

Microbiological Profile, Antimicrobial Susceptibility Test Results, and Inflammatory Profiles in Surgically Managed Spondylodiscitis: Results from A Retrospective Single-Center Cohort Study

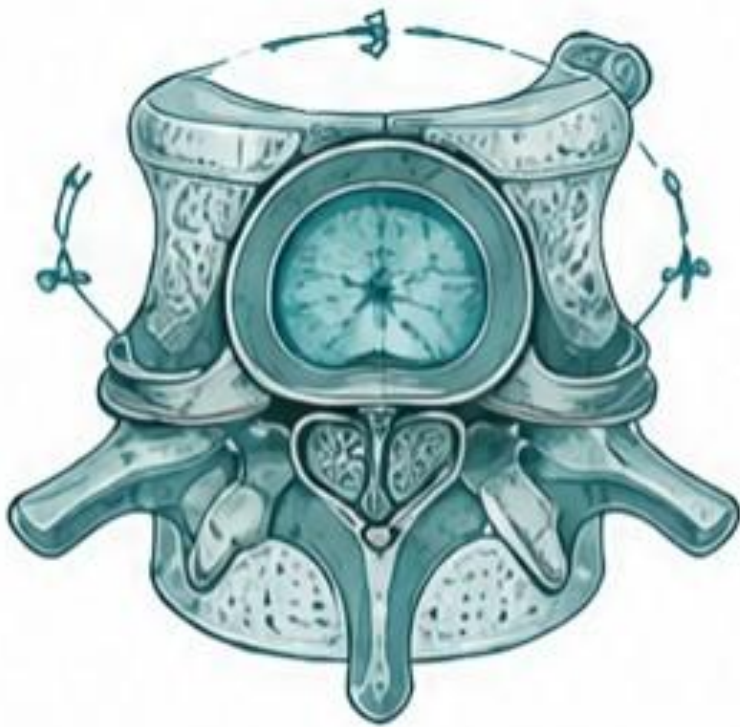
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1 Introduction & Aim



Spondylodiscitis is a rare but serious infection of the intervertebral disc and adjacent vertebrae, caused by a wide range of pathogens, most commonly pyogenic bacteria and *Mycobacterium tuberculosis*. Its incidence is rising, while diagnosis remains difficult due to a nonspecific clinical presentation, delayed recognition, and a significant number of culture-negative cases.



This study assessed the demographic, laboratory, microbiological, and antimicrobial resistance patterns of surgically treated spondylodiscitis.

2 Methods



Retrospective single-center study of 130 consecutively surgically treated spondylodiscitis cases (2009–2025).



Intraoperative cultures and clinical, laboratory, anatomical level, and AST data were extracted and standardized at the patient level.



Microorganisms grouped into predefined categories; resistance profiles mapped to antibiotic classes to quantify resistance burden.



Continuous data summarized as medians and IQR; categorical data as frequencies and percentages.



Associations assessed using chi-square and Kruskal-Wallis tests.

Analytical Approach



Multivariable linear regression evaluated predictors of log-transformed CRP.

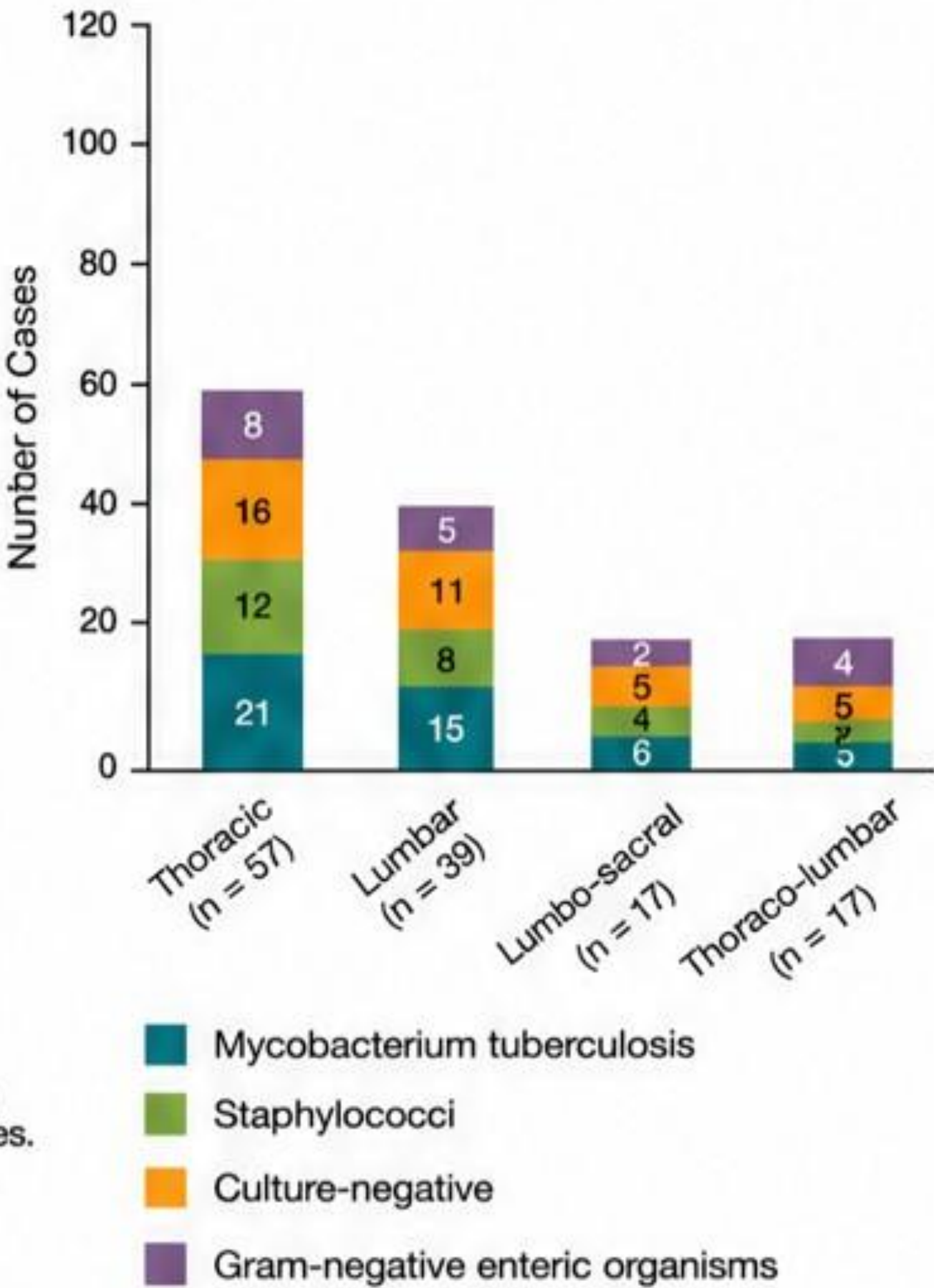


Logistic and quasi-Poisson models explored determinants of any resistance burden.

3 Results

- Median age: 57 years (± 14.17)
- Median BMI: 27.3 kg/m² (± 4.48)
- Thoracic involvement most frequent (n = 57), followed by lumbar (n = 39); lumbo-sacral and thoraco-lumbar cases each accounted for 17 cases.
- Mycobacterium tuberculosis* was the most common group (n = 47), followed by culture-negative (n = 31), staphylococci (n = 27), and gram-negative enteric organisms (n = 14) (Figure 1).
- Distribution of microorganisms differed significantly across spinal regions (p = 0.030).
- Inflammatory biomarkers varied across microbiological groups: significant differences for CRP (p = 0.019) and ESR (p = 0.014); leukocyte count and hemoglobin did not differ significantly.
- Multivariable linear regression: ESR independently associated with higher log-transformed CRP (p < 0.001); WBCs showed a borderline association (p = 0.084).
- Beta-lactams and fluoroquinolones were the most frequently represented antibiotic classes, followed by cephalosporins and aminoglycosides.
- Resistance-focused modeling: thoracic-related disease associated with a higher burden of resistant antibiotic classes.

Figure 1. Microbiological results across affected spinal regions in surgically treated spondylodiscitis



4 Discussion

Interpretation

ESR independently predicts higher CRP levels, indicating a strong link between systemic inflammation markers in surgically managed spondylodiscitis.

Anatomical Impact

Thoracic-related involvement is associated with a higher burden of resistant antibiotic classes, suggesting anatomical factors may influence resistance complexity.

Microbiological Findings

Mycobacterium tuberculosis was the most common pathogen group, followed by culture-negative and staphylococcal infections.

Biomarker Insights

CRP and ESR vary significantly across microbiological groups, whereas WBC and hemoglobin do not.

5 Conclusions



- Thoracic-related involvement emerged as an independent predictor of higher antimicrobial resistance burden in surgically treated spondylodiscitis.
- Microbiological category, age, and BMI were not significantly associated with the number of resistant antibiotic classes.
- CRP and ESR, but not WBC, differed across microbiological groups.



These findings highlight a possible link between anatomical distribution and resistance complexity in this setting.