



## LRINEC Score for Necrotizing Soft-Tissue Infection

**Introduction:** The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) Score was developed to distinguish necrotizing fasciitis from severe cellulitis or abscess.

### Points & Pearls

- The original LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) study (Wong et al 2004) was a retrospective observational study divided into a developmental cohort and a validation cohort. It included 145 patients with necrotizing fasciitis and 309 patients with severe cellulitis or abscesses admitted to Changi General Hospital.
- The developmental cohort consisted of 89 patients with necrotizing fasciitis and 225 control patients. Necrotizing fasciitis was defined as an operative exploration findings of a presence of grayish necrotic fascia, lack of resistance of normally adherent muscular fascia to blunt dissection, lack of bleeding of the fascia during dissection, and the presence of foul-smelling, "dishwater" pus.
- From the developmental cohort, the study authors derived a scoring system of 6 criteria, each worth 0, 1, 2, or 4 points. The score was then "externally validated" on a separate cohort of 56 consecutive patients with necrotizing fasciitis and 84 control patients with severe cellulitis or abscess seen at Singapore General Hospital during a similar time frame.
- Patients were classified into three groups: low risk (LRINEC score  $\leq 5$  points,  $<50\%$  risk for necrotizing fasciitis), moderate risk (LRINEC score 6-7 points, 50%-75% risk for necrotizing fasciitis), and high risk (LRINEC score  $\geq 8$  points,  $>75\%$  risk for necrotizing fasciitis). Using a

### Why to Use

The LRINEC score may be helpful in providing an overall gestalt picture of a patient with a potential necrotizing soft-tissue infection, but it cannot rule out this infection.

### When to Use

- Use in patients with a concerning history or physical examination (eg, pain out of proportion to examination or rapidly progressive cellulitis).
- It can also be used in patients with an unconcerning story, as it can provide some reassurance if the score is very low.

### Next Steps

- Prompt fluid resuscitation and antibiotic administration are crucial in the treatment of necrotizing fasciitis.
- Consider early surgical consultation in borderline cases.

LRINEC score of  $\geq 6$  points as a cutoff for necrotizing fasciitis yielded a positive predictive value (PPV) of 92% and negative predictive value (NPV) of 96%. Approximately 90% of patients with necrotizing fasciitis had LRINEC scores  $\geq 6$  points, while only 3.1% to 8.4% of control patients had LRINEC scores  $\geq 6$  points.

- Ten percent of patients with necrotizing fasciitis still had a LRINEC Score  $<6$ . Also, there have been no prospective trials validating the LRINEC Score, and subsequent validation studies have not replicated the numbers shown in the original study.

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## Advice

All patients for whom there is a high clinical suspicion for necrotizing fasciitis should receive immediate surgical consultation for potential operative debridement. Consider calculating a LRINEC score to distinguish patients with severe cellulitis/abscess vs necrotizing fasciitis.

## Critical Actions

A LRINEC score  $\geq 6$  points is a reasonable cutoff to rule in necrotizing fasciitis, but a LRINEC score  $< 6$  points does not rule out the diagnosis.

## Evidence Appraisal

A validation study looking only at patients with pathology-confirmed necrotizing fasciitis showed that a LRINEC score cutoff of 6 points for necrotizing fasciitis only had a sensitivity of 59.2% and a specificity of 83.8%, yielding a PPV of 37.9% and NPV of 92.5%. However, the study did show that severe cellulitis had a LRINEC score  $\geq 6$  points only 16.2% of the time. Other validation studies have shown similarly poor sensitivities and specificities.

A subsequent retrospective analysis of patients with confirmed necrotizing fasciitis also showed that LRINEC scores  $\geq 6$  points were also associated with statistically significant increases in mortality and amputation rates.

The original derivation study was a retrospective observational study looking at laboratory differences between patients with confirmed necrotizing fasciitis and those with severe cellulitis or abscess. The study derived 6 criteria (C-reactive protein, white blood cell count, hemoglobin, sodium, creatinine, and glucose), with each criterion assigned a point value from 0-4. Using a cutoff of  $\geq 6$  points for necrotizing fasciitis, the study then retrospectively applied the criteria to separate cohorts of necrotizing fasciitis and severe cellulitis/abscess patients drawn from a population similar to the derivation study.

The study found that a LRINEC score  $\geq 6$  points had a sensitivity of approximately 90% and a specificity of approximately 95%, with a PPV of 92% and a NPV of 95%. However, this cutoff still missed 10% of patients with necrotizing fasciitis. Subsequent studies of the LRINEC Score yielded even poorer sensitivities of around 60% and a specificity in the 80% range. A LRINEC score of  $\geq 6$  points could be used as a potential tool to rule in necrotizing fasciitis, but a score of  $< 6$  points should not be used to rule out the diagnosis.

## Use the Calculator Now

[Click here to access the calculator.](#)

## Calculator Creator

Wong Chin Ho, MD

[Click here to read more about Dr. Ho.](#)

## References

### Original/Primary Reference

- Wong CH, Khin LW, Heng KS, et al. [The LRINEC \(Laboratory Risk Indicator for Necrotizing Fasciitis\) score: a tool for distinguishing necrotizing fasciitis from other soft tissue infections.](#) *Crit Care Med.* 2004;32(7):1535-1541.

### Validation Reference

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### Other References

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