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 ≤ 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 ≥ 8 points, > 75% risk for necrotizing fasciitis). Using a LRINEC score of ≥ 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 ≥ 6 points, while only 3.1% to 8.4% of control patients had LRINEC scores ≥ 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.

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 (e.g., pain out of proportion to examination or rapidly progressive cellulitis).
- It can also be used in patients with an un concerning 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.

Calculated Decisions

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

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Calculator Creator
Wong Chin Ho, MD
Click here to read more about Dr. Ho.

References

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Validation Reference

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