

Histologically Confirmed Necrotizing Fasciitis: Identification of Discriminative Factors and Development of Diagnostic Scores

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INTRODUCTION

Necrotizing fasciitis (NF) is a severe soft tissue infection with high morbidity and mortality, and its diagnosis remains challenging.

Current diagnostic tools rely mainly on clinical and laboratory parameters but have limited ability to distinguish true NF from other severe soft tissue infections.

Aim: To identify clinical, laboratory, and microbiological factors associated with histologically confirmed NF and develop exploratory diagnostic scores to improve diagnostic specificity.

METHODS

STUDY DESIGN & COHORT

- Retrospective observational case-control study of 32 patients operated for suspected NF at a tertiary hospital between 2019-2024
- Cohort:
 - Cases (n = 20), patients with histologically confirmed NF
 - Controls (n = 12), patients with negative histopathology

ANALYZED PARAMETERS

- Demographics, Comorbidities and Clinical Presentation
- Laboratory Parameters (CRP, ESW, leukocytes, MDW, Procalcitonin)
- Microbiology (Blood cultures, intraoperative cultures)
- Outcomes (postoperative course and mortality)

MICROBIOLOGICAL STRATIFICATION

Positive cultures were classified as high- or low-risk, with high-risk defined as β -hemolytic streptococci or polymicrobial infection.

STATISTICAL ANALYSIS

Univariate analysis + Firth penalized logistic regression model were used. Based on these results, three exploratory diagnostic scores were developed:

- preoperative score (MDW, procalcitonin (PCT), and sodium),
- preoperative + blood cultures score (blood cultures + MDW + PCT)
- intraoperative score (intraoperative microbiology + MDW + PCT)

RESULTS

DEMOGRAPHICS & LABORATORY MARKERS

No differences were observed between cases and controls in terms of Age, BMI, comorbidities, or classical laboratory parameters.

Higher MDW ($p < 0.03$), higher procalcitonin ($p < 0.04$), and high-risk microbiological profiles ($p < 0.01$), together with lower sodium levels ($p < 0.04$), were significantly associated with confirmed NF.

SCORE PERFORMANCE EVALUATION

- Blood Cultures & Microbiology Agreement: Diagnostic agreement between pre-surgical blood cultures and intraoperative tissue microbiology was moderate (63.6%; $\kappa = 0.29$)
- Score Specificity: The Preoperative + Blood Cultures score reaches a specificity of 95.7%

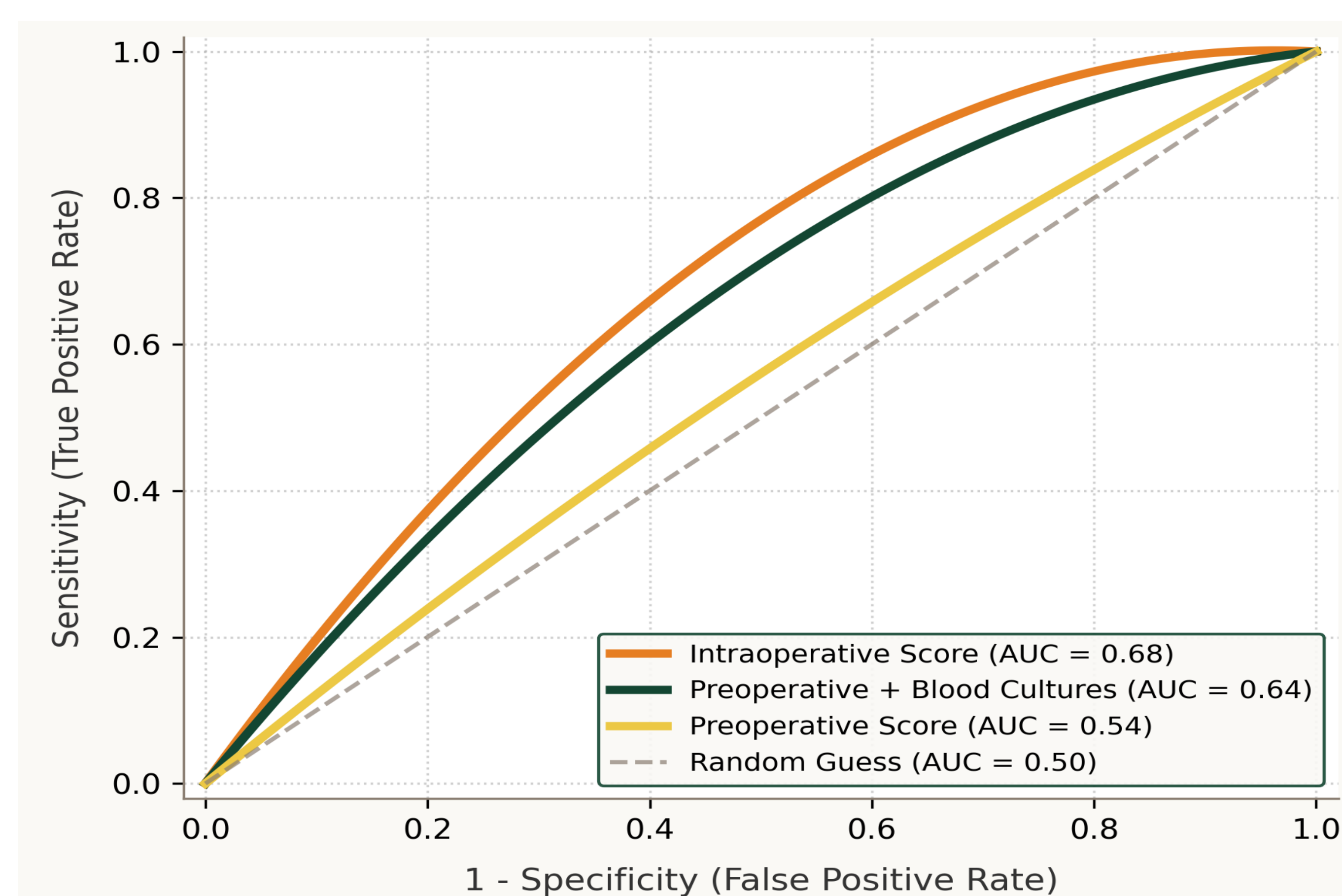


Figure 1: ROC Curve analysis demonstrating the discriminative capacities (AUC) of the three exploratory diagnostic scores.

CONCLUSIONS

1. **Limited diagnostic accuracy:** Conventional clinical and laboratory variables poorly discriminate NF from mimicking infections.
2. **Key discriminators:** Higher levels of MDW and PCT; low levels of Na and high-risk microbiological profile were the main independent factors associated with confirmed NF.
3. **Exploratory scores:** The proposed scores showed high specificity but low sensitivity, specially the preoperative + blood culture score