

## Intradural extramedullary tuberculoma of the spinal cord at D1 to D10 Vertebra Level

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### Abstract:

Intradural extramedullary tuberculoma is a rare manifestation of central nervous system tuberculosis with clinical manifestations. The patient presented with back pain, which was progressive in nature, along with para-paresis with bowel and bladder involvement. Investigations of MRI is suggestive of compressive myelopathy due to an extramedullary collection present in the spinal cord. A D1-D10 vertebra laminectomy and microsurgical excision were performed, and the patient showed clinical recovery. Excellent clinical outcomes were achieved.

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### Introduction

Tuberculosis (TB) remains a global health priority, with spinal involvement representing 1-5% of TB cases [1]. Intradural extramedullary spinal tuberculoma (IETSC) is a rare manifestation (<2% of CNS TB) often linked to paradoxical reactions during antitubercular therapy (ATT) [2,3]. Paediatric cases demonstrate heightened susceptibility due to the dynamics of immune reconstitution [4]. Thoracic spine predominance (60-80% of cases) reflects vascular anatomy and biomechanical stress [5]. Three clinical profiles exist: primary presentation, disseminated disease manifestation, or post-treatment paradoxical onset [2]. Diagnosis is challenged by histopathology showing granulomatous inflammation [7], requiring multimodal approaches [8]. We detail a paediatric

D1-D10 IETSC case developing paradoxically during ATT for meningitis, highlighting critical management principle

**Case:** A 14-year-old female presented to OPD with a 20-day history of progressively worsening back pain, localized in the thoracic region, and fever. The pain was described as dull and constant, with occasional sharp episodes. She also reported a recent onset of loss of power in both lower limbs and bowel and bladder involvement (fig.1). The patient has a history of treatment for tuberculous meningitis for the last 2 months and was otherwise healthy prior to these symptoms. On examination, this patient had tenderness in the thoracic spine region, particularly over the D1 to D10 vertebrae.



Figure 1: Pre-operative clinical picture of patient with tuberculoma at D1 to D10 vertebra level



Figure 2: MRI imaging of patient with tuberculoma at D1 to D10 vertebra

Table 1: Neuro-Chart (On Admission)

| Neuro-Chart (On Admission) |                       |         |
|----------------------------|-----------------------|---------|
| Lower limb                 | Right                 | Left    |
| <b>Power</b>               | 2/5                   | 1/5     |
| 1) Hip                     | 2/5                   | 1/5     |
| 2) knee                    | 2/5                   | 1/5     |
| 3) ankle                   | 2/5                   | 1/5     |
| 4) Toe                     | 2/5                   | 1/5     |
| <b>Tone</b>                | Eutonic               | Eutonic |
| <b>Reflexes</b>            |                       |         |
| Superficial                | +                     | +       |
| Deep                       | +                     | +       |
| <b>Bowel and Bladder</b>   | Involved              |         |
| <b>Sensation</b>           | Present till D3 level |         |

**Investigations:** Xray shows no deformity or abnormalities, but MRI showed large extramedullary homogeneously enhancing collection and lesion of size 0.8x1.1x19.1 cm noted from D1 to D10 vertebral body level posteriorly. Cord is displaced anteriorly. associated cord signal hyperintensity is noted form C5 to D11 level S/O Compressive myelopathy(fig.2). Blood reports are within normal limits

Biopsy of extracted soft tissue was performed. Histopathological examination revealed non-specific inflammatory lesions. CB-NAAT revealed detection of M. Tuberculosis

**Diagnosis:** A case of intradural extramedullary tuberculoma with para-paresis with collection at D1 to D10 vertebra level with bowel and bladder involvement.

**Treatment:**

1. **Surgical Intervention:** Given the presence of significant spinal cord compression and progressive neurological deficit (paraparesis,

bowel/bladder involvement), urgent surgical decompression was indicated. A D1-D10 decompressive laminectomy (fig.3) was performed to alleviate pressure on the spinal cord [1,2].

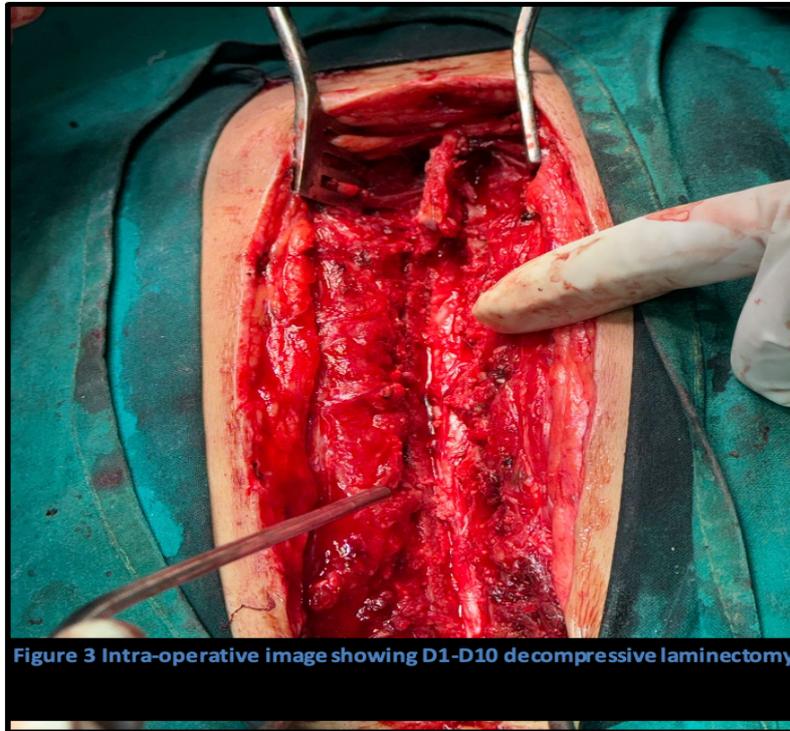


Figure 3: Intra-operative image showing D1-D10 decompressive laminectomy

Table 2: POD1 and POD10

|                          | POD 1                 |         | POD 10      |         |
|--------------------------|-----------------------|---------|-------------|---------|
|                          | Neuro-Chart           |         | Neuro-Chart |         |
|                          | Lower limb            |         | Lower limb  |         |
|                          | Right                 | Left    | Right       | Left    |
| <b>Power</b>             | 3/5                   | 3/5     | 4/5         | 4/5     |
| 1) Hip                   | 3/5                   | 3/5     | 4/5         | 4/5     |
| 2) knee                  | 3/5                   | 3/5     | 4/5         | 4/5     |
| 3) ankle                 | 3/5                   | 3/5     | 4/5         | 4/5     |
| 4) Toe                   | 3/5                   | 3/5     | 4/5         | 4/5     |
| <b>Tone</b>              | Eutonic               | Eutonic | Eutonic     | Eutonic |
| <b>Reflexes</b>          |                       |         |             |         |
| Superficial              | +                     | +       | +           | +       |
| Deep                     | +                     | +       | +           | +       |
| <b>Bowel and Bladder</b> | Involved              |         | Normal      |         |
| <b>Sensation</b>         | Present till D3 level |         | Present     |         |

2. **Anti-tuberculosis Therapy (ATT):** Anti-tubercular therapy (ATT) was continued and rigorously adhered to, as it forms the cornerstone of management for all forms of tuberculosis, including rare manifestations like IETSC [5, 6]. The anti-tuberculosis therapy regimen includes a combination of first-line drugs: isoniazid, rifampicin, ethambutol, and pyrazinamide.

3. **Supportive Care:** Comprehensive supportive care was initiated, encompassing tailored pain management and a structured physical therapy program. This was essential for early recovery, improve functional capacity, and enhance the overall quality of life during the rehabilitation phase [4].

4. **Post-Operative care:** Following initiation of the treatment regimen, this patient had a significant reduction in pain and improvement

of her neurological symptoms. Regular follow-up with clinical assessments done. 6 months follow up showed power 5 in both lower limb with bowel and bladder normal, Patient can

stand, walk, climb stairs (fig.4). The patient is currently on extrapulmonary anti-tuberculosis therapy with active physical activity with regular follow-up.

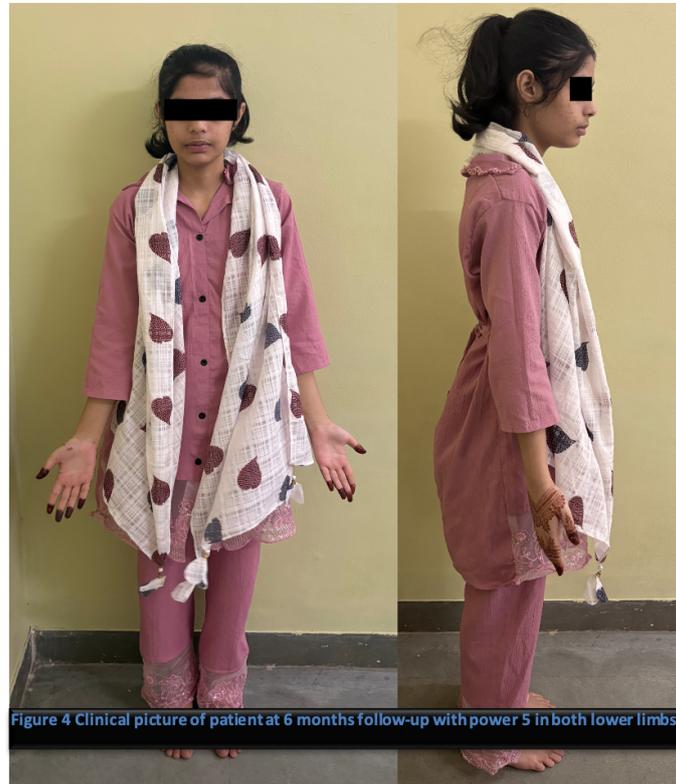


Figure 4 Clinical picture of patient at 6 months follow-up with power 5 in both lower limbs

**Figure 4: Clinical picture of patient at 6 months follow-up with power 5 in both lower limbs**

### Discussion

This case serves as an example of paradoxical tuberculoma, a rare central nervous system TB complication in which new lesions form in spite of successful antitubercular therapy (ATT). Immunorestitution inflammatory syndrome (IRIS) is frequently associated with it [3,5,9]. The presentation in the thoracic spine matches its known preference, which is due to the vascular structure of the area [1,5].

Magnetic resonance imaging (MRI) is essential for diagnosis. It shows distinctive compressive lesions that are usually hidden on plain X-rays [2,10]. Initial histopathological results can be non-specific [7], which highlights the important role of molecular diagnostics like CB-NAAT for definitive confirmation and to direct targeted treatment [8].

Surgery is crucial in cases of acute cord compression, as demonstrated by the patient's rapid neurological recovery following decompressive laminectomy [1,2]. The successful outcome was achieved through a combination of surgical decompression, a complete course of ATT, and supportive rehabilitation [5,6,9].

### Conclusion

This case highlights several critical principles in managing spinal tuberculoma. First, a high index of suspicion is necessary for new neurological symptoms arising during ATT, as they may indicate a paradoxical reaction. Second, MRI is essential for early detection and characterization of intradural lesions, while CB-NAAT provides a crucial tool for overcoming the limitations of non-specific histopathology and confirming the diagnosis [7,8]. Finally, a prompt multidisciplinary strategy involving surgical decompression for neurological compromise followed by a complete course of ATT [6] leads to excellent neurological recovery and prognosis. This approach is vital for mitigating long-term disability in patients with this severe complication of tuberculosis.

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