

Necrotizing Fasciitis - An Experience with Surgical Management at a Tertiary Care Center

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Abstract

Introduction: Being a surgical emergency and with progression to dreaded complications, necrotizing fasciitis (NF) reflects the standard of living of community in developing countries where it accounts for most number of deaths.

Aim: The aim of this study was to study the overall management of necrotizing fasciitis.

Materials and Methods: A total of 50 cases of NF were studied at Katihar Medical College between 2015 and 2016 with emphasis on the diagnosis and treatment of the disease in the Department of General Surgery.

Results: Maximum 36% of the cases were in the age group of 51-60 years. The sex incidence revealed a male to female ratio of 11.5:1. Leukocytosis was present in all the patients followed by anemia (58%). Debridement was the mainstay of treatment and mortality in these patients was attributed to septicemia.

Conclusion: Need of the hour is adopting a individualized multidisciplinary approach along with prompt diagnosis and immediate surgical management when needed in hospital settings for good results. Awareness of the disease especially in rural areas by means of health education can help in decreasing mortality arising from NF.

Keywords: Amputation, Debridement, Fournier's gangrene, Necrotizing fasciitis

INTRODUCTION

Necrotizing fasciitis (NF) is a rapidly progressing infection of the skin and soft tissues that has been known since the days of Hippocrates.¹ Considered as a life-threatening infection of the skin, soft tissues, and muscles, NF tend to progress rapidly through the fascia planes, causing gradual destruction of the fascia. Regions prone for this disease are lower or upper extremities, the perineum and genital area (where it is called Fournier's gangrene) and in the abdominal wall. All of

this is attributed to polymicrobial infection and synergy, which usually coexists.^{2,3} According to microbiological characteristics, recent studies have classified NF into four types.^{4,5}

Type I (polymicrobial) - Obligate and facultative anaerobes affecting trunk and perineum; Type II (monomicrobial) - Beta-hemolytic *Streptococcus* A affecting limbs; Type III - *Clostridium* species, Gram-negative bacteria, *Vibrios* spp., *Aeromonas hydrophila* affecting limbs, trunk, and perineum; Type IV - *Candida* spp., *Zygomycetes* affecting limbs, trunk, perineum.

The diagnosis of NF is essentially clinical. The patient presents with pain, rise of temperature and toxemia which is out of proportion to the local signs (type and size of wound) which is hallmark for diagnosis.⁶ The presentation is so varied that a simple cellulitis to septic shock to multiorgan dysfunction syndrome can occur

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in this disease. Most cases are associated with systemic inflammatory response syndrome after running a fulminant course.^{7,8} Several laboratory-based scoring systems have been proposed for establishing early diagnosis of NF. Wong *et al.* proposed a laboratory risk indicator for NF which comprised parameters such as C-reactive protein, white blood cell count, hemoglobin, sodium, creatinine, and glucose.^{9,10} In addition to enabling early recognition of the disease, this score can also facilitate the classification of patients into risk categories, and help in the allocation of diagnostic resources.

Successful outcome depends on identification of disease early, aggressive resuscitation, broad spectrum antibiotic therapy, extensive surgical debridement, and supportive care. To ensure a speedy recovery and to prevent mortality resulting from this disease, the goal should be an extensive debridement of all the necrotic soft tissue and fascia and thus halting progression of the disease.¹¹ This study is basically aimed to study the disease in this region where the people are ignorant of this disease, present late and unaware of its fatal outcomes and to ensure better and prompt management.

MATERIALS AND METHODS

Source of Data

This study was conducted comprising 50 patients of NF in Department of General Surgery and Microbiology at Katihar Medical College, Katihar (Bihar) for a period between 2015 and 2016. Institutional Ethical Committee approval was obtained to carry out this study.

Methods of Collection of Data

- Detailed history taking and predisposing factors
- Clinical examination
- Investigations (routine laboratory investigation) with microbiological profile
- Relevant special investigations
- Conservative management with meticulous dressing and if needed major surgical interventions with its outcome.

RESULTS

Age

Out of 50 cases studied, the youngest patient was 30 years of age and oldest was 79 years. The highest number of cases was found in the age group 51-60 years (36%), followed by 41-50 years (28%) (Table 1).

Sex

Out of the 50 cases studied under this series, the majority of the patients were male 46 (92%) and the contribution of female patients were 4 (8%) (Table 2).

Investigations

Various laboratory investigations were done in all patients of this series, in which leukocytosis was present in all the patients, followed by anemia in 58% of the patients (Table 3 and Figure 1).

Treatment and Complications

Various surgical modalities of treatment were carried out in almost all the 50 patients. In our study, debridement was the mainstay of the treatment. It was carried out in 94% of the patients at regular intervals. Average rate of debridement per patients in this study was 2.04%. Fasciotomy was performed in 12% of the patients along with debridement. Abscess drainage was done in 20% of patients. A total of 19 (38%) of the patients in this study underwent amputations at different levels based on the level of gangrene. Skin grafting was carried out in 15 (30%) of the patients, while local flap reconstruction was done in 8% of patients. Postoperatively, more than 40% of the patients required blood transfusions. The most common complication was septicemia observed in 28% of patients, and overall mortality was 8% resulting mainly from septicemia.

DISCUSSION

NF is a disease in which prompt treatment is required as early as possible due to high degree of morbidity and

Table 1: Age distribution among 50 presenting cases of NF

Age (in years)	n (%)
0-10	-
11-20	-
21-30	1 (2)
31-40	5 (10)
41-50	14 (28)
51-60	18 (36)
61-70	10 (20)
71-80	2 (4)

NF: Necrotizing fasciitis

Table 2: Sex distribution among 50 presenting cases of NF. Ratio of males was higher than females

Sex	n (%)
Male	46 (92)
Female	4 (8)

Table 3: Various investigations in patients of NF

Investigation	n (%)
Leukocytosis	50 (100)
Decreased Hb% (anemia)	29 (58)
Increased blood sugar	22 (44)
Increased serum creatinine	11 (22)
HIV (kit detection)	1 (2)

Hb: Hemoglobin, HIV: Human immunodeficiency syndrome

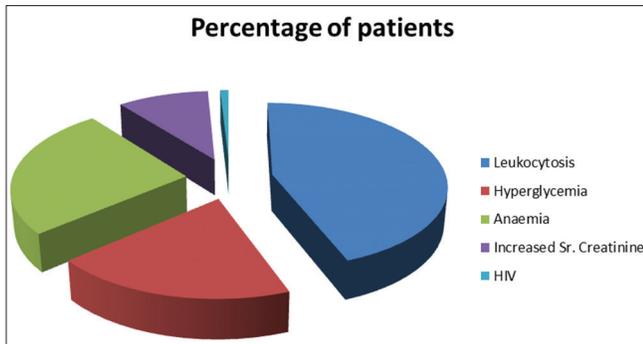


Figure 1: Pie diagram showing results of investigations

mortality. Key to successful treatment is early recognition of the disease, resuscitation, broad spectrum antibiotic coverage and aggressive debridement to avoiding septicemia and subsequent death from it as mortality rate from 30 to as high as 70% have been reported by various authors in cases of NF.¹²⁻¹⁴ NF has affected wide age group, but most commonly affected age of presentation was between age group 51 and 60 years (36%) and minimum in young age group of 21-30 years (2%) in our study. The incidence being more common in male gender by far which is in agreement with other studies, where also male gender was most commonly affected.¹⁵ The reason for male gender was most of them work outdoors (farmers) in field for long time and ignoring minor pricks and trauma leading to larger infected wound. Other associated reasons being lack of education, unhygienic environment, and lack of access to health-care facilities in rural area. Diabetes mellitus was the most common risk factor present in majority of the cases in our study of NF with 44% of diagnosed cases of diabetes. Various investigations were done in these patients, in which leukocytosis was present in all the patients. This was followed by 58% of patients who had decreased hemoglobin, which was followed by hyperglycemia in 44% of patients. Serum creatinine was increased in 22% of patients and human immunodeficiency syndrome was detected in 1 patient. This was quite similar to study done by other authors.¹⁶ Increasing age and diabetes, both favored the development of disease in these patients as these conditions are associated with infections in the tissue planes due to decrease in immunity. Diabetic microangiopathy lead to decreased vascularity while diabetic neuropathy increased the risk of injuries and triggered the disease.¹⁷ 58% of patients were anemic in this study, which lead to decrease in oxygen carrying capacity of blood leading to infection. In NF, aggressive surgical debridement is always necessary to keep it from spreading. Repeated debridement usually need to be done to remove additional necrotic tissue which in cases of large wound promotes development of healthy granulation tissue and subsequent skin grafting or flap reconstruction. Amputation of the affected limb may be necessary.¹⁸ In this study, 94% cases underwent debridement of necrotic

tissues with some patients going for repeated debridement emphasizing the role of debridement as the mainstay of treatment in cases of NF. Other forms of surgical treatment were amputation (38%), skin grafting (30%), and flap reconstruction (8%) which was quite similar to study done by others.¹⁹ Overall mortality rate was 8% in the study which mainly resulted due to septicemia. Nutritional support, maintenance of electrolyte balance and broad spectrum antibiotic coverage is necessary from the 1st day of admission to control infection, supplement lost protein and replace fluid from large wounds and prevention of resultant toxic shock. These days, improved wound healing and a significant reduction of wound surface are seen in full-thickness wounds treated with vacuum assisted closure (VAC) devices as compared to conventional gauze therapy.²⁰ Late presentation, diabetes mellitus and systemic toxicity are major determinants of outcome in cases of NF.

CONCLUSION

NF is considered as a surgical emergency, so requires aggressive approach on the part of treating doctor. Health education in remote and rural areas, proper care of skin especially in patients with co morbid disease and an all-round approach at a tertiary care center is required in patients presenting with NF for improved survival. The use of VAC therapy in wound management has greatly improved the results of post-operative management in these patients, and this closure technique is currently being studied by various authors worldwide.

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