How Far The Laboratory Risk Indicator For Necrotizing Fascitis (Lrinec) Score Validate For Early Diagnosis of Necrotizing Fascitis

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Abstract: Introduction: Necrotizing fasciitis (NF) is a rapidly progressive infection primarily involving the fascia and subcutaneous tissue. It describes a group of relatively uncommon, but life-threatening infections of the skin, soft tissues, and muscles, which tend to progress rapidly through the fascial planes, causing rapid destruction of the fascial planes. It is a surgical emergency which requires immediate wide surgical debridement and patients to be kept on broad-spectrum antibiotics. Aim & Objective: To study validation of the laboratory risk indicator for necrotizing fasciitis (LRINEC) score for early diagnosis of necrotizing fasciitis and study its validation with the help of parameters like C-reactive protein, Total WBC count, Hemoglobin Serum sodium, Serum creatinine and Blood glucose. Methods: A prospective observational study over a period of one year in which a total of 69 patients of necrotizing fasciitis were studied and are correlated with LRINEC score. Results: The median age of the patients was 48.4 years, out of which 46 patients were male and 23 patients were female. The present study shows that out of 69 patients 42 patients (60.87%) had an LRINEC score more than 6. Conclusion: LRINEC scoring system is a valid diagnostic tool for early diagnosis of necrotizing fasciitis, but it should also be kept in mind that if the LRINEC score comes to be less than six than it should not be excluded. Emphasis must remain on expert clinical diagnosis and judgment in order not to delay surgical treatment as well as the use of the multidisciplinary team. [Alok R NJIRM 2017; 8(6):4-7]

Key Words: Necrotizing fasciitis, LRINEC score, Infections, Debridement.

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Introduction: Necrotizing fasciitis (NF) is a rapidly progressive infection primarily involving the fascia and subcutaneous tissue. It describes a group of relatively uncommon, but life-threatening infections of the skin, soft tissues, and muscles, which tend to progress rapidly through the fascial planes, causing rapid destruction of the fascial planes. Necrotizing soft tissue infections are known by the different name depending on the structure involved i.e. necrotizing fasciitis (when involving fascial layers), Fournier gangrene (when involving the perineum and genitalia), and Ludwig angina (when involving the floor of the mouth) and meleny's gangrene when involving anterior abdominal wall.

Initial signs and symptoms usually include swelling, erythema, pain, and tachycardia, and once the infection progresses, more typical signs and symptoms can be observed, including tense edema outside the area of compromised skin, pain disproportionate to appearance, skin discoloration (ecchymosis), blisters/bullae and necrosis, and crepitus or subcutaneous gas. Systemic findings include fever, tachycardia, hypotension, and shock.[1] Soft tissue gas, detected clinically or radiologically, is a classic sign, but its absence does not exclude the presence of a necrotizing infection.[2] Early recognition and aggressive debridement of all necrotic fascia and subcutaneous tissue are very important. Delay in operative debridement has been shown to increase the mortality rate.[3, 4]

Necrotizing fasciitis was first recognized in 500 BC, when Hippocrates reported a clinical description of a complication of erysipelas disease, resembling the current description of NF. In France, Claude Colles, chief surgeon of the Hotel Dieu in Lyon, described a condition in 1783 that was very similar to modern descriptions of NF. The first description of "modern" NF was made by Joseph Jones, a military surgeon of the army of the Confederate States of America. In 1871, he reported 2,642 cases of gas gangrene treated in hospital during the American Civil War, with a mortality rate of approximately 46%. In 1883, Jean Alfred Fournier described a syndrome with necrosis of the perineum in five men; this type of NF was subsequently given his name and is known as Fournier's gangrene. In 1924, Meleney reported an association with beta-hemolytic streptococcus A in a study of a series of hospitalized cases in Beijing. Thereafter, these cases were described for several decades as Meleney's gangrene. In 1952, the term "necrotizing fasciitis" was proposed by Wilson, as a more accurate description of this disease [5].

There are a wide variety of diagnostic tools that have been described and tested to diagnose Necrotizing fasciitis more accurately and expeditiously. Even in the

most experienced hands, clinical findings are not accurate enough for diagnosis, and both clinical clues and diagnostic tools should be used in combination to help make an early diagnosis. The laboratory risk indicator for necrotizing fasciitis (LRINEC) score was first introduced by Wong et al in 2004. Laboratory data including hemoglobin, creatinine, glucose, sodium, C-reactive protein (CRP) levels and the white blood cell count are used for early recognition of NF. An LRINEC score of six or more is found to have the positive predictive value of 92% and negative predictive value of 96% for necrotizing fasciitis.
The present aim of this study is to know that how far LRINEC score helps in diagnosis of necrotizing soft tissue infection.

Aim: To study validation of the laboratory risk indicator for necrotizing fasciitis (LRINEC) score for early diagnosis of necrotizing fasciitis.

Objective: To describe the defining characteristics of necrotizing fasciitis (NF), emphasizing early diagnostic indications with the help of parameters like C – reactive protein , Total WBC count , Hemoglobin, Serum sodium, Serum creatinine and Blood glucose .

Method: The present study was prospective observational study over a period of one year in Rohilkhand medical college and hospital. A total of 69 patients were studied after getting permission from the ethical committee of the college. The patient included in studied were all the patients of age groups between 18 to 60 years with the diagnosis of soft tissue infection either in form of cellulitis or necrotizing fasciitis. The patient excluded in the study was all the patients who were operated or primary debridement done before admission or were on parenteral antibiotics for more than 48 hrs. The following characteristics were taken into mind while considering the diagnosis of necrotizing fasciitis i.e. Presence of foul-smelling dishwater pus, the presence of necrotic soft tissue, fascia, demonstration of lack of resistance of normally adherent muscular fascia to blunt dissection and lack of bleeding of fascia during dissection. The confirmatory diagnosis was made on the basis of histo-pathological examination. All the routine laboratory investigation were done keeping in mind of parameters of LRINEC score i.e. CRP(C-reactive protein),Total white cell count(WBC),Hemoglobin, sodium(Na+),Creatinine, Glucose and on the day of operation tissue was sent for histopathological examination to confirm the diagnosis and were analyzed accordingly. A score greater than or equal to 6 indicates necrotizing fasciitis which should be seriously considered.[6]

Fig 1: showing necrotizing fasciitis of perineum and abdominal region

Fig 2: showing necrotizing fasciitis of perineal region

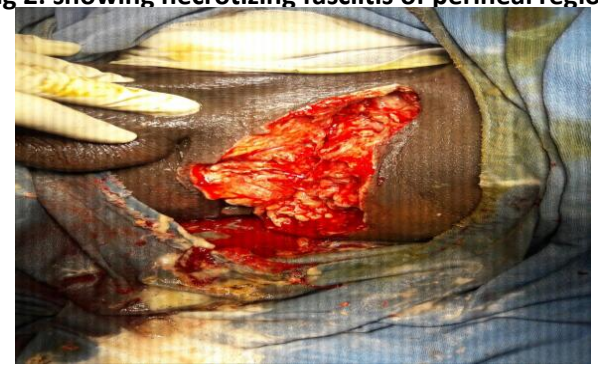

Table 1: Lrinec Scoring System For Necrotizing Fasciitis

Variables	Points
CRP(mg/L)	
<150	0
≥150	4
WBC(per mm^3)	
<15	0
15-25	1
>25	2
Hemoglobin(g/dl)	
>13.5	0
11-13.5	1
<11	2
Sodium(mmol/L)	
≥135	0
<135	2
Creatinine(mg/dl)	
≤ 1.6 mg/dl	0
>1.6 mg/dl	2
Glucose(mg/dl)	
≤ 180 mg/dl	0
> 180 mg/dl	1

Statistical Analysis: LIRNEC score was calculated in each case and was compared with the definitive diagnosis to find out how much accuracy does this scoring system have and whether it can be used as criteria for definitive diagnosis and early management.

Results:

Table 2: showing Age wise distribution of patient

Age Group	Frequency	Percentage (%)
<20	8	11.59%
21-30	12	17.39%
31-40	15	21.74%
41-50	12	17.39%
51-61	16	23.19%
>60	6	8.70%
Total	69	100.00%
Male/Female	46/23	
Mean ± S.D	48.4 ± 16.56	

Table 3: Showing frequency of patient according to variables of LRINEC score

Variables	Frequency	Percentage (%)
CRP(mg/L)		
<150	28	40.58%
≥150	41	59.42%
WBC(per mm^3)		
<15	28	40.58%
15-25	37	53.62%
>25	4	5.80%
Hemoglobin(g/dl)		
>13.5	3	4.35%
11-13.5	35	50.72%
<11	31	44.93%
Sodium		
≥135	33	47.83%
<135	36	52.17%
Creatinine		
≤ 1.6 mg/dl/140mmo/L	39	56.52%
>1.6 mg/dl/140mmo/L	30	43.48%
Glucose		
≤ 180 mg/dl/140mmo/L	32	46.38%
> 180 mg/dl/140mmo/L	37	53.62%

Table 4: Showing patients according to total LRINEC Score

Score	Frequency	Percentage (%)
< 6	27	39.13%
>6	42	60.87%
Total	69	100.00%

Table 5: showing anatomical site involved

Site Involved	Frequency	Percentage (%)
Perineal Region	26	37.68%
Lower Limb	19	27.54%
Thigh	15	21.74%
Lower Abdomen	9	13.04%
Total	69	100%

Discussion: Necrotizing fasciitis affects 0.4 to 1 person per 100,000 per year.[7] Both sexes are affected equally.[8] Necrotizing fasciitis results from a polymicrobial, synergistic infection, most commonly a streptococcal species in combination with staphylococcal, Escherichia coli, Pseudomonas, Proteus.[9] There are many predisposing factors of necrotizing fasciitis which includes diabetes, immunocompromised states, intravenous drug abusers, perineal infections and penetrating trauma. It is seen that eighty percent of the patients have a history of previous trauma or infections and over 60 percent commence in the lower extremities.[10]during the total one year of the study period, 69 patients were treated for necrotizing fasciitis. The median age of the patients was 48.4 years, out of which 46 patients were male and 23 patients were female. The reason for the frequently observed association of NF with advanced age could be explained in part by the preexisting co-morbidities and immunosuppression. Golger et al. [11] reported advanced age, Streptococcal toxic shock syndrome and immunocompromised status to be independent predictors of mortality in NF patients. We calculated the LRINEC score for all patients and the cut-off level was a score 6 according to a previous study 9. The present study shows that out of 69 patients 42 patients (60.87%) had an LRINEC score more than 6. On the basis of the present study, it can be said that LRINEC score is a very important tool which helps in early diagnosis necrotizing fasciitis. Chin-Ho-Wong [9] in his study The LRINEC score a tool for distinguishing necrotizing fasciitis from other soft tissue infections stated that the LRINEC score is capable of detecting early cases of necrotizing fasciitis among patients with severe soft tissue infections. An LRINEC scores more than 6 should raise the suspicion of necrotizing fasciitis, and a score of more than 8 is strongly predictive of disease. The most common infection site was the perineal region (37.68%) followed by lower limb (27.54%). The most common organism isolated was a group A streptococcal infections which in contrast with other study were many cases found was polymicrobial infections.[12]

The necrotizing fasciitis is a surgical emergency which requires immediate wide surgical debridement and patients to be kept on broad-spectrum antibiotics. All tissue that appears pale, ischemic, and necrotic or does not bleed appropriately needs to be removed. This should include the overlying skin, even when it appears viable, as studies have documented severe vasculitis and microvessel thrombosis that eventually lead to loss of skin, if not adequately debrided. Early diagnosis, aggressive serial debridement, broad-spectrum antibiotics and multidisciplinary critical care approach are vital to attain favorable outcomes in NF patients [13, 14, 15].

Conclusion: We feel that LRINEC scoring system is a valid diagnostic tool for early diagnosis of necrotizing fasciitis, but it should also be kept in mind that if the LRINEC score comes to be less than six than it should not be excluded. Emphasis must remain on expert clinical diagnosis and judgment in order not to delay surgical treatment as well as the use of the multidisciplinary team.

Reference:

1. Stamenkovic I, Lew PD. Early recognition of potentially fatal necrotizing fasciitis: the use of frozen-section biopsy. New England Journal of Medicine. 1984; 310(26):1689-93.
2. Elliott DC, Kufera JA, Myers RA. Necrotizing soft tissue infections. Risk factors for mortality and strategies for management. Annals of surgery. 1996; 224(5):672.
3. McHenry CR, Piotrowski JJ, Petrinic D, Malangoni MA. Determinants of mortality for necrotizing soft-tissue infections. Annals of surgery. 1995; 221(5):558.
4. Bilton BD, Zibari GB, McMillan RW, Aultman DF. Aggressive surgical management of necrotizing fasciitis serves to decrease mortality: a retrospective study/discussion. The American Surgeon. 1998; 64(5):397.
5. Moss RL, Musemeche CA, Kosloske AM. Necrotizing fasciitis in children: prompt recognition and aggressive therapy improve survival. Journal of pediatric surgery. 1996;31(8):1142-6.
6. Wong C-H, Khin L-W, Heng K-S, Tan K-C, Low C-O. The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score a tool for distinguishing necrotizing fasciitis from other soft tissue infections. Critical care medicine. 2004; 32(7):1535-41.
7. Maya SP, Beltrán DD, Lemercier P, Leiva-Salinas C. Necrotizing fasciitis: an urgent diagnosis. Skeletal radiology. 2014; 43(5):577-89.
8. Loyer EM, DuBrow RA, David CL, Coan JD, Eftekhari F. Imaging of superficial soft-tissue infections: sonographic findings in cases of cellulitis and abscess. AJR American journal of roentgenology. 1996;166(1):149-52.
9. Williams N, O'Connell PR. Bailey & Love's Short Practice of Surgery 26E: Crc Press; 2013.
10. Borschitz T, Schlicht S, Siegel E, Hanke E, von Stebut E. Improvement of a clinical score for necrotizing fasciitis: 'pain out of proportion 'and high CRP levels aid the diagnosis. PloS one. 2015; 10(7):e0132775.
11. Karkas A, Chahine K, Schmerber S, Brichon PY, Righini C. Optimal treatment of cervical necrotizing fasciitis associated with descending necrotizing mediastinitis. British Journal of Surgery. 2010;97(4):609-15
12. Edlich RF, Cross CL, Dahlstrom JJ, Long WB. Modern concepts of the diagnosis and treatment of necrotizing fasciitis. The Journal of emergency medicine. 2010; 39(2):261-5.
13. Magala J, Makobore P, Makumbi T, Kaggwa S, Kalanzi E, Galukande M. The clinical presentation and early outcomes of necrotizing fasciitis in a Ugandan Tertiary Hospital-a prospective study. BMC research notes. 2014; 7(1):476.
14. Misiakos EP, Bagias G, Patapis P, Sotiropoulos D, Kanavidis P, Machairas A. Current concepts in the management of necrotizing fasciitis. Frontiers in surgery. 2014; 1.
15. Shiroff AM, Herlitz GN, Gracias VH. Necrotizing soft tissue infections. Intensive Care Med. 2014; 29:138–44.

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