A Study on Evaluation of Lrinec Scoring System in Patients Presenting with Necrotizing Soft Tissue Infection

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Abstract

Background: Necrotizing fasciitis is an uncommon life-threatening soft-tissue infection characterized by rapidly progressing inflammation and necrosis of subcutaneous fascial tissues and it represents a subset of all necrotizing soft-tissue infections (NSTIs). The common pyoderma does not extend beyond the skin (epidermis and dermis) and include erysipelas, impetigo, etc. Necrotizing fasciitis is often underestimated because of the lack of specific clinical findings in the initial stages of the disease.

Methods: This was a prospective observational study in which 200 patients presenting with symptoms suggestive of necrotizing soft tissue infections in general surgery department, Sri venktaeshwara Medical College, Tirupati from March 2017 to Oct 2018 were taken for the study.

Results: In patients with severe soft tissue infections, LRINEC SCORE based on laboratory parameters is an easy and reliable predictor to diagnose necrotizing fasciitis. In developing countries like India, where in resources are limited, LRINEC score will greatly help in predicting necrotizing fasciitis.

Keywords: Necrotizing fasciitis; LRINEC score; Soft tissue infection.

Introduction

Necrotizing fasciitis is an uncommon life-threatening soft-tissue infection characterized by rapidly progressing inflammation and necrosis of subcutaneous fascial tissues and it represents a subset of all necrotizing soft-tissue infections (NSTIs). The common pyoderma does not extend beyond the skin (epidermis and dermis) and include erysipelas, impetigo, etc. Necrotizing fasciitis is often underestimated because of the lack of specific clinical findings in the initial stages of the disease. It has been shown by numerous studies in the past that early recognition and surgical intervention at the earliest is the sole factor in preventing the morbidity and mortality in patients with necrotizing fasciitis[1]. So a scoring system which is easy to follow and cost effective with high positive and negative predictive value is required. One such scoring system is the LRINEC Scoring system devised by Wong *et al.*[2] and this study was carried out to assess the utility of the LRINEC scoring system for the diagnosis of necrotizing fasciitis where the mortality rates is very high in our country.

Materials and Methods

Source of Data: This was a prospective observational study in which 200 patients presenting with symptoms suggestive of soft–tissue infections in general surgery department, Sri Venktaeshwara Medical College, Tirupati from March 2017 to Oct 2018 were taken for the study.

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Inclusion Criteria

1. Patients admitted with symptoms suggestive of necrotizing soft-tissue infections.

Exclusion Criteria

1. Patients below 18 years or above 90 years of age.
2. Patients who have not given consent.

Procedure: Patients presenting with symptoms suggestive of soft-tissue infections underwent routine clinical examinations and tissue for histopathology, following which information regarding the demographics and covariates of soft-tissue infections was collected using a pretested semi-structured pro-forma cum observational checklist. LRINEC scoring system was applied to each of the study subjects. The confirmatory diagnosis for necrotizing fasciitis was done vide histopathology for all patients irrespective of the result of the LRINEC scoring system.

Statistical Analysis: Descriptive and inferential statistical analysis has been carried out in the present study. Chi-square/Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups. Diagnostic statistics, viz. Sensitivity, Specificity, PPV, NPV and accuracy has been computed to find the correlation of LRINEC Score with HPE findings. All statistical analyses were performed by using a statistical software program (SPSS version 22). $p<0.05$ was considered statistically significant.

Results

Table 1: Lrinec Score Levels in Relation to Histopathology Findings

LRINEC	Histopathology		Total
	Necrotizing Fasciitis	No Necrotizing Fasciitis	
<6	45(30.4%)	29(55.8%)	74(37%)
≥6	103(69.6%)	23(44.2%)	126(63%)
Total	148(100%)	52(100%)	200(100%)

Out of total patients, 148 patients were histologically proved to have necrotizing fasciitis, 103 patients (69.6%) had a LRINEC Score >6. (Table 1)

Correlation of LRINEC Score with histopathology was significant when LRINEC Score >6. (p value <0.0001) (Table 2).

In our study the sensitivity of LRINEC Score is 90.90% and specificity is 87.5%. Positive predictive value is 95.23% whereas negative predictive value is 77.78%. Accuracy of LRINEC Score in diagnosing necrotizing fasciitis is 90. LRINEC Score in diagnosing necrotizing fasciitis was found to be statistically significant ($p<0.001$) (Table 3).

Discussion

Necrotizing fasciitis is a spreading fascial gangrene that destroys the fascia while sparing skin and muscle. There is no age or gender predilection for necrotizing fasciitis which was consistent with the study done by Stoneback JW et al.[3] and Faucher et al.[4] The positive predictive value of LRINEC

Table 2: Comparison of Clinical Variables in Relation to Histopathology Findings

Variables	Histopathology		Total	p value
	Necrotizing Fasciitis	No Necrotizing Fasciitis		
Age in years	55.41 ± 13.27	49.94 ± 8.36	53.99 ± 12.40	0.315
Hemoglobin %	10.59 ± 2.13	10.23 ± 2.51	10.50 ± 2.23	0.067+
WBC	15787.83.41 ± 5774.70	15811.34 ± 3824.28	15793.95 ± 5327.43	0.396
RBS	167.52 ± 40.88	170.38 ± 15.18	168.26 ± 35.99	0.067+
Serum Creatinine (mg/dl)	1.67 ± 0.44	1.52 ± 0.47	1.63 ± 0.45	0.035*
Sodium (mEq/l)	133.58 ± 2.81	133.36 ± 1.40	133.52 ± 2.52	0.166
CRP	144.54 ± 15.89	147.30 ± 19.51	145.26 ± 16.90	0.315
LRINEC	6.58 ± 1.93	5.88 ± 2.11	6.40 ± 2.00	<0.001**

Table 3: Correlation of Lrinec Score with Histopathology Findings: Diagnostic Role of Lrinec Score

	True Positive	False Positive	False Negative	True Negative	Total	p value
Observation	103	23	45	29	200	<0.001**
	Sensitivity	Specificity	PPV	NPV	Accuracy	
Evaluation (%)	90.90	87.5	95.23	77.78	90	

score is 95.23% and the negative predictive value of LRINEC score is 77.78% which was consistent with the study done by Wong et al.[2] wherein the positive predictive value was 92% and negative predictive value of 96%. These findings were also consistent with the study done by Bharadwaj et al.[5] where the positive predictive value was 92% and negative predictive value of 82.22% as compared to 43.33%. The sensitivity of the score calculated in our study is 90.20 which was in contrast with the study done by Bharadwaj et al.[5] wherein the sensitivity was 68.51%. The study findings were also in consistent with the study done by Kumar et al.[6] which concluded that LRINEC score is robust score capable of detecting even clinically early cases of necrotizing fasciitis.

Conclusion

In patients with severe soft-tissue infections, LRINEC Score based on laboratory parameters is an easy and reliable predictor to diagnose Necrotizing fasciitis. In developing countries like India, wherein resources are limited, LRINEC score will greatly help in predicting necrotizing fasciitis. Because of its cost-effectiveness, availability and ease of us, it is recommended as a part in the holistic approach of treatment of necrotizing soft-tissue infections.

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