Surgically Treated Necrotizing Fasciitis: Clinical Features, Microbiology, Mortality, and the Potential Prognostic Value of the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) Score

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INTRODUCTION:
Necrotizing fasciitis (NF) is a rapidly progressing soft tissue infection associated with high morbidity and mortality. Diagnosis relies on clinical suspicion, supported by laboratory data and confirmed intraoperatively. While early surgical debridement remains the cornerstone of management, few studies have described the demographics, wound characteristics, and laboratory risk profiles of surgically treated NF patients. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score, although primarily developed as a diagnostic tool, may also carry prognostic significance. This study aimed to 1) characterize clinical, demographic, and microbiologic features of NF patients undergoing surgical intervention; 2) report the frequency and spectrum of organisms isolated from these cases; and 3) evaluate the relationship between LRINEC scores and patient mortality.
METHODS:
We performed a retrospective review of patients who underwent surgical debridement for necrotizing fasciitis (NF) between 2015 and 2024 at the Bone and Joint Infection Division of our institution. Patients with at least one year of follow-up were included. Clinical records, laboratory data, and operative reports were reviewed to collect demographic information, comorbidities, wound size, number of procedures, and microbiologic findings. The LRINEC score was calculated using preoperative values of C-reactive protein (CRP), white blood cell count (WBC), hemoglobin, sodium, creatinine, and glucose. Patients were stratified into low (<6), intermediate (6–7), and high-risk (≥8) LRINEC categories. Culture data were analyzed for pathogen frequency and polymicrobial infections. Mortality status was recorded at the time of analysis and reported by LRINEC group. Deceased patients were included in the mortality analysis but excluded from postoperative functional assessment. Descriptive statistics were used to summarize clinical, laboratory, microbiologic, and outcome data.
RESULTS:
Fifty-five patients underwent surgical treatment for necrotizing fasciitis and 10 patients were deceased at the time of study analysis. The mean age was 53.93 ± 15.43 years. Males comprised 67.3% of the cohort. The anatomical distribution of wounds in this cohort revealed that the lower limbs were the most frequently affected site, with the calf involved in 23.6% of cases, followed by the thigh (20%), foot (12.7%) and the other regions of leg(10.9%), while the sacrum and ankle accounted for 5.5% each. The forearm, hip, and tibia were each affected in 3.6% of patients. Less commonly involved sites included the upper extremity and chest wall, BKA stump, heel, back, and knee, each comprising approximately 1.8% of cases. The average wound size was 231.1 cm^2. Common comorbidities included hypertension (38.2%), diabetes mellitus (34.5%), smoking history (38.2%), and alcohol use (41.8%). Seven patients (12.7%) required multiple surgeries, either as planned multistage debridement or due to recurrence. Among the 55 patients, 36 (65.4%) had positive wound cultures, with 40% of those growing multiple organisms. Of these, the most isolated organisms were *Staphylococcus aureus* (30.3%), followed by *Escherichia coli* (27.3%), *Proteus mirabilis* (15.2%), *MRSA* (15.2%), and *Pseudomonas aeruginosa* (12.1%). Among the 55 patients, 18 were categorized as high-risk (score ≥8) with a mortality rate of 44.4%, 34 were intermediate-risk (score 6–7) with a mortality rate of 5.8%, and 3 were low-risk (score <6) with a mortality rate of 0%.

DISCUSSION AND CONCLUSION: Surgically treated necrotizing fasciitis remains a life-threatening condition, with mortality strongly associated with higher preoperative LRINEC scores. While originally developed as a diagnostic aid, our findings support the LRINEC score's potential utility in early prognostic assessment. The microbiologic profile was predominantly polymicrobial, with frequent isolation of *Staphylococcus aureus* and *Escherichia coli*, reinforcing the need for broad-spectrum empiric therapy. Early recognition, accurate risk stratification, and timely surgical intervention remain essential to improving outcomes and reducing mortality in this high-risk population.

No.	AGE	SEX	LRINEC Score	Size and location of wound	Deceased
1	82	F	8	2x2x2 cm left med ankle	N
2	46	M	6	30x20 cm Left mid shaft and medial calf	N
3	65	F	8	50x30cm Rt anterior thigh	N
4	79	M	8	25x7 cm Rt- ant tibia, post calf 15x5 cm, lateral ankle 15x3 cm	N
5	48	F	6	4x3.8x 2.3 cm Rt back	N
6	41	M	6	5x8 cm Left calf wound	N
7	38	M	9	5x30x150cm Left lateral thigh	N
8	32	M	2	Left femoral and thigh wounds	N
9	42	M	6	13x3 cm Lt lateral fibula	N
10	62	M	7	20x10 cm Rt heel	N
11	49	F	6	Bilateral tibia, Rt 10x5cm, Lt 20x10 cm	N
12	45	M	6	Lt ankle 25x20 cm	N
13	39	M	11	Rt upper limb 15x20 cm	N
14	56	F	8	Lt medial thigh 15x10 cm	N
15	75	F	4	Lt lateral calf 13x15 cm	N
16	77	F	6	Rt calf 15x7 cm	N
17	45	M	6	Left foot 10x25 cm	N
18	71	M	6	Left lateral tibia 10x10 cm	N
19	41	F	6	Left medial calf 25x15 cm	N
20	43	M	7	Rt calf 25x7 cm	N
21	50	M	7	Rt foot	N
22	16	M	7	Left foot 10x25 cm	N
23	50	M	6	Rt calf 40x30 cm	N
24	60	M	6	Rt thigh	N
25	70	M	6	Lt hip 5x5 cm	N
26	39	M	6	Left leg 5x30x150 cm	N
27	68	F	6	Left BKA stump 25x10 cm	N
28	72	F	7	Rt heel 10x4 cm x5mm	N
29	70	F	8	Lt knee 20x10 cm	N
30	52	F	6	Rt lower leg	N
31	33	F	9	Rt forearm 25x20 cm	N
32	62	M	4	Rt calf 20x3x1.5 cm	N
33	50	F	7	Rt brachial wound 25 cm2	N
34	43	M	7	Lt arm and chest wall	N
35	43	F	6	Rt thigh 7x7 cm, Lt thigh 12x14 cm, Lt calf 2.5x3 cm	N
36	54	F	10	Rt lower leg	N
37	32	M	6	Left tibia 15x13 cm	N
38	63	F	6	Rt anterior knee 7x4 cm	N
39	47	M	11	Left upper extremity and left chest wall	N
40	60	M	7	Left leg	N
41	60	F	6	Rt forearm 15x13 cm	N
42	81	M	6	Lt lower leg	N
43	30	M	6	Lt leg 35x25 cm	N
44	44	M	6	Lt mid-calf 30x2 cm	N
45	73	M	6	Left hip	N
46	59	M	8	Left leg, foot and thigh	Y
47	66	M	8	Rt calf 15x10 cm	Y
48	65	M	7	Rt sacrum 25x25 cm	Y
49	64	M	8	Rt calf 7cm, Rt dorsal foot 25 cm	Y
50	71	M	8	Lt AKA 15x8 cm	Y
51	54	M	8	Lt dorsal foot 20x15 cm	Y
52	31	M	8	Rt ankle 20x5 cm	Y
53	75	M	6	Rt sacrum 25x22 cm	Y
54	52	M	9	Lt leg 15x2 cm	Y
55	32	M	10	Lt thigh 25x20 cm	Y