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Surgical management of Pott's disease in Madagascar: A retrospective analysis of 36 cases in a neurosurgical setting

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Abstract

Background: Pott's disease, or tuberculous spondylodiscitis, is a severe form of osteoarticular tuberculosis, posing significant public health challenges due to delayed diagnosis and complex management.

Objective: This study aims to describe the surgical management of Pott's disease and evaluate the clinical and functional outcomes of patients undergoing surgical intervention.

Methods: A retrospective study was conducted on 36 patients hospitalized with Pott's disease between January 2019 and December 2022. Assessment criteria included demographic characteristics, surgical indications, operative techniques, neurological outcomes, and postoperative complications.

Results: Surgical intervention was performed in 75% of patients, with complete neurological recovery in 10% and partial functional improvement in 57% of cases. Bone consolidation was achieved in 61.1% of cases at 12 months. Postoperative complications included urinary tract infections and pressure ulcers (18.5%), as well as persistent spinal deformity in 7.4% of cases. One case of septic shock-related mortality was reported.

Conclusion: Surgery is an effective therapeutic option for complicated cases of Pott's disease, particularly in the presence of neurological compression or spinal instability. A multidisciplinary approach integrating antibiotic therapy, surgery, and rehabilitation optimizes functional and neurological outcomes.

Keywords: Pott's disease; Spinal tuberculosis; Surgical management; Neurological deficits; MRI imaging; Perioperative findings

1 Introduction

Pott's disease, a form of tuberculous spondylodiscitis, results from spinal infection by *Mycobacterium tuberculosis*. It accounts for 50–70% of osteoarticular tuberculosis cases and remains a leading cause of spinal deformity and paraplegia in developing countries. Although antibiotic therapy is the cornerstone of treatment, surgical intervention is indicated in cases of neurological deficits, spinal instability, or extensive bone destruction compromising sagittal balance.

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2 Methods

A retrospective study was conducted on 36 patients hospitalized with Pott's disease between January 2019 and December 2022. Assessment criteria included demographic characteristics, surgical indications, operative techniques, neurological outcomes, and postoperative complications.

3 Results

Among the 36 included patients, the mean age was 39 years (range: 2–67 years), with a male predominance (58.3%). The mean delay between symptom onset and neurosurgical management was 7.7 months, highlighting significant diagnostic delays. The most common symptoms were spinal pain (91.6%), vertebral stiffness (75%), and neurological deficits (68%).

The most frequently affected regions were the thoracic spine (61.1%) and the lumbar spine (27.8%). Surgical indications were established in 27 patients (75%) due to severe spinal cord compression with neurological deficits (23.3%), spinal instability (60.9%), or failure of anti-tuberculous treatment (15.8%). The most commonly performed procedure was a posterior approach (96.3%), involving decompressive laminectomy and spinal fusion in 60.9% of cases requiring stabilization. An anterior approach was selectively employed for more extensive debridement of the infectious lesion.

Postoperative neurological recovery was complete in 10% of cases, with partial functional improvement in 57%. Radiological evaluation confirmed satisfactory bone consolidation in 61.1% of patients at 12 months.

Postoperative complications occurred in 18.5% of cases, including urinary tract infections and pressure ulcers associated with prolonged immobilization. Persistent spinal deformity was observed in 7.4% of cases, necessitating orthopedic follow-up. One patient succumbed to postoperative septic shock, emphasizing the potential severity of infectious complications associated with spinal surgery in this context.

Perioperative sample analysis confirmed the tuberculous nature of the infection in most cases. Granulomatous inflammation with caseous necrosis was observed in 85.2% of cases. Culture was positive for *Mycobacterium tuberculosis* in 66.7% of cases, and PCR analysis significantly increased diagnostic sensitivity, detecting bacterial DNA in 88.9% of cases. These findings highlight the importance of molecular diagnostics in tuberculosis management.

4 Discussion

Pott's disease accounts for 50–70% of osteoarticular tuberculosis cases, making it the most common form of osseous tuberculosis. Its incidence varies worldwide, with higher prevalence in sub-Saharan Africa and Southeast Asia, where tuberculosis remains endemic [1]. In industrialized nations, incidence is lower but has risen among immunocompromised individuals, particularly those with HIV [2].

Our study reports a prevalence rate similar to those described previously, though differences in screening methodologies and healthcare accessibility may influence these figures [3]. Diagnostic delays remain a major challenge in managing Pott's disease. In our study, the mean diagnostic delay was 7.7 months, exceeding the 4–6 months reported in some Asian studies [4]. This delay facilitates the progression of bone and neurological damage, increasing the risk of paraplegia and spinal deformities [5]. It has been demonstrated that neurological recovery rates are significantly better when intervention occurs within 3–4 months of symptom onset [6].

Perioperative samples provided essential diagnostic confirmation. The histopathological detection of granulomas and caseous necrosis aligns with previous findings, reinforcing the need for tissue biopsy in unclear cases. The 66.7% culture positivity rate is consistent with prior studies, though lower than expected due to potential antibiotic pretreatment. PCR testing significantly improved diagnostic sensitivity, supporting its integration into routine tuberculosis diagnostics.

Clinically, our findings confirm that chronic spinal pain is the predominant symptom (91.6% of cases), aligning with existing literature [7]. However, our 68% rate of neurological deficits is higher than the 50–60% reported in international studies, likely due to delayed diagnosis, leading to prolonged spinal cord compression and more severe neurological complications.

Decompressive laminectomy and posterior spinal fusion were the most commonly performed procedures in our study, with an anterior approach utilized in 15% of cases (figure 1). This is lower than the >30% reported in some European and Asian studies, where anterior debridement is preferred for more extensive infectious lesion removal [8]. However, the posterior approach remains favored in our center due to lower morbidity and surgeon familiarity with the technique. Adopting a more frequent combined approach may improve bone consolidation rates and limit progressive spinal deformity.

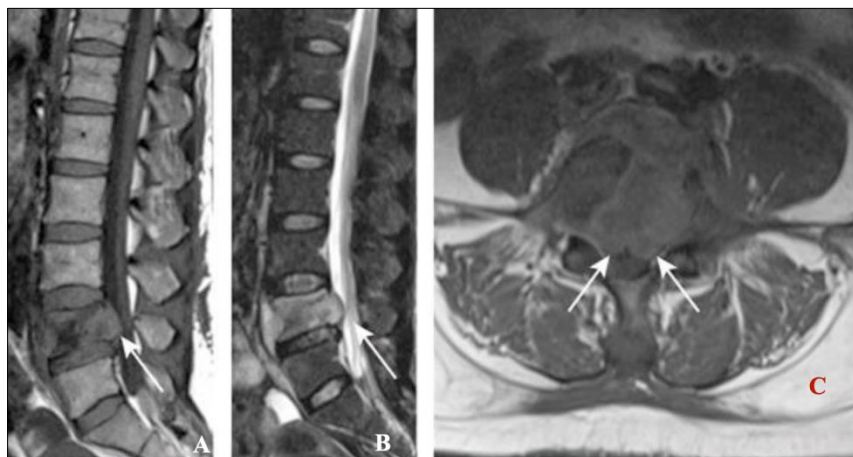


Figure 1 Thoracolumbar MRI showing a monofocal Pott's disease lesion at the L4 level A: Sagittal T1-weighted image B: STIR sequence C: Axial T1-weighted image

Our results show a 10% rate of complete neurological recovery and 57% partial improvement, slightly lower than the 12–15% reported in previous studies [9]. This discrepancy may be attributed to the severity of cases managed and prolonged delays before intervention. Enhancing postoperative care, including more intensive rehabilitation and closer radiological follow-up, may improve outcomes (table 1).

Table 1 Comparative Table of Clinical and Surgical Outcomes

Study	Clinical Presentation	Perioperative Findings	Surgical Treatment	Evolution
Current Study (Madagascar)	Spinal pain (91.6%), neurological deficits (68%)	Granulomas (85.2%), caseous necrosis (74.1%), positive culture (66.7%), PCR detection (88.9%)	Posterior approach (96.3%), anterior debridement (15%)	Complete recovery (10%), partial recovery (57%), mortality (2.7%)
Jain et al. (2010)	Back pain (95%), kyphosis (55%), neurological deficits (50%)	Caseous necrosis (80%), positive culture (60%)	Anterior debridement (40%), posterior fusion (60%)	Neurological improvement (75%), residual kyphosis (20%)
Rajasekaran et al. (2018)	Pain (92%), neurological deficits (60%)	Histology positive in 88%, culture positive in 70%	Combined anterior and posterior approach (30%)	Functional improvement (85%), persistent deformity (15%)
Dunn & Ben Husien (2018)	Neurological impairment (65%), spinal deformity (50%)	Granulomatous inflammation (82%), PCR sensitivity (90%)	Posterior instrumentation (80%), anterior decompression (20%)	Recovery (80%), complications (10%)

5 Conclusion

Our findings confirm the efficacy of surgery in managing complicated cases of Pott's disease, particularly in the presence of neurological compression or spinal instability. However, delayed diagnosis remains a major obstacle, negatively impacting functional outcomes. Improving early detection, optimizing surgical strategies, and enhancing access to postoperative rehabilitation could improve the overall prognosis of patients with Pott's disease.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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Statement of ethical approval

This article does not contain any studies with human participants performed by any of the authors

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