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CASE REPORT

COMPREHENSIVE REHABILITATION MANAGEMENT OF A COMPLICATED MULTILEVEL TUBERCULOUS SPONDYLITIS: A CASE REPORT

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ABSTRACT

Multilevel tuberculous spondylitis is a severe and complex form of spinal tuberculosis that poses significant challenges in both diagnosis and management. Involving multiple vertebral levels, the condition can cause debilitating symptoms, neurological deficits, and extensive spinal damage if untreated. This case report describes a 26-year-old male presented with a complicated multilevel tuberculous spondylitis, spinal cord injury (SCI), and an odontoid fracture. The study aimed to address the complexities associated with multilevel tuberculous spondylitis and highlights the need for an interdisciplinary approach, combining surgical intervention, pharmacological treatment, and comprehensive rehabilitation, to improve patient outcomes and quality of life.

KEY WORDS: Tuberculosis; Spondylitis; Spinal Cord; Injury; Rehabilitation.

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INTRODUCTION

Indonesia is the 2nd country with the highest Tuberculosis (TB) burden based on WHO estimation. In 2021, TB incidence rate is 354 per 100.000 populations with mortality rate is 52 per 100.000 populations.[1] Globally, the incidence of extrapulmonary TB is 3%, among which 10% of cases are skeletal TB. Spinal TB cases constitute 50% of skeletal tubercular infections.[2,3] Multilevel tuberculous spondylitis is a severe form of spinal tuberculosis, characterized by the involvement of multiple vertebral levels, this condition can lead to debilitating symptoms, neurological deficits, and extensive structural damage to the spine if left untreated.[3,4]

The lack of certain clinical diagnostic criteria makes it extremely difficult to diagnose spinal tuberculosis in a timely manner. Inflammatory back pain, especially in the absence of constitutional symptoms, TB risk factors, or initial negative TB cultures, should be highlighted in the criteria. To aid in early diagnosis, suitable laboratory tests, such as the Xpert MTB/RIF test, should be carried out in conjunction with MRI imaging.[5] Due to the disease's complex nature, a thorough rehabilitation strategy that takes into account both the psychological and physical components of healing is required.[4,6]

The objective of this study was to present a comprehensive case report of a 26-year-old male with multilevel tuberculous spondylitis, spinal cord injury, and an odontoid fracture,

Case Presentation

A 26-year-old male presented with a 6-month history of neck pain and progressive weakness in his upper and lower extremities over the previous two months, significantly affecting his ability to perform activities of daily living (ADLs). The patient was bedridden, requiring assistance for even basic movement, such as log rolling.

Physical examination revealed muscle weakness from C5 to S1, sensory deficits at T4-T5 and L1-L2 levels (Figure 1), and spasticity across multiple muscle groups, with hyperreflexia and clonus. Imaging studies, including X-ray and MRI, indicated destructive lesions from T8-T12, with abscess formation extending from C1 to VL1, right side m. erectus spinae at the level of VL 2-5, collapse of the corpus VL 5, and an odontoid fracture at C2 compressing the myelum at that level. (Figure 2). His history included posterior spinal stabilization (occiput to C5) and ongoing anti-tuberculous therapy. Additionally, he had

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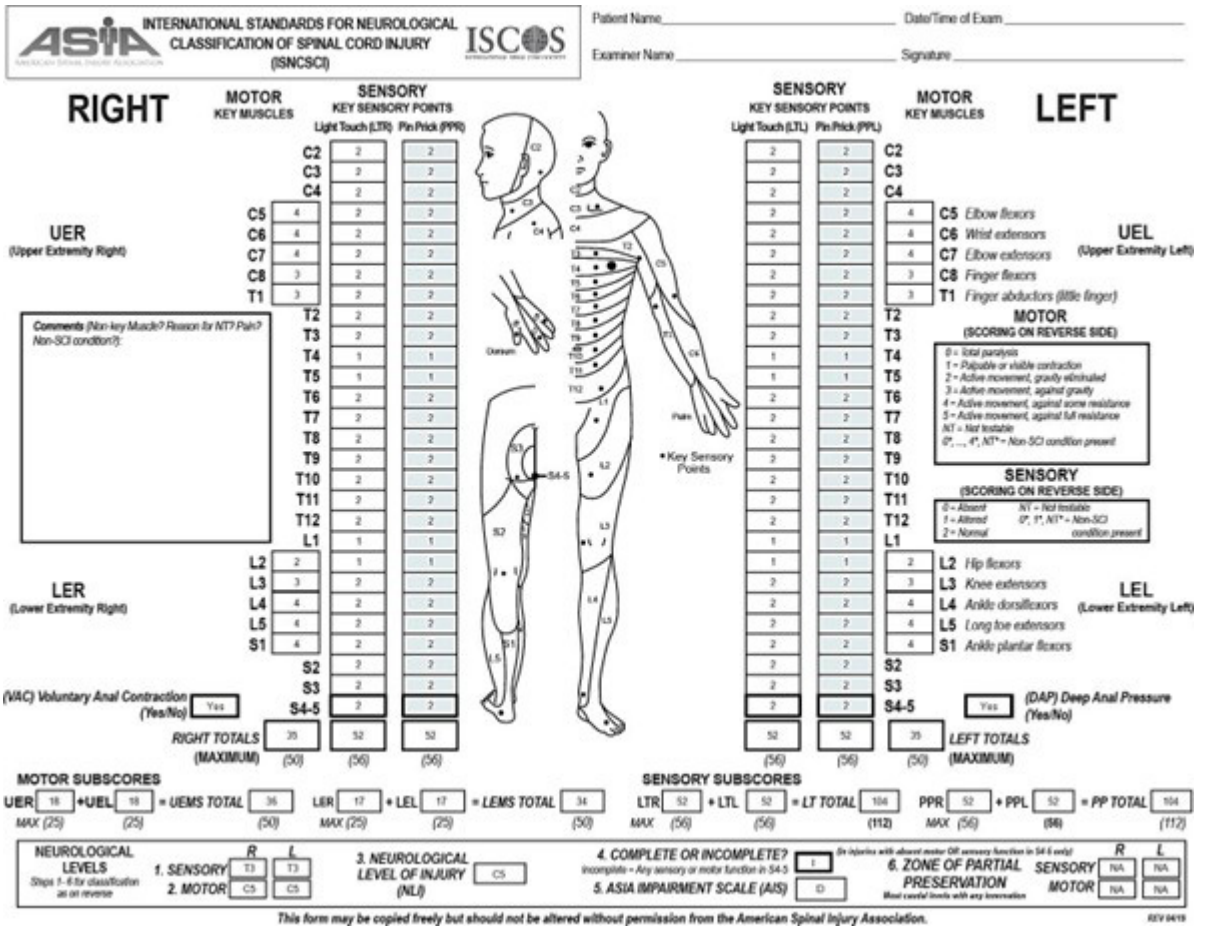

Figure 1. Spinal Cord Injury assessment showed patient with SCI AIS D with NLI C5

prior episodes of tuberculous meningoencephalitis and TB gonitis in the left knee.

Management

Medical Management: The patient continued anti-tuberculous therapy to address spinal TB. Pain management, spasticity control, and close monitoring for any new infections were prioritized.

Surgical Management: Due to spinal instability, posterior spinal stabilization surgery was performed, as indicated in cases of neurological deficit, instability, or spinal deformity in TB spondylitis. The surgical goals were debridement, stabilization, and correction of the spinal deformity.

Rehabilitation Management: Rehabilitation focused on maximizing functional recovery and minimizing disability. Therapeutic Exercises: Included active range of motion (AROM) exercises, upper and lower limb strengthening, sensory resensitization, supported sitting, breathing exercises to improve respiratory function, and spasticity inhibition techniques. Occupational Therapy: addressed hand dexterity and coordination to facilitate ADLs, such as grooming and dressing. Orthotic: the use of cervical-thoraco-lumbo-sacral orthosis (CTLSO) (Figure 3).

A. Contrast-enhanced whole-spine MRI : Tuberculosis Spondylitis with multiple abscess formation that projected at the level of VC1-VC4, VC4-VC7, VTh8-VTh12, and VL 1 which partially destroyed the left side corpus, pressing the left side lamina of the corpus VTh10-VTh 11, there was also an abscess formation in the m. erectus spinae on the right side at the level of VL2-VL5 and VL3-VS1 which was visualized accompanied by collapse of the corpus VL 5 causing lumbar dextroscoliosis. Odontoid fracture in the corpus VC 2 thus compressing the myelum at that level.

B. Lateral cervical X-ray: anterior dislocation of corpus VC2-VC3.

C. Anterolateral cervical X-ray post stabilization procedure: posterior stabilizers projected at os

occipital to VC5 level with screw installed in os occipital and pedicle screw in pedicle of right and left VC 2,3,4,5.

Outcome. After a one-year intensive rehabilitation program, the patient achieved substantial functional recovery. He regained independent ambulation, could perform ADLs without assistance, and no longer required a CTLSO. Regular follow-ups showed stable improvement.

Figure 3. Custom made Cervico-thoraco-lumbo-sacral Orthosis (CTLSO)

DISCUSSION

The disease's detrimental effects on the intervertebral discs and surrounding vertebral bodies cause progressive collapse, kyphosis, and neurological impairments. Although laboratory testing and distinctive imaging characteristics help identify the illness, tissue investigation utilizing cultures, histopathology, and polymerase chain reaction is required for the final diagnosis.[6, 8] Patients who require surgery usually have neurological impairments, spinal instability, or the need to repair a deformity. The three primary surgical techniques are stable fusion, deformity correction, and debridement.[6, 10,11]

The foundational elements of the SCI program include: general peripheral articular mobilization (passive, assisted active, or active); breathing exercises; core and upper limb strengthening exercises; encountered spastic muscle posturing and stretching; prevention of bed confinement complications (adaptive support, pressure ulcer prevention mattress, alternate positions, and early progressive verticalization); and evaluation of any vesico sphincter disorders to prevent upper urinary tract damage and to maintain renal function in patients with spinal TB who have neurological deficits due to spinal cord compression.[8,10] In order to treat a variety of symptoms in patients with spinal tuberculosis (ST), such as neurological disorders, pain, musculoskeletal disorders, posture, balance, gait, and cardio-respiratory difficulties, rehabilitation is crucial. The primary goals are to minimize disability, restore independence, and improve patients' quality of life.[7,8]

The prognosis for spinal TB is generally favorable, especially with early diagnosis and intervention. While there is no universal treatment guideline, an aggressive medical approach followed by surgery when necessary is often favored.[11] In this patient's case, rehabilitation was initiated early and focused on therapeutic exercises, sensory resensitization, and spasticity management. These interventions align with the literature indicating that early, multidisciplinary rehabilitation is critical for improving outcomes in spinal cord injury cases with concurrent TB spondylitis. A multidisciplinary approach involving medical, surgical, and rehabilitative strategies has been demonstrated to improve quality of life and promote functional independence in such patients.

CONCLUSION

This case underscores the importance of an integrated, multidisciplinary approach to managing spinal TB with complex neurological involvement. Effective management using anti-tuberculous therapy, stabilization surgery, and targeted rehabilitation led to significant functional recovery in this patient. The findings support early rehabilitation intervention as a cornerstone for enhancing outcomes in spinal TB cases with neurological complications.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	MDPS, OW
Acquisition, Analysis or Interpretation of Data:	MDPS, OW, DP, MKK
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All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.