Spondylodiscitis management

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Spondylodiscitis, requires a multidisciplinary approach for effective management. The goal is to eradicate the infection, prevent or treat complications (e.g., deformity, neurological deficits), and restore spinal stability and function.

see Spondylodiscitis treatment

Key Components of Management

1. Diagnosis

Accurate and early diagnosis is critical for effective treatment.

- **Clinical Presentation**:
  - Symptoms: Back pain (most common), fever, localized tenderness, and occasionally neurological deficits.
  - Risk factors: Immunosuppression, recent surgery, infections, or intravenous drug use.

- **Laboratory Investigations**:
  - Elevated inflammatory markers: C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and leukocytosis.
  - Blood cultures: Identify causative organisms (positive in ~50-70% of cases).
- **Imaging**:
  - **MRI** (gold standard): High sensitivity and specificity, detects soft tissue and bone involvement.
  - **CT-guided biopsy**: Essential for microbiological diagnosis when blood cultures are negative.

2. Medical Management

- **Antibiotics**:
  - Empiric therapy: Cover gram-positive (e.g., *Staphylococcus aureus*), gram-negative, and anaerobic organisms.
  - Targeted therapy: Adjusted based on blood or biopsy cultures.
  - Duration: 6–12 weeks (longer for complicated cases or immunocompromised patients).
- **Supportive Measures**:
  - Pain management with NSAIDs or opioids.
  - Immobilization: Bracing may reduce pain and prevent deformity in acute phases.

3. Surgical Management

Surgery is indicated in specific scenarios:

- **Indications**:
  - Neurological deficits (e.g., weakness, bowel/bladder dysfunction).
  - Spinal instability or deformity (e.g., kyphosis >20°).
  - Abscess formation (e.g., epidural or paravertebral abscesses).
  - Failure of medical therapy (e.g., persistent infection despite antibiotics).
- **Techniques**:
  - Minimally invasive surgery (MIS): Drainage of abscesses, debridement, stabilization.
  - Open surgery: Extensive debridement and reconstruction for severe instability or deformity.

4. Rehabilitation and Follow-Up

- **Physical Therapy**: Promotes recovery of function and prevents deconditioning.
- **Regular Monitoring**:
  - Clinical symptoms and inflammatory markers to assess response.
  - Follow-up imaging (MRI or CT) in unresolved cases or when complications are suspected.

Complications to Monitor

- Neurological deficits.
- Chronic pain or deformity.
- Spinal instability.

- Paraspinal abscess or septicemia.
- Relapse of infection.

Recent Advances and Recommendations

- **Minimally Invasive Surgery (MIS)**:
  - Preferred when feasible, due to lower morbidity and faster recovery.
- **Imaging Advances**:
  - MRI techniques can differentiate between infection and malignancy more effectively.
- **Consensus Guidelines** (e.g., EANS recommendations):
  - Provide structured thresholds for surgical indications and antibiotic durations.

Challenges in Management

- Delayed diagnosis due to non-specific symptoms.
- Rising antimicrobial resistance.
- Balancing the risks of surgery in medically fragile patients.

Conclusion

Spondylodiscitis management requires individualized care based on patient presentation, infection severity, and comorbidities. The integration of targeted antibiotics, timely surgical intervention when indicated, and structured follow-up ensures optimal outcomes. Ongoing research is essential to refine treatment protocols and improve patient care.

Delphi consensus studies

The de novo non-specific spinal infection managements (spondylodiscitis - SD) remains inconsistent due to varying clinical practices and a lack of high-level evidence, particularly regarding the indications for surgery.

Research question: This study aimed to develop consensus recommendations for spondylodiscitis diagnosis and spondylodiscitis management, addressing diagnostic modalities, surgical indications, and spondylodiscitis treatment strategies.

A Delphi consensus study was conducted with 26 experts from the European Association of Neurosurgical Societies (EANS). Sixtytwo statements were developed on diagnostic workup, management decisions, surgical techniques, non-surgical treatment, and follow-up and submitted to the panel of experts.

Consensus was reached on 38 of 62 statements. MRI was confirmed as the gold standard for diagnosis. Regarding surgical indications, the panel agreed that any new neurological deficit, even subtle, warrants surgical consideration. Motor deficits with a motor score (MRC) below 4 and bladder or bowel dysfunction were unanimously considered clear indications for surgery. For spinal deformity and instability, thresholds such as kyphosis >20°, scoliosis >10°, and vertebral body collapse >50%

were established to guide surgical decision-making. Minimally invasive surgery (MIS) was endorsed whenever feasible, and a 12 week antibiotic treatment regimen was favored in cases of complicated infections.

This EANS consensus provides updated recommendations for spondylodiscitis management, incorporating recent evidence on improved outcomes with surgical therapy. While these guidelines offer a more structured approach to clinical decision-making, further research is required to optimize surgical timing and validate the long-term impact of these treatment strategies [1].

This study successfully tackles a clinically significant challenge by providing structured recommendations for the diagnosis and management of de novo non-specific spinal infections. While the use of the Delphi method lends credibility, the reliance on expert opinion, incomplete consensus, and limited global representation are notable limitations. Nonetheless, it serves as an important step towards standardizing care for spinal infections and highlights the urgent need for further research to validate and refine these recommendations.

Systematic review and meta-analysis

Thavarajasingam et al. aimed to compare the mortality, relapse rate, and length of hospital stay of conservative versus early surgical treatment of pyogenic spondylodiscitis. All major databases were searched for original studies, which were evaluated using a qualitative synthesis, meta-analyses, influence, and regression analyses. The meta-analysis, with an overall pooled sample size of 10,954 patients from 21 studies, found that the pooled mortality among the early surgery patient subgroup was 8% versus 13% for patients treated conservatively. The mean proportion of relapse/failure among the early surgery subgroup was 15% versus 21% for the conservative treatment subgroup. Further, it concluded that early surgical treatment, when compared to conservative management, is associated with a 40% and 39% risk reduction in relapse/failure rate and mortality rate, respectively, and a 7.75 days per patient reduction in length of hospital stay ($p < 0.01$). The meta-analysis demonstrated that early surgical intervention consistently significantly outperforms conservative management in relapse/failure and mortality rates, and length of stay, in patients with pyogenic spondylodiscitis [2]

Thavarajasingam et al.'s systematic review and meta-analysis provide compelling evidence that early surgical intervention significantly outperforms conservative management in pyogenic spondylodiscitis, with reductions in mortality, relapse rates, and hospital stays. However, limitations such as heterogeneity, reliance on observational data, and a lack of long-term outcome evaluation temper the strength of its conclusions. Future studies should address these gaps to enhance the robustness and applicability of the findings across diverse patient populations and healthcare environments.

Systematic review

A population-based study from Denmark showed that the incidence of spondylodiscitis rose from 2.2 to 5.8 per 100 000 persons per year over the period 1995-2008; the age-standardized incidence in

Germany has been estimated at 30 per 250 000 per year on the basis of data from the Federal Statistical Office (2015). The early diagnosis and treatment of this condition are essential to give the patient the best chance of a good outcome, but these are often delayed because it tends to present with nonspecific manifestations, and fever is often absent.

Herren et al published an article based on a systematic search of Medline and the Cochrane Library for the period January 2009 to March 2017. Of the 788 articles identified, 30 publications were considered.

The goals of treatment for spondylodiscitis are to eliminate infection, restore functionality of the spine, and relieve pain. Magnetic resonance imaging (MRI) remains the gold standard for the radiological demonstration of this condition, with 92% sensitivity and 96% specificity. It also enables visualization of the spatial extent of the infection and of abscess formation (if present). The most common bacterial cause of spondylodiscitis in Europe is Staphylococcus aureus, but tuberculous spondylodiscitis is the most common type worldwide. Antibiotic therapy is a pillar of treatment for spondylodiscitis and should be a part of the treatment in all cases. Neurologic deficits, sepsis, an intraspinal empyema, the failure of conservative treatment, and spinal instability are all indications for surgical treatment.

The quality of life of patients who have been appropriately treated for spondylodiscitis has been found to be highly satisfactory in general, although back pain often persists. The risk of recurrence increases in the presence of accompanying illnesses such as diabetes mellitus, renal failure, or undrained epidural abscesses [3)]

Literature review with clinical recommendations

Five influential studies on PS that have the potential to shape current practice in spinal infections were selected and reviewed. Each study was chosen for its contribution to a critical phase in PS management: diagnosis, imaging, surgical vs conservative treatment, and antibiotic duration. Recommendations were graded as strong or conditional following the GRADE methodology.

Five studies were highlighted. Article 1: Pluemer et al introduced the Spinal Infection Treatment Evaluation (SITE) Score, a novel scoring tool for standardizing treatment decision-making. Conditional recommendation to incorporate the SITE Score or SISS Score for improved treatment outcomes. Article 2: Maamari et al conducted a meta-analysis comparing imaging modalities, with conditional recommendation to consider 18F-FDG PET/CT to diagnosis PS as an adjunct to MRI which remains the gold standard. Article 3: Thavarajasingam et al demonstrated the potential survival benefit of early surgery in specific PS cases, leading to a strong recommendation for early intervention in appropriate patients. Article 4: Neuhoff et al compared conservative and surgical treatments in well-resourced settings, concluding a strong recommendation for early surgery in appropriate patients. Article 5: Bernard et al evaluated antibiotic treatment duration, with a conditional recommendation for a 6-week course in confirmed cases, based on comparable efficacy to a 12-week regimen.

Management of PS remains complex and varied. This perspective provides spine surgeons with evidence-based recommendations to enhance standardization and effectiveness in clinical practice [4)].

The study represents a valuable effort to synthesize impactful research on PS management and translate it into actionable recommendations. However, its narrow scope, reliance on conditional

recommendations, and limited discussion of implementation challenges restrict its immediate applicability in diverse settings. Future efforts should expand the evidence base, address variability in resources, and validate the proposed guidelines to enhance their utility in standardizing and improving care for pyogenic spondylodiscitis.

1)
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