Neurologically Deficient Infectious Spondylodiscitis: Mid-Term Management Outcomes

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■ 1. INTRODUCTION & BACKGROUND

Epidemiological Burden

- Infectious Spondylodiscitis (SPDI) is a critical spinal infection.
- Accounts for 2% to 4% of all community-acquired bone and joint infections.
- Tunisian Context: Annual incidence in the country is estimated at 15.1 cases/year.
- Requires urgent diagnostic workup combining clinical, biological, and radiological data.

Neurological Turning Point

- Neurological complications (deficits) represent a major prognostic shift.
- Indicates progressive spinal cord or nerve root compression.
- Management is highly multidisciplinary (Orthopedic surgeons, ID specialists, Radiologists, Rehabilitation therapists).
- Early decompression and stabilization are critical to prevent permanent paralysis.

■ 2. STUDY OBJECTIVES

01. OUTCOME EVALUATION

To evaluate the clinical, functional, and radiological outcomes of the medico-surgical management of infectious spondylodiscitis complicated by neurological deficits.

02. PROGNOSTIC CRITERIA

To identify critical pre-operative and intra-operative prognostic factors associated with a favorable clinical response and full neurological recovery.

■ 3. PATIENTS & METHODS

Study Design

- Retrospective descriptive and analytical study.
- Conducted at the Adult Orthopedics and Infectious Diseases Department of Mohamed Kassab Institute (IMKO).
- 13-Year Period: January 2010 to December 2022.
- Reflected a significant single-center experience in Tunisia.

Inclusion Criteria

- Adult patients (age >= 18 years) with confirmed infectious spondylodiscitis.
- Strict documentation of an associated neurological deficit (motor, sensory, or genito-sphincteric).
- Minimum postoperative follow-up of 2 years (24 months) to ensure stable recovery assessment.

Exclusion Criteria

- Unusable, incomplete, or corrupted patient medical records.
- Patients lost to follow-up before the 2-year clinical milestone.
- Infections following open fractures, direct post-traumatic inoculation, or post-surgical spinal implants (contiguous infections).

1. Epidemiological Factors

- Age and Gender distribution
- Lifestyle habits (dietary, tobacco)
- Personal/family history of TB
- Underlying risk factors (e.g., degenerative spine, obesity, age >65 years)
- Circumstances & delay of discovery

2. Medical Management

- Empiric vs. targeted antibiotics
- Etiological ATB regimens (antitubercular, antibrucellar, pyogenic)
- Adjuvant corticosteroid administration (type, dose, duration)
- Preoperative & postoperative immobilization type (body jacket, brace, minerve)

3. Surgical Parameters

- Indication for spinal decompression
- Surgical approach & technique type (isolated decompression, fusion, instrumentation)
- Total operative duration
- Interval: Symptoms - Surgery
- Interval: Antibiotics - Surgery

■ 4. METHODS: FOLLOW-UP & BIOSTATISTICS

Postoperative Progression & Rehabilitation

- **Rehabilitation Protocols:** Structured physical therapy for functional recovery.
- **Clinical Evolution:** Monitoring of back pain, focal symptoms, and progressive motor/sensory recovery.
- **Biological Evolution:** Systematic serial monitoring of inflammatory biomarkers (CRP, WBC).
- **Radiological Healing:** Regular radiographic control and MRI to confirm bone fusion and decompression.
- **Complications:** Tracking of hardware failure, infection relapse, or adjacent segment disease.

■ 5. RESULTS:

Patient Cohort & Clinical Presentation

COHORT DEMOGRAPHICS

N = 35 Patients

Sex Ratio: 1.08 (52% Male ♂ | 48% Female ♀)

Age Profile at Surgery

Mean Age: 62.8 years

- Geriatric Subgroup: 47% of patients were aged > 65 years.
- High prevalence of degenerative spine conditions as a predisposing factor.

Symptom / Motif	Patients (N)	Percentage
Spinal Pain (Rachialgia)	35	100%
Fever	29	84%
Altered General Status (AEG)	2	7%
Neurological Deficit	1	3%
Dorsal Swelling	1	3%

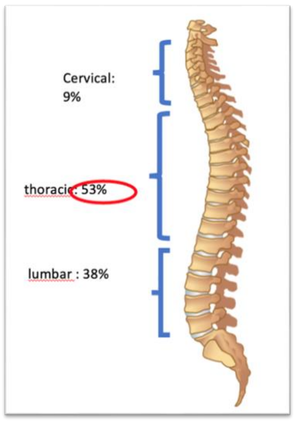
■ 5. RESULTS: Imaging Modalities, Locations & Etiologies

- **Magnetic Resonance Imaging (MRI):**

Performed in 100% of patients. Gold standard for evaluating spinal cord compression, epiduritis, and soft tissue involvement.

- **Computed Tomography (CT):**

Performed in 12% of patients. Useful for detailing bony erosions and guiding discovertebral needle biopsy.



Etiological Profile	%
Tubercular (TB)	52%
Brucellar Spondylodiscitis	22%
Pyogenic Spondylodiscitis	28%

■ 5. RESULTS: Medical Management & Immobilization

Etiology-Specific Antibiotics

- **Tuberculosis SPDI (52%):**

Strictly managed with quadruple antitubercular regimen.

- **Brucellosis SPDI (22%):**

Dual targeted regimens:

- Rifamycin + Cotrimoxazole: 4 cases (57%)
- Tetracycline + Rifamycin: 2 cases (29%)
- Tetracycline + Cotrimoxazole: 1 case (14%)

- **Pyogenic SPDI (28%):**

55% of patients started on immediate empiric broad-spectrum antibiotics upon high clinical suspicion.

Adjuvant Corticotherapy

Administered in 78% of cases

Protocol: Dexamethasone for a mean duration of 8 ± 2 days to control cord edema.

Body Jacket (Corset)	Lumbar Brace (Lombostat)	Cervical Collar (Minerve)	Strict Bed Rest (Decubitus)
51%	29%	9%	11%

■ 5. RESULTS: Surgical Decompression & Neurological Recovery

Surgical Exposure

80% Operated

- **Operated Cases:**

28 out of 35 patients underwent stabilization/decompression.

- **Operative Timing:**

Mean delay to surgery was 17.4 days (range: 5 to 47 days).

- **Post-Op Follow-Up:**

Mean longitudinal follow-up was 4.4 years.

Neurological Outcomes

Complete Recovery: **57%**

Partial Recovery: **31%**

Worsening (Deficit): **13%**

High complete recovery rate (57%) confirms the clinical efficacy of urgent decompressive surgery.

SPSS Prognostic Predictors

- Cervical Spine Location $p = 3.2 \times 10^{-5}$
- Absent Corticosteroids $p = 0.002$
- Surgical Delay > 3 Months $p = 0.003$
- Presence of Soft Tissue Abscess $p = 0.014$

■ 6. CONCLUSIONS

Clinical Directives for Spondylodiscitis Management

- **Diagnostic & Therapeutic Challenge:**

Infectious spondylodiscitis remains a complex, high-stakes bone and joint infection.

- **Endemic Burden in Tunisia:**

Tubercular SPDI is highly endemic. Demands persistent clinical vigilance and systematic testing at the IMKO.

- **Early Pathogen Identification:**

Determining the etiological organism is paramount to initiate targeted antibiotic therapy and prevent disease progression.

- **Critical Role of Surgery:**

Decompression and stabilization are mandatory in patients with neurological deficits to avoid permanent sequelae.

- **No Single Optimal Approach:**

Spinal approaches must be customized. Decisions must always be made multidisciplinary, on a patient-specific basis.