

Beyond the LRINEC Score: The Importance of Clinical Judgement in Preventing Unnecessary Amputation

Carmen R. Carland DPM, MS¹ and Jeffrey E. Shook DPM¹

¹Orthopaedic and Rheumatological Institute, Department of Foot, Ankle & Podiatry, Cleveland Clinic, 9500 Euclid Avenue, Cleveland OH, 44195



Clinical Message

The LRINEC score may underestimate disease severity in atypical or gram-negative infections. Clinical judgment, multi-disciplinary examination, and intraoperative findings should guide limb-salvage decisions in limb-threatening soft tissue infections.



Introduction

- Severe soft tissue infections exist on a spectrum from cellulitis to necrotizing fasciitis and require timely recognition and intervention. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score is commonly used to aid diagnosis; however, strict reliance on this scoring system without full consideration of the clinical picture may lead to premature amputation.
- Cutaneous findings may be delayed or unreliable early in disease progression, and laboratory thresholds may not capture atypical or gram-negative infections. *Serratia marcescens*, although uncommon, is a potentially aggressive pathogen that can present with rapidly progressive soft tissue infection despite laboratory values that do not meet traditional diagnostic criteria.
- This case highlights the importance of integrating clinical judgment with scoring systems when managing limb-threatening infections.

Case Summary

- A 45-year-old male presented with rapidly progressive right lower extremity infection, systemic inflammatory response, due to *S. marcescens*. Despite significant concern for necrotizing fasciitis, the patient's LRINEC score of 6 was at the lower threshold of the intermediate-risk category and did not prompt surgical exploration (scores 0-5 indicate low risk, 6-7 intermediate risk, and ≥8 high risk, maximum score 13)
- Vascular imaging demonstrated patent runoff without stenosis, and imaging showed no evidence of osteomyelitis. Given preserved perfusion, a limb-salvage strategy was pursued rather than immediate below-knee amputation.

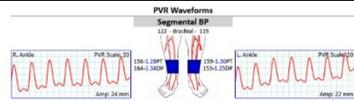
Objective Findings

Vitals:
 • BP: 124/72
 • Pulse: 84
 • Temp: 38.7°C
 • Resp: 21
 • BMI: 35.96

HgA1c: 6.2
 ESR: 10
 CRP: 40.2
 ALB: 2.3
 INR: 1.8

LRINEC score 6
 CRP 40.2, WBC 13.39, Na 128, High 15.6, Cr 3.96, Glucose 111, Lactate 4

Micro:
 • Blood cultures positive for *Serratia marcescens*



- Palpable DP/PT pulses
- CTA RLE runoff, no stenosis, vessels patent
- No history of diabetes or PVD
- X-rays RLE (tib/fib, foot & ankle) negative for osteomyelitis or osseous involvement

Key Clinical Decision Points

- LRINEC score of 6 demonstrated limited correlation with the severity of clinical progression
- Intact vascular supply with no radiographic osteomyelitis
- Clinical findings supported staged debridement rather than primary amputation
- Multidisciplinary agreement to pursue limb preservation with close monitoring & reassessment



Figure 1. Diffuse erythema present on the RLE from below the knee to the distal foot with areas of ruptured bullae on forefoot, lateral foot and anterior medial leg, non-viable dermal tissue underlying the ruptured bullae areas and gangrenous changes to toes 1-5



Figure 2. First of 6 serial debridements: I&D of right leg and foot with amputation of the first and second digits. Upon incision exudative material was noted down to the level of the 1st MTPJ, disarticulation of the first two digits was performed. Eschar, and non-viable skin and subcutaneous tissue were incised. There were pockets of pus/exudative material on the distal and dorsal lateral foot as well as the posterior aspect of the ankle all the way up to the proximal aspect of the gastrocnemius.



Figure 3. After a TMA during the 3rd surgical intervention and 8 weeks of NPWT coupled with IV antibiotic therapy, patient underwent surgical intervention #6: Harvest of STSG from right thigh for reconstruction of RLE and tenotomy of Achilles tendon.



Figure 4. Final RLE appearance at long-term follow-up (21 months post- initial presentation). A total of 6 surgical interventions, aggressive wound care, NPWT, IV antibiotic therapy as well as pain control was needed to fully heal the wounds in the summer of 2024.

Conclusions

- Although the LRINEC score was not satisfied and necrotizing fasciitis was excluded, the patient had a severe soft tissue infection requiring aggressive surgical management, including six surgical interventions (Fig. 2 & Fig. 3).
- Treatment included serial debridements, NPWT, intravenous antibiotics, and coordinated pain control.
- Surgical planning should be guided by the overall clinical picture, rather than reliance on scoring systems alone, when managing limb-threatening infections.
- Through timely operative intervention and multidisciplinary care, the patient achieved clinical stability, limb preservation, and progressed toward a functional return to normal activities.

Acknowledgements

The authors would like to thank the Podiatry residents of the 2023-2026 cohorts at CCF and CCF/OKC for their assistance in the OR and inpatient setting; the Department of Plastic Surgery, specifically Dr. Kwicien, for his help with the STSG harvesting; and the wonderful staff at Cleveland Clinic Main Campus for their continued support.

Selected Citations

- Kiat, H. J., Natalie, Y. H. E., & Fatimah, L. (2017). Necrotizing fasciitis: how reliable are the cutaneous signs?. *Journal of emergencies, trauma, and shock*, 10(4), 205.
- Marin, L., Rowan, R., Mantilla, A., Olupona, B., & MacIntyre, A. (2017). Lower-extremity infections caused by *Serratia marcescens*: a report of three cases and a literature review. *Journal of the American Podiatric Association*, 107(3), 231-239.
- Roberts, M., Crasto, D., & Roy, D. (2021). A case of subacute necrotizing fasciitis due to *serratia marcescens*. *The Journal of Clinical and Aesthetic Dermatology*, 14(1), 55.
- Wong, C.-H., Khin, L.-W., Heng, K.-S., Tan, K.-C., & Low, C.-O. (2004). *The LRINEC score: A tool for distinguishing necrotizing fasciitis from other soft tissue infections*. *Critical Care Medicine*, 32(7), 1535-1541