

The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score: A tool for distinguishing necrotizing fasciitis from other soft tissue infections*

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Objective: Early operative debridement is a major determinant of outcome in necrotizing fasciitis. However, early recognition is difficult clinically. We aimed to develop a novel diagnostic scoring system for distinguishing necrotizing fasciitis from other soft tissue infections based on laboratory tests routinely performed for the evaluation of severe soft tissue infections: the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score.

Design: Retrospective observational study of patients divided into a developmental cohort (n = 314) and validation cohort (n = 140)

Setting: Two teaching tertiary care hospitals.

Patients: One hundred forty-five patients with necrotizing fasciitis and 309 patients with severe cellulitis or abscesses admitted to the participating hospitals.

Interventions: None.

Measurements and Main Results: The developmental cohort consisted of 89 consecutive patients admitted for necrotizing fasciitis. Control patients (n = 225) were randomly selected from patients admitted with severe cellulitis or abscesses during the same period. Hematologic and biochemical results done on admission were converted into categorical variables for analysis. Univariate and multivariate logistic regression

was used to select significant predictors. Total white cell count, hemoglobin, sodium, glucose, serum creatinine, and C-reactive protein were selected. The LRINEC score was constructed by converting into integer the regression coefficients of independently predictive factors in the multiple logistic regression model for diagnosing necrotizing fasciitis. The cut-off value for the LRINEC score was 6 points with a positive predictive value of 92.0% and negative predictive value of 96.0%. Model performance was very good (Hosmer-Lemeshow statistic, $p = .910$); area under the receiver operating characteristic curve was 0.980 and 0.976 in the developmental and validation cohorts, respectively.

Conclusions: The LRINEC score is a robust score capable of detecting even clinically early cases of necrotizing fasciitis. The variables used are routinely measured to assess severe soft tissue infections. Patients with a LRINEC score of ≥ 6 should be carefully evaluated for the presence of necrotizing fasciitis. (Crit Care Med 2004; 32:1535-1541)

KEY WORDS: early diagnosis; electrolytes changes; hematologic changes; necrotizing fasciitis; sepsis; systemic inflammatory response syndrome

Necrotizing fasciitis is a rare, rapidly progressive infection primarily involving the fascia and subcutaneous tissue. It is perhaps the most severe form of soft tissue infection and is potentially limb and life threatening. Early recognition and aggressive debridement of all necrotic fascia and subcutaneous tissue are major prognostic determinants, and de-

lay in operative debridement has been shown to increase mortality rate (1-8). The differentiation of necrotizing fasciitis from other soft tissue infections is therefore critically important. However, early clinical recognition of necrotizing fasciitis is difficult, as the disease is often indistinguishable from cellulites or abscesses early in its evolution. Since Meleney's (8) time, the mortality rate of this condition has remained high with a reported cumulative mortality rate of 34% (range, 6-76%) (8, 9). Delayed recognition is one of the main reasons for the high mortality rate (1-7). Although modalities such as computed tomography, magnetic resonance imaging (MRI), and frozen section biopsy have been shown to be useful in the early recognition of necrotizing fasciitis, routine application of these modalities in the evaluation of soft tissue infections has been limited by cost

and availability (10-14). We describe a novel, simple, and objective scoring system, the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score, based on routine laboratory investigations readily available at most centers, that can help distinguish necrotizing fasciitis from other soft tissue infections.

MATERIALS AND METHODS

Patients. The developmental cohort consisted of all patients treated at the Changi General Hospital for necrotizing fasciitis between January 1997 and August 2002. Patients were identified through a computer-generated search through the Medical Records Department for all patients diagnosed with necrotizing fasciitis (*International Classification of Diseases-9th Revision*). Data were extracted retrospectively from hospital records. The following characteristics at operative exploration were used for definitive diagnosis: the pres-

*See also p. 1618.

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ence of grayish necrotic fascia, demonstration of a 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. Permanent histopathologic tissue examination was used to confirm the diagnosis when available (1, 6). Eighty-nine consecutive patients were identified and included in this cohort.

Two thousand five hundred fifty-five patients were admitted to our institution with the clinical diagnosis of cellulitis or abscesses during the same period. Control patients were randomly selected from this patient pool. Method of randomization is simple randomization using the SAS statistical software (SAS Institute, Cary, NC). Patient charts were reviewed to identify patients with severe soft tissue infection: The criteria we used for severe soft tissue infections were clinical impression of severe infection based on documentation in the patients' charts, the use of parenteral antibiotics for ≥ 48 hrs, and abscesses (when present) needing surgical debridement. Patients with a length of stay of < 48 hrs and the use of oral antibiotics only were excluded as these patients were considered to have minor soft tissue infections. Three hundred twenty patients were randomly selected initially. Of these, 225 patients fulfilled our criteria for severe soft tissue infections and were used as controls for this study.

Demographic and clinical data and outcome of our cases and controls were collected (Table 1). The first biochemical and hematologic tests done on admission were analyzed. Variables analyzed were age, gender, total white cell count, hemoglobin, platelet count, serum sodium, potassium, chloride, glucose, urea, creatinine (Cr), C-reactive protein (CRP), and erythrocyte sedimentation rate.

Statistical Analysis and Development of Score. Thirteen variables were analyzed. Statistical analyses were performed using the SPSS statistical software (version 11.0, SPSS, Chicago, IL). To construct a diagnostic scoring system, factors were entered as categorical variables. For patients' age, an age of 50 was taken as a cutoff. For all the laboratory variables, the cutoff points were determined based on a combination of the means of our cases and controls, clinical experience, and review of previous reports (15–19). The methods of analyses used in this study were univariate and multivariate analyses by backward stepwise logistic regression procedure. We used $p < 0.1$ as a cutoff value for statistical significance for variable selection for the multivariate modeling in order not to miss any potentially important predictors. Statistical significance remained conventionally defined as $p < .05$ in the univariate and multivariate models. Intercept and regression coefficients were adjusted by the shrinkage factor of .89 to minimize the error estimates of these coefficients (20). Internal validation of the data set was done by bootstrap resampling technique. The LRINEC

score was constructed by converting into integer the regression coefficients of independently predictive factors in the logistic model for diagnosing necrotizing fasciitis (21, 22, 23). The LRINEC score of each patient was calculated by totaling the scores of each independent variable (Table 2).

To evaluate model calibration, we performed Hosmer-Lemeshow goodness-of-fit test (24). The predictive accuracy of the LRINEC score was expressed as area under the receiver operating characteristic curve (Fig. 1) (25). The curve represents the relationship between corresponding values of sensitivity and specificity with all possible values of prob-

abilities as a cutoff point to predict for the presence of necrotizing fasciitis.

Validation of Score. External validation of our diagnostic model was performed in a separate cohort of 56 consecutive patients with necrotizing fasciitis seen at a separate hospital (Singapore General Hospital) between June 1999 and December 2002. Eighty-four patients were randomly selected from patients admitted to that hospital for severe cellulitis or abscesses during the same period and used as controls. The criteria used for cases and controls selection were as described for the developmental cohort.

Table 1. Demographic and clinical variables and outcome of patients used in the developmental cohort

	Case (n = 89)	Control (n = 225)
Mean age ^a	56 (27–84)	47 (13–87)
Gender ^b		
Male	53 (59.6)	148 (65.8)
Female	36 (40.4)	77 (34.2)
Comorbidities ^b		
Diabetes mellitus	63 (70.8)	116 (51.6)
Peripheral vascular disease	20 (22.5)	86 (38.2)
No comorbidities	12 (13.5)	69 (28.9)
Variables on admission ^b		
Temperature $> 38.0^{\circ}\text{C}$	47 (52.8)	95 (42.2)
Hypotension	16 (18.0)	6 (2.7)
Multiple-organ failure at admission ^b	4 (4.5)	2 (0.9)
Mortality rate ^b	19 (21.3)	3 (1.3)

^aThe data are given as mean with range in parentheses; ^bdata given as the number of patients, with the percentage in parentheses.

Table 2. Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score

Variable, Units	β	Score
C-Reactive Protein, mg/L		
< 150	0	0
≥ 150	3.5	4
Total white cell count, per mm^3		
< 15	0	0
15–25	0.5	1
> 25	2.1	2
Hemoglobin, g/dL		
> 13.5	0	0
11–13.5	0.6	1
< 11	1.8	2
Sodium, mmol/L		
≥ 135	0	0
< 135	1.8	2
Creatinine, $\mu\text{mol/L}$		
≤ 141	0	0
> 141	1.8	2
Glucose, mmol/L		
≤ 10	0	0
> 10	1.2	1

Final model constructed using factors found to be independently predictive of necrotizing fasciitis on multivariate analysis. β values are the regression coefficients of our model after adjusting for a shrinkage factor of .89. The maximum score is 13; a score of ≥ 6 should raise the suspicion of necrotizing fasciitis and a score of ≥ 8 is strongly predictive of this disease. To convert the values of glucose to mg/dL, multiply by 18.015. To convert the values of creatinine to mg/dL, multiply by 0.01131.

RESULTS

In the developmental cohort, 89 patients with necrotizing fasciitis and 225 control cases were included in the analysis. The clinical presentation of these 89 patients with necrotizing fasciitis in the developmental cohort has previously been described (1). A summary of the demographic and clinical characteristics and outcome of the cases and controls in the developmental cohort is shown in Table 1. Table 3 shows the means, SD, and ranges of the laboratory values of our

cases and controls. Univariate and multivariate logistic regression analyses excluded seven of the candidate diagnostic variables. The final fitted model contains six variables: white cell count and CRP, hemoglobin, serum sodium, glucose, and serum Cr concentrations (Table 4). Of these six variables, complete data were available for five of these variables (total white cell count, hemoglobin, serum sodium, glucose, and Cr). CRP was available for 271 (86.3%) patients in the developmental cohort. Single imputation

method was used to handle the missing values. The measures of association for the significant variables were expressed as odds ratio with 95% confidence intervals (CI) and *p* values. After adjusting the intercept and regression coefficients (by the shrinkage factor .89), we developed the final logistic model for probability of developing necrotizing fasciitis. The LRINEC score is derived from this formula by converting into integer the regression coefficients of independently predictive factors in the final logistic model (Table 2). The performance of the final model was very good (Hosmer-Lemeshow goodness-of-fit test, *p* = .910) (24) and discriminated well between patients with necrotizing fasciitis and those with other soft tissue infections. Area under the receiver operating characteristic curve for the developmental cohort was 0.980 (95% CI, 0.962–0.999) (25).

This model was validated externally using a cohort of 56 patients diagnosed with necrotizing fasciitis and 84 control patients with severe cellulitis or abscesses from a separate hospital. In the validation cohort of 140 patients, complete data were available on five variables (total white cell count, hemoglobin, serum sodium, glucose, and Cr). CRP was available for 123 (87.9%) patients. The model was found to be reliable on external validation with an area under the receiver operating characteristic curve of 0.976 (95% CI, 0.955–0.997) (Fig. 1).

A numerical score was derived from the regression coefficients of each independently significant variable in the manner as described earlier. The clinical application of the score chart is presented in Table 2. Using the LRINEC score, we

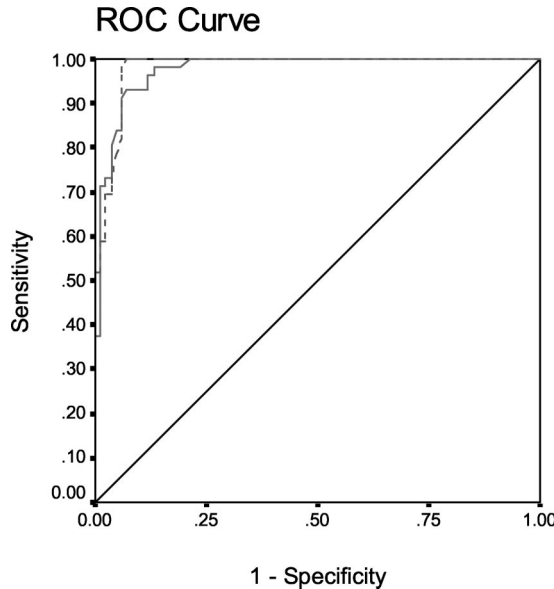


Figure 1. Receiver operating characteristic (ROC) curves for accuracy of the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score in predicting the presence necrotizing fasciitis. Area under curve for our model is 0.980 (95% confidence interval, 0.962–0.999) in the developmental cohort (solid line). The accuracy of this diagnostic model was validated in a separate cohort of patients with necrotizing fasciitis and control patients with severe cellulitis and abscesses (area under curve, 0.976; 95% confidence interval, 0.955–0.997, dashed line). A predictor that performs with perfect accuracy has an Az value of 1.

Table 3. Mean, SD, and ranges of the laboratory results of patients with necrotizing fasciitis (cases) and control patients with severe cellulitis and abscesses at admission

Variable (Normal Values)/ Units	TW (4–10) per mm ³	Hb (13.5–17.5) g/dL	Plt (140–440) per mm ³	Na (135–145) mmol/L	K (3.3–4.9) mmol/L	Cl (96–108) mmol/L	Glc (3.1–10) mmol/L	Urea (2.8–7.7) mmol/L	Cr (44–141) μmol/L	CRP (0–5) mg/L	ESR (1–10) mm/hr
Case											
Mean	20.72	12.1	326	129.3	4.2	98.1	15.6	11.1	137.9	254.3	81.1
SD	8.91	2.49	202	4.9	0.92	6.7	9.0	10.8	103.4	84.1	32.0
Min	5.7	5.8	9	114.0	2.6	82	2.2	2.5	10.8	44.5	5.0
Max	43.8	19.0	1266	139.0	8.0	115	47.1	67.8	846.0	476.0	145.0
Control											
Mean	11.48	14.1	275	137.0	4.0	104.3	7.9	5.1	90.5	63.1	33.2
SD	4.32	1.57	86	3.2	0.53	7.8	4.6	3.3	48.4	49.3	22.8
Min	4.60	8.6	35	124.0	2.5	90	3.1	1.7	22.0	0.1	2.0
Max	28.60	17.6	580	146.0	7.1	113	22.8	37.3	586.0	273.0	147.0

TW, total white cell count; Hb, hemoglobin; Plt, platelets; Na, serum sodium; K, potassium; Cl, chloride; Glc, glucose; Cr, creatinine; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate. To convert the values of glucose to mg/dL, multiply by 18.015. To convert the values of urea to mg/dL, multiply by 2.801. To convert the values of creatinine to mg/dL, multiply by 0.01131.

Table 4. Univariate analyses of the mean difference between cases and control

Variable Name	Univariate Analysis			Multivariate Analysis		
	OR (Unadjusted)	95% CI	<i>p</i> Value	OR (Adjusted)	95% CI	<i>p</i> Value
CRP, mg/L						
<150	1	—	—	1	—	—
≥150	95.34	42.3–214.7	<.001	50.33	14.9–169.7	<.001
Hb, g/dL						
>13.5	1	—	—	1	—	—
11.0–13.5	2.72	1.53–4.85	.01	1.22	0.36–4.13	.747
<11.0	17.8	7.36–43.06	<0.001	7.85	1.57–39.4	.01
Na, mmol/L						
≥135	1	—	—	1	—	—
<135	42.89	20.2–90.8	<.001	7.19	2.11–24.49	.002
TW, per mm ³						
<15.0	1	—	—	1	—	—
15.0–25.0	7.31	4.00–13.46	<.001	1.81	0.55–6.02	.333
>25.0	59.30	16.7–210.3	<.001	10.06	1.32–76.97	.026
Cr, μmol/L						
≤141	1	—	—	1	—	—
>141	11.60	5.2–25.8	<.001	7.43	1.57–35.04	.011
Glucose, mmol/L						
≤10.0	1	—	—	1	—	—
>10.0	7.28	4.2–12.5	<.001	3.97	1.26–12.49	.018
ESR, mm/hr						
≤50	1	—	—	1	—	—
>50	31.06	16.0–60.3	<.001	2.08	0.62–7.00	.24
Age						
<50	1	—	—	1	—	—
≥50	2.16	1.30–3.58	.03	0.61	0.19–2.00	.41
Cl, mmol/L						
≥96	1	—	—	1	—	—
<96	21.50	8.59–53.84	<.001	1.99	0.35–11.43	.44
K, mmol/L						
≤4.9	1	—	—	1	—	—
>4.9	5.15	1.84–14.39	.02	1.75	0.14–21.47	.66
Urea, mmol/L						
≤7.7	1	—	—	1	—	—
>7.7	10.32	5.64–18.92	<.001	1.26	0.31–5.05	.75
Gender						
Female	1	—	—	1	—	—
Male	0.624	0.38–1.04	.071	0.88	0.22–3.47	.85
Platelet, per mm ³						
≥144	1	—	—	1	—	—
<144	2.05	0.74–5.68	.168			

OR, odds ratio; CI, confidence interval; CRP, C-reactive protein; Hb, hemoglobin; Na, serum sodium; TW, total white cell count; Cr, creatinine; ESR, erythrocyte sedimentation rate; Cl, chloride; K, potassium. To convert the values of glucose to mg/dL, multiply by 18.015. To convert the values of urea to mg/dL, multiply by 2.801. To convert the values of creatinine to mg/dL, multiply by 0.01131. Significant factors (*p* < 0.1) were entered into a multivariate model and analyzed with a multiple logistic regression approach by means of a backward stepwise selection procedure.

stratified the patients into three groups, low (LRINEC score ≤5), moderate (LRINEC score 6–7), or high (LRINEC score ≥8) risk categories for necrotizing soft tissue infections. These risk groups corresponded to a probability of developing necrotizing soft tissue infections of <50%, 50–75%, and >75%, respectively (Fig. 2). At a cutoff of a LRINEC score of ≥6, the model has a positive predictive value 92.0% (95% CI, 84.3–96.0) and negative predictive value 96.0% (95% CI, 92.6–97.9). A score of ≥8 is strongly predictive of necrotizing fasciitis (positive predictive value, 93.4%; 95% CI, 85.5–97.2). The performance of the LRINEC score in the developmental and validation

cohorts is as shown in Table 5. As shown in Table 5, 89.9% and 92.9% of patients with necrotizing fasciitis had a LRINEC score of ≥6 in the developmental and validation cohorts, respectively, whereas only 3.1% and 8.4% of control patients in the corresponding cohorts had a score of ≥6.

DISCUSSION

The LRINEC score is capable of detecting early cases of necrotizing fasciitis among patients with severe soft tissue infections. A LRINEC score of ≥6 should raise the suspicion of necrotizing fasciitis, and a score of ≥8 is strongly predic-

tive of this disease. In the developmental cohort of 89 patients, only 13 (14.6%) patients had a diagnosis or suspicion of necrotizing fasciitis on admission. A majority were therefore initially missed, resulting in delayed operative debridement (1). In contrast, 80 (89.9%) of these patients had a LRINEC score of ≥6. The biochemical and hematologic changes in necrotizing fasciitis develop early in the evolution of the disease, and the LRINEC score can stratify patients into high- and moderate-risk categories even when the clinical picture is still equivocal. Used in the right context (patients with soft tissue infections with no other septic foci), the LRINEC score can significantly de-

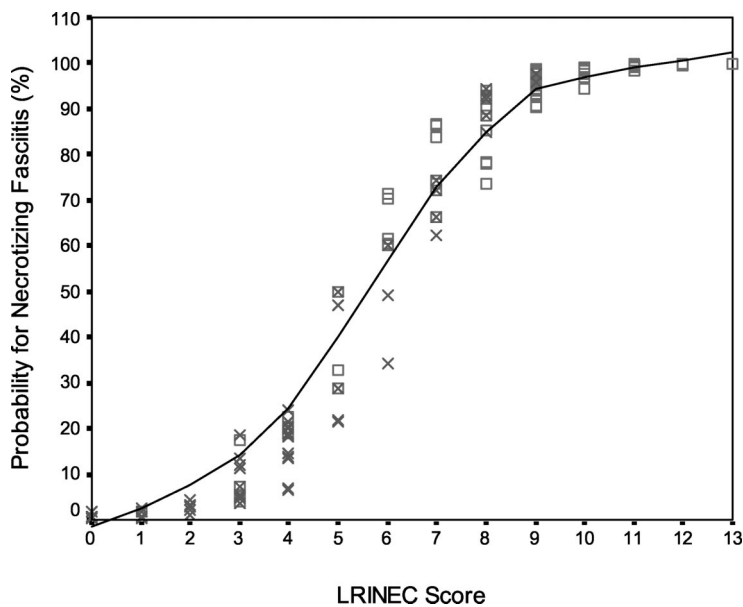


Figure 2. Plot of probability of necrotizing fasciitis against the ascending categories of Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score. Cases of necrotizing fasciitis ($n = 145$) are represented by boxes and control patients are represented by crosses ($n = 309$). From the graph, a probability of necrotizing infections of $<50\%$ corresponds to an LRINEC score of ≤ 5 and a probability of necrotizing infections of $>75\%$ corresponds to a score of ≥ 8 .

Table 5. Performance of Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score for our cases and controls from the developmental and validation cohorts

	No. of Patients (%)		
	Low Risk (LRINEC Score ≤ 5)	Moderate Risk (LRINEC Score 6–7)	High Risk (LRINEC Score ≥ 8)
Developmental cohort (NF cases)	9 (10.1)	9 (10.1)	71 (79.8)
Validation cohort (NF cases)	4 (7.1)	9 (16.1)	43 (76.8)
Developmental cohort (Control)	218 (96.9)	5 (2.2)	2 (0.9)
Validation cohort (Control)	77 (91.6)	5 (6.0)	2 (2.4)

NF, necrotizing fasciitis.

crease the time to diagnosis by stratifying patients into risk categories for necrotizing soft tissue infections warranting immediate further evaluation.

Clinical variables alone are often non-specific early in the course of the disease and can potentially lead to fatal delay in operative treatment (1, 6, 7). A diagnostic score that includes clinical as well as laboratory variables would inevitably favor advance cases of necrotizing fasciitis (where clinical recognition is usually not a problem) and risk missing early cases of necrotizing fasciitis (where early diagnosis would profoundly affect outcome). We therefore favor an objective diagnostic adjunct, based on laboratory variables alone to assess for the possibility of necrotizing soft tissue infections.

Necrotizing fasciitis is associated with severe sepsis (1–9). Sepsis and the asso-

ciated systemic inflammatory response syndrome cause changes in the biochemical and hematologic variables in a predictable manner. These biochemical and hematologic disturbances that we observed in our patients with necrotizing fasciitis had also been previously reported by other authors (15–19). The LRINEC score is essentially a measure of these changes and predicts the probability of the presence of necrotizing fasciitis based on the severity of sepsis. Other soft tissue infections such as cellulites and abscesses rarely cause an inflammatory state severe enough to cause such disturbances in the laboratory variables. Although other laboratory variables such as prothrombin time, activated partial thromboplastin time, serum calcium, arterial blood gas assays, and liver function tests may be of diagnostic significance, they were not an-

alyzed as these tests were not routinely performed for patients with soft tissue infections on admission. Furthermore, the inclusion of these tests in the evaluation of all soft tissue infections is difficult to justify and makes the scoring system inconvenient for routine clinical use.

Various modality and techniques have been proposed to aid in the early diagnosis of necrotizing fasciitis. Frozen section biopsies and MRI scans of the affected part have been shown to be capable of detecting early cases of necrotizing fasciitis (10–14). However, it is neither feasible nor logical to subject all patients with the suspicion of necrotizing fasciitis to frozen section biopsies, as the procedure is not without morbidity. Routine MRI scanning for all patients at the first suspicion of necrotizing fasciitis is financially prohibitive (7). Alternatively, the “finger test” should be considered. This is a bedside procedure where under local anesthesia a 2-cm incision is made down to the deep fascia and a gentle probing maneuver 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 necrotizing fasciitis (26). The LRINEC score can be used for patient selection and for allocation of resources by stratifying patients with soft tissue infections into high-, moderate-, and low-risk categories. Depending on availability, frozen section biopsy, MRI scan, or a bedside finger test should be considered for patients with equivocal clinical findings but found to have moderate or high risks for necrotizing fasciitis based on the LRINEC score.

Figure 3 shows our suggested clinical pathway in the management of soft tissue infections. It should be emphasized that the diagnosis of necrotizing soft tissue infections is a clinical diagnosis, and this diagnosis or even suspicion of it warrants immediate operative debridement (1). The LRINEC score is, however, a very useful diagnostic adjunct in the management of soft tissue infections to stratify these patients into low-, moderate-, and high-risk categories for necrotizing fasciitis for further evaluation.

The potential applications and advantages of the LRINEC score are as follows:

1. It is based on routine laboratory investigations done on admission for evaluation of all severe soft tissue

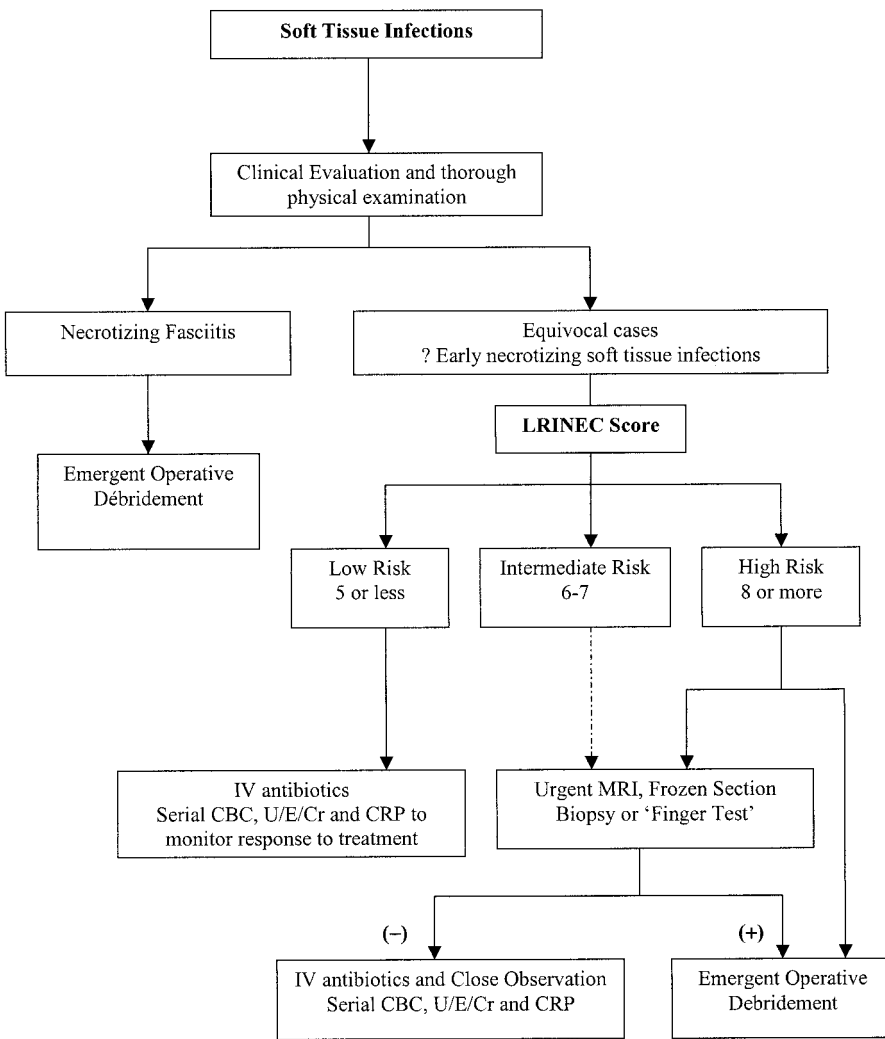


Figure 3. Suggested clinical pathway in the management of soft tissue infections. *LRINEC*, Laboratory Risk Indicator for Necrotizing Fasciitis; *IV*, intravenous; *CBC*, complete blood count; *CRP*, C-reactive protein; *MRI*, magnetic resonance imaging.

infections: complete blood count, serum electrolytes (U/E/Cr), and CRP. These investigations are cheap and readily available.

2. It can stratify patients into high-, moderate-, and low-risk categories for serious soft tissue infections warranting admission, intravenous antibiotics, and immediate further evaluation.
3. To achieve early diagnosis, operative debridement, and ultimately better survival in necrotizing fasciitis, patients in the moderate- and especially the high-risk categories should be evaluated urgently to exclude necrotizing fasciitis. MRI scan, frozen section biopsy, or the finger test are some diagnostic tests

that should be considered in equivocal cases of soft tissue infections. Some potential pitfalls and weaknesses of the *LRINEC* score should be borne in mind when using this scoring system. Serial *LRINEC* score monitoring is helpful, and in many cases an increasing score despite broad-spectrum antibiotics is a valuable diagnostic clue. However, in our experience, once in the hospital, interventions to correct laboratory disturbances described (intravenous normal saline, insulin infusions, and blood transfusions) tend to interfere with the accuracy of the score. In patients with multiple comorbidities, the inflammatory response may be blunted and the score should be interpreted with

The Laboratory Risk Indicator for Necrotizing Fasciitis (*LRINEC*) score is a robust score capable of detecting even clinically early cases of necrotizing fasciitis.

caution. Of note, neutropenia is a poor prognostics marker in sepsis and, in patients with a total white count of $<4 \times 10^3$ per mm^3 , should alert the physician of the possibility of leukopenic sepsis (27). Finally, this is an adjunct in the management of soft tissue infections. Clinical acumen remains of paramount importance, and when the clinical suspicion is high, emergent debridement must be performed regardless of the *LRINEC* score.

CONCLUSIONS

The *LRINEC* score we have described is an indicator of the severity of sepsis. Although it measures nonspecific biochemical and inflammatory changes triggered by systemic inflammatory response syndrome and sepsis, we believe that when used in the right context, it can be helpful in stratifying patients into risk categories of possibility of necrotizing fasciitis, allocating resources (e.g., patient selection for MRI scan), and ultimately aiding in the early recognition of necrotizing fasciitis. The *LRINEC* score is a robust index that is capable of detecting early cases of necrotizing fasciitis and is simple enough for routine use. The score, however, needs to be prospectively validated before routine use in evaluation of soft tissue infections can be recommended.

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