is overcrowding. These data are very similar to the data reported by Song *et al.*⁵ and Ansari *et al.*¹⁰

The anatomical regions most affected in this study were the thoracic and lumbar regions; however, Rasouli *et al.*,¹² Pu *et al.*¹³ and Fuentes *et al.*¹⁵ report that the most affected region is the thoracic region, as it is closer to the pulmonary region. The existence of two or more vertebrae affected by the tuberculosis is frequent, the most commonly affected vertebral bodies being L3 and L4.^{12,13,15}

Most patients were diagnosed during the first year of evolution of the disease. This is consistent with some studies such as those of Ansari *et al.*¹⁰ and Moon *et al.*,¹⁶ who state that tuberculosis of spine is frequently reported from the first year of evolution, with a history of incidents of low back pain, sometimes accompanied by other symptoms such as loss of appetite, weight loss, or sweating, as symptoms with insidious onset. However, the majority of patients in this study were diagnosed when they observed an increase in pain, or the presence of neurological disorders secondary to invasion of the spinal canal.^{10,11,16}

The diagnostic tests used in patients were diverse and led to non-specific results for the disease. Many of these were not suitable for diagnosis of the patients, although some should have been conclusive, as reported by Agrawal *et al.*¹¹ in their research.

Whereas the radiographic studies show indefinite signs, they were of little help in clarifying the diagnosis. MRI is an excellent tool for diagnosis.

Proper identification of *Mycobacterium tuberculosis* by Ziehl-Neelsen staining has sensitivity of 64%, and for Lowenstein-Jensen culture or other specific medium for tuberculosis, sensitivity can be as high as 83%. The option for determining the remaining cases is through PCR, which is more appropriate.¹²

In our experience, biopsy only supports the diagnosis in just over half of individuals. This is consistent with the literature, which reports that histopathological diagnosis through the identification of caseating granulomas can be positive in up to 73% of cases with tuberculosis. Therefore, even in the patient whose microbiological and histological studies are all negative, spinal tuberculosis is not ruled out, and the tool that helps in the diagnosis is still MRI when previous studies are inconclusive.

While it is true that many of our patients received an antituberculosis regimen for two weeks before surgery, as suggested by Song *et al.*⁵ other patients were operated on by radical debridement, neurological decompression and collection of samples before medical management, as the correct diagnosis was not suspected.⁵

Surgical management was mainly performed to correct spinal instability or neurological involvement, after which the management was performed according to the evaluations carried out in visits both in the Department of Traumatology and Orthopedics and the Infectious Diseases Service, for the administration of antituberculosis drugs and control of inflammatory activity.¹³

The surgical approach used in the patients of this study was via the posterior approach, unlike the study published by Wang *et al.*,¹⁷ in which the anterior approach was used.¹⁷

According to the parameters established by Zhang *et al.*,¹⁸ for the clinical improvement of the patient with spinal tuberculosis, a return to normal conditions is expected within a period of six months to one year; due to the damage caused, some of the patients of the study were unable to return to work, although the majority had possibilities of leading an independent life.¹⁸

Nowadays, knowledge of the presence of spinal tuberculosis is essential for any level of healthcare in our population, and a lack of such knowledge, on the part of physicians, can result in severe complications due to an inaccurate or late diagnosis, as well as delayed treatment.

CONCLUSION

Discitis or infectious spondylodiscitis should be considered in any patient with localized pain at any level of the spine. MRI is the gold standard for diagnostic accuracy. We suggest having a good knowledge of the guidelines of clinical practice, and applying them in order to optimize the diagnosis and resources. This disease is considered part of syndromic diagnosis known as vertebral destruction syndrome (VDS).

Therefore, it is suggested that this pathology be considered as a possible diagnosis, as timely detection of the disease can prevent surgery and neurological complications.

All authors declare no potential conflict of interest concerning this article.

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