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Clinicodemographic Profile, Treatment Approaches and Outcome in Necrotizing Fasciitis: A Prospective Study

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Abstract

Necrotizing fasciitis (NF) is a severe infection characterized by rapid spread along fascial planes, leading to extensive tissue necrosis. Although rare, NF is a life-threatening condition that imposes considerable financial burdens on both individuals and healthcare systems. Despite its severity, few studies have explored the correlation between demographic and clinical features, treatment and outcomes of NF. Therefore, this study aimed to investigate these correlations. This study included patients aged over 18 years who were clinically diagnosed with NF admitted to an Indian tertiary care medical teaching hospital. Patients with other soft-tissue infections such as cellulitis and abscesses were excluded from the study. For each patient, a thorough history was taken and a detailed clinical examination was performed. Data were collected from the case records of patients diagnosed with NF. The most affected age group was 51-60 years. Of the 124 patients, 124 were male and 30 were female, yielding a male-to-female ratio of 4.13:1. The lower limb was the most commonly involved site. Trauma was the most common risk factor for NF, followed by diabetes. Piperacillin combined with tazobactam was the most commonly used antibiotic. Among the 154 patients, 31 underwent amputations, 41 developed septic shock and subsequently died, 16 required skin grafting. The mean duration of hospital stay was 12.56 days. The mortality rate was 26.62%. The study observed a high mortality rate among NF patients., however, significant improvements were noted in survivors. Early surgical intervention (within 72 hours) coupled with broad-spectrum antibiotics are associated with favorable outcomes. Prompt surgical intervention and comprehensive care are crucial in reducing the morbidity and mortality associated with NF.

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Key Words

Necrotizing fasciitis, demographic profile, clinical profile, treatment, outcomes

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INTRODUCTION

Necrotizing fasciitis (NF) is an infection that propagates along fascial planes, leading to extensive tissue necrosis. This rare yet potentially fatal infectious disease imposes a substantial financial burden on both individuals and the healthcare system, with an incidence rate of four cases per 100,000 person-years[1,2].

Patients with type 1 (polymicrobial) NF are generally immunocompromised, whereas those with type 2 (monomicrobial) NF are typically immunocompetent and have a history of trauma. The mortality rate for type 1 NF is 21%, while type 2 NF has a mortality rate ranging from 14-34%. Additionally, NF can significantly diminish the quality of life, particularly in patients undergoing amputations. The high mortality rate also represents a critical public health concern[3,4].

Risk factors for NF include advanced age, diabetes, smoking, immunosuppression, obesity, malnutrition, steroid therapy and HIV infection, with injury and diabetes being particularly significant. Early in the disease, the skin may appear normal, but the condition rapidly advances to painful, erythematous areas and eventual necrosis due to compromised blood supply. Despite aggressive treatment involving extensive surgical debridement, patients often suffer from severe systemic illness, including fever, toxemia and septic shock, with a high mortality rate. The extent of fascial gangrene generally exceeds that of the clinically apparent skin involvement[5,6].

Diagnosing NF is exceedingly difficult due to the lack of specific skin indicators differentiating it from other soft-tissue infections like cellulitis. This diagnostic challenge has perplexed clinicians for decades. Delays in diagnosis lead to increased tissue loss, sepsis and fatalities. The high mortality rate is largely attributed to the failure of early diagnosis and treatment, due to the absence of clinical symptoms in the early stages of the disease[7,8]. Diagnosis is frequently delayed because of minimal symptoms and low suspicion. While blood tests and imaging, particularly computed tomography (CT) and magnetic resonance imaging (MRI), can be helpful, they are not definitive for NF. Surgical intervention is recommended when there is a high clinical suspicion. Early diagnosis and prompt surgical intervention are crucial in reducing morbidity and mortality in NF patients[9,10].

Few studies have examined the correlation between demographic and clinical features, treatment, and outcomes. Therefore, this study aims to correlate these variables with age, sex and mode of presentation to enhance the suspicion and management of NF.

MATERIALS AND METHODS

This study included patients clinically diagnosed with NF admitted to an Indian tertiary care medical teaching hospital. The study included patients presenting with clinical features of NF who were aged over 18 years. Patients with other soft-tissue infections such as cellulitis and abscesses were excluded from the study.

For each patient, a thorough history was taken and a detailed clinical examination was performed. Data were collected from the case records of patients diagnosed with NF.

Data were entered into SPSS (version 20) for analysis. Descriptive statistics were used to summarize baseline data. Continuous variables, such as age, blood pressure and blood sugar levels, were analyzed using Student t-tests. Categorical variables, such as disease severity, mortality and antibiotic use, were analyzed using Chi-square tests. Ordinal data were analyzed using the Mann-Whitney U test. Statistical significance was set at P-values below 0.05.

RESULTS AND DISCUSSIONS

The most affected age group was 51–60 years. Of the 124 patients, 124 were male and 30 were female, yielding a male-to-female ratio of 4.13:1 (Table 1).

The lower limb was the most commonly involved site. Trauma was the most common risk factor for NF, followed by diabetes (Fig. 1 and 2).

Piperacillin combined with tazobactam was the most commonly used antibiotic (Table 2). Among the 154 patients, 31 underwent amputations, 41 developed septic shock and subsequently died, 16 required skin grafting. The mean duration of hospital stay was 12.56 days. The mortality rate was 26.62% (Table 3).

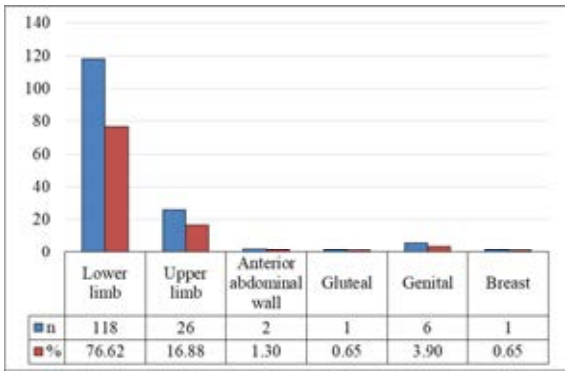

Fig. 1: Site distribution of NF cases

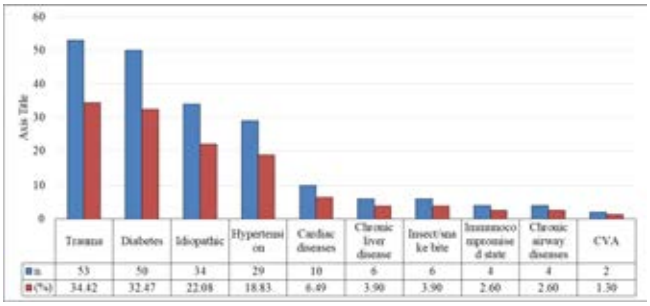

Fig. 2: Risk Factors for NF in study population

Table 1: Age and gender distribution of NF cases

Age group	Males		Females		Total		p-value
	n	%	n	%	n	%	
<2Z0	1	0.81	1	3.33	2	1.30	0.61
21-30	5	4.03	1	3.33	6	3.90	0.24
31-40	14	11.29	1	3.33	15	9.74	0.22
41-50	26	20.97	5	16.67	31	20.13	0.57
5160	41	33.06	7	23.33	48	31.17	<0.05
61-70	20	16.13	10	33.33	30	19.48	0.055
71-80	11	8.87	4	13.33	15	9.74	0.06
>80	6	4.84	1	3.33	7	4.55	0.13
Total	124	100.00	30	100.00	154	100.00	<0.05

Table 2: Antibiotic therapy used in NF cases

Antibiotics	n	Percentage
Piperacillin+tazobactum	66	42.86
Metronidazole+ciprofloxacin	42	27.27
Metronidazole+ceftriaxone	35	22.73
Metronidazole+clindamycin	6	3.90
Metronidazole+ampicillin	5	3.25

Table 3: Prognosis and Outcome of NF among studied cases

Prognosis and Outcome	n	Percentage
Amputations	31	20.13
Septic shock	41	26.62
Death	41	26.62
Skin grafts	16	10.39
Debridements	19	12.34
Hospital stay (Days)., Mean±SD	12.56±10.10	

In our investigation, the average age of patients was approximately 56 years, consistent with prior literature and studies by El-Menyar[11] and Su[12]. Specifically, 37% and 39% of patients fell within the age range of 51-60 years[11,12].

Regarding gender distribution, our findings mirrored those of Sarani *et al.*, with males constituting the majority of patients at 78%[13]. Moreover, the lower limbs were predominantly affected, aligning with Loudon *et al.*'s report that 86.4% of cases involved the lower limbs and 8.5% involved the upper limbs[14].

Trauma emerged as the primary precipitating factor for NF in our study, followed by diabetes, consistent with Anaya *et al.'s* findings where trauma affected 83.2% of patients and diabetes and dyslipidemia were prevalent[15].

In terms of antibiotic usage, piperacillin combined with tazobactam was the most commonly administered, followed by metronidazole combined with ciprofloxacin, similar to Nissar's observations over a decade[16].

Among the 154 patients in our study, 31 underwent amputations, 41 developed septic shock and subsequently succumbed and 16 required skin grafting. The average hospital stay was 12.56 days and the mortality rate stood at 26.62%. These outcomes align with Andreasen *et al.*'s data, which reported septic shock in 37% of patients, a mortality rate of 28.8% and an average of 2.14±1.5 debridement procedures[17].

Our study's strength lies in prompt diagnosis and timely surgical intervention, particularly in a tertiary care setting, leading to favorable outcomes for most patients. However, limitations include the study's single-institution nature.

CONCLUSIONS

In this study, the mortality rate was 26.62%, although the surviving patients exhibited significant improvement. NF has a poor prognosis, often leading to septic shock and death. However, early surgical intervention within 72 hours combined with broad-spectrum antimicrobial resulted in favorable outcomes. Effective local wound treatment is crucial. Timely surgical intervention and comprehensive care are essential in reducing morbidity and mortality.

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