International Surgery Journal
Prasad BH et al. Int Surg J. 2019 Jun;6(6):2007-2010
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20192282

Original Research Article

LRINEC: an economical diagnostic tool for prognosis in patients with necrotizing soft tissue infections in a tertiary care centre

Ballapalli Hari Prasad*, Minchala Chengalrayan Narendra, Shaik Nurul Hameed

Department of General Surgery, Sri Padmavathi Medical College (W), Tirupati, Andhra Pradesh, India

Received: 05 May 2019
Revised: 19 May 2019
Accepted: 20 May 2019

***Correspondence:**
Dr. Ballapalli Hari Prasad,
E-mail: drballapallihari@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The objective of the study was to evaluate the efficacy of LRINEC score in the management and prognosis of patients with soft tissue necrotizing infections.
Methods: This is a prospective study conducted in Sri Padmavathi Medical College (W), Tirupati, Andhra Pradesh, India from May 2018 to January 2019. It included 50 patients who were diagnosed with severe soft tissue infection of lower limbs who needed surgical intervention. The effectiveness of LRINEC score was determined from the outcome.
Results: Age group varied from 40 to 60 years. Out of 50 patients 40 were men and 10 were women. The male to female ratio was 4:1. All the patients were investigated at the time of admission in the emergency department using the LRINEC score. Hospital stay varied from 15-45 days.
Conclusions: This study concludes that LRINEC score is an economical and accurate investigating tool in necrotizing soft tissue infections to determine the prognosis and outcomes.

Keywords: LRINEC score, Necrotizing soft tissue infections, Necrotizing fasciitis

INTRODUCTION

Necrotizing soft tissue infections are rapidly progressing infections with necrosis of the skin, subcutaneous tissue, vessels and superficial fascia (fascia superficialis).[1,2] If untreated the condition can progress to SIRS, MODS & death. Necrotizing fasciitis infection was first described by Jones in 1871 and termed as "hospital gangrene".[3]

First surgical debridement was performed in 1920 by Meleney and still plays the key role in the treatment of such infective conditions.[4,5]

Necrotizing soft tissue infections are broadly categorized into:

- Type 1- Polymicrobial/synergestic,
- Type 2- Monomicrobial (includes Group A Beta haemolytic Streptococcus),
- Type 3- Marine related organisms including Vibrio vulnificus,
- Type 4 - Fungal.[6,7]

The laboratory risk indicator for necrotising fasciitis (LRINEC) was first described by Wong et al.[8] The tool consists of six parameters at the time of presentation: C - reactive protein (CRP), total white cell count, haemoglobin, serum sodium, serum creatinine and blood glucose (Table 1).

Table 1 describes the parameters used in LRINEC scoring system and their scores. Based on the scores patients were categorized into low risk (<5); intermediate risk (6–7); high risk (>8).

Table 1: Describes the parameters used in LRINEC scoring system and their scores.

Parameter	Range	Score
Hb (g/dl)	>13.5	0
	11–13.5	1
	<11	2
WBC per mm^3	<15	0
	15–25	1
	>25	2
Sodium (mmol /l)	<135	2
Serum creatinine (mg/dl)	>1.6	2
Plasma glucose (mg/dl)	>180	1
C– reactive protein	>150	4

Score: <5 = Low risk; 6–7: Intermediate risk; >8: high risk.

The laboratory risk indicator for necrotizing fasciitis (LRINEC) score described by Wong et al is a good diagnostic tool to distinguish between necrotizing soft tissue infections versus non-necrotizing soft tissue infections.[8]

The objective of this study is to evaluate the efficacy of LRINEC score in clinical evaluation in the management and prognosis of patients with soft tissue necrotizing infections.

METHODS

This prospective study was carried out in Sri Padmavathi Medical College (W), SVIMS, Tirupati over a period of 9 months from May 2018 to January 2019.

A total number of 50 patients were included in the study.

Inclusion criteria

All patients with severe soft tissue infection of lower limbs who required hospital admission for surgical procedure were taken into the study.

Exclusion criteria

Children below the age of 13 years, pregnant women, associated malignancies.

Patients with severe soft tissue infection of lower limbs were evaluated at the time of admission and blood investigations in the LRINEC score were obtained and score was calculated. Patients were treated with i.v. fluids, i.v. antibiotics, surgical debridement and fasciotomy.

RESULTS

50 patients of Indian origin were taken into the study with age group ranging from 40–60 years.

Male to female ratio was 4:1. Risk factors predisposing to necrotizing soft tissue infections included diabetes mellitus 39 (78%), trauma 32 (64%), jaundice 12 (24%), smoking 24 (48%), alcoholism 30 (60%), renal disease 11 (22%), peripheral vascular disease 18 (36%) multi organ failure 9 (18%).

Symptoms included painful swelling of affected lower limb 42 (84%), fever 34 (68%), bullae 29 (58%), decreased urine output 23 (46%).

Describes the categorization of patients based on LRINEC score and the associated mortality rate (Table 2). 16 patients were categorized into Low risk group with 0% mortality, 27 patients were categorized into Moderate risk with 0% mortality and 7 patients were categorized into high risk with a mortality of 57%.

Table 2: Describes the categorization of scores based on LRINEC and the associated mortality rate.

LRINEC score	No. of patients	Mortality
Low risk	16	-
Moderate risk	27	-
High risk	7	4

Table 3: Describes the various surgical procedures performed on these patients.

Procedure	No. of patients	%
Single surgical debridement	18	36
Multiple surgical debridement	33	66
Split thickness skin grafting	5	10
Below knee amputation	3	6
Above knee amputation	2	4

Table 4: Demographic data of the patients with comorbidities and outcomes.

	No. of patients	%
Indian origin	50	100
Age group	40 - 60	
Gender		
Men	40	80
Women	10	20
Comorbitities		
Diabetes mellitus	39	78
Trauma	32	64
Jaundice	12	24
Smoking	24	48
Alcoholism	30	60
Renal disease	11	22
Peripheral vascular disease,	18	36
Multi organ failure	9	18
Mortality rate	7	14

Describes the various surgical procedures performed on these patients (Table 3). Procedures ranging from single surgical debridement (36%), multiple surgical debridement (66%) and split thickness skin grafting (10%), below knee amputation (6%), above knee amputation (4%) were performed.

Describes the demographic data of the patients consisting of the nationality with comorbid conditions & the outcomes (Table 4).

This study proves that LRINEC score is an economical and a good diagnostic modality to predict the outcomes & prognosis of patients with necrotizing soft tissue infections.

DISCUSSION

Wong et al identified a LRINEC score of ≥6 with a suspicion of necrotizing fasciitis and a score of ≥8 having a strong prediction for necrotizing fasciitis.[8]

It is evident that the LRINEC score is a reliable scoring method to detect and differentiate early cases of necrotizing fasciitis among patients with severe soft tissue infections. It is necessary to have a systematic approach for the early identification of the disease, early surgical intervention and to decrease the morbidity and mortality among patients with necrotizing soft tissue infections.

Necrotizing fasciitis leads to severe sepsis and associated systemic inflammatory response syndrome leading to changes in the biochemical and hematologic values. The LRINEC score measures these changes and interprets the probability of necrotizing fasciitis and the severity of sepsis.

Frozen section biopsy and MRI scans of the affected part have been used in the early diagnosis of necrotizing fasciitis. It is not possible to subject all patients with the suspicion of necrotizing fasciitis to frozen section biopsies and MRI scanning as the procedures is associated with morbidity and costly.[9]

The "finger test" should be considered as an alternative. Under local anesthesia a 2 cms incision is made up to the deep fascia and a gentle probing with the index finger is performed at the level of the deep fascia. The lack of bleeding, presence of characteristic "dishwater pus," and lack of tissue resistance to blunt finger dissection are features of a positive finger test and suggests necrotizing fasciitis.[10]

The diagnosis of necrotizing soft tissue infections needs high clinical index of suspicion & needs immediate surgical debridement.[7]

The LRINEC uses simple laboratory investigations at the time of admissions for patients with necrotizing fasciitis and stratifies the patients into low, intermediate and high risk groups subjecting them for surgical procedures. Serial LRINEC scores can be obtained to check for the presence of infections and escalation of antibiotic treatment or repeated surgical debridements. Care should be taken to treat other comorbidities. Presence of neutropenia indicates neutropenic sepsis and is a poor prognostic indicator.[11]

CONCLUSION

The LRINEC score is a good tool to classify the degree of sepsis in necrotizing fasciitis at the emergency department categorizing the patients for surgical management. In developing countries like India, this is an economical investigative modality and can be repeated to assess the success of initial surgical debridement.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Ahn C. Necrotizing fasciitis: reviewing the causes and treatment strategies. Advances in skin and wound care. 2007;20(5):288-93.
2. Trent JT, Kirsner RS. Diagnosing necrotizing fasciitis. Advances Skin Wound Care. 2002;15(3):135-8.
3. Eke N. Fournier's gangrene: a review of 1726 cases. British J Surg. 2000;87(6):718–28.
4. Meleney F. Hemolytic streptococcus gangrene. Arch Surg. 1924;9:317–64.
5. Wilson B. Necrotizing fasciitis. Am Surg. 1952;18(4):416–31.
6. Morgan MS. Diagnosis and management of necrotising fasciitis, a multiparametric approach. J Hosp Infect. 2010;75:249-57.
7. Wong CH, Chang HC, Pasupathy S, Khin LW, Tan JL, Low CO. Necrotising Fasciitis: Clinical Presentation, Microbiology And Determinants Of Mortality. J Bone Joint Surg Am. 2003;85:1454-60.
8. Wong CH, Khin LW, Heng KS, Tan KC, Low CO. The LRINEC (laboratory risk indicator for necrotizing fasciitis) score: a tool for distinguishing necrotizing fasciitis from other soft tissue infections. Crit Care Med. 2004;2(7):1535–41.
9. Green RJ, Dafoe DC, Raffin TA. Necrotizing fasciitis. Chest. 1996;110:219–29.
10. Andreasen TJ, Green SD, Childers BJ. Massive soft-tissue injury: Diagnosis and management of necrotizing fasciitis and purpura fulminans. Plast Reconstr Surg. 2001;107:1025–35.
11. Bone RC, Balk RA, Cerra FB, Dellinger RP, Fein AM, Knaus WA, et al. Definitions for sepsis and organ failure and guidelines for the use of

innovative therapies in sepsis. The ACCP/SCCM Consensus Conference Committee. American College of Chest Physicians/Society of Critical Care Medicine. Chest. 1992;101:1644–55.

Cite this article as: Prasad BH, Narendra MC, Hameed SN. LRINEC: an economical diagnostic tool for prognosis in patients with necrotizing soft tissue infections in a tertiary care centre. Int Surg J 2019;6:2007-10.