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Prognostic factors Influencing Necrotizing Soft tissue lesions in North India

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Abstract

Background: Severe skin or soft tissue (SST) infections can involve fascia planes, thereby constitution necrotizing fasciitis. Such infections are characterized by extensive necrosis and systemic toxicity [1, 2]. Early clinical diagnosis of necrotizing fasciitis and superficial SST infection (erysipelas or cellulitis), may be difficult [3, 4].

Method: At the time of admission a detailed clinical history were taken, clinical examination was done, patients were admitted and stabilized in emergency ward, aggressive debridement of infected and necrotizing tissue. All necrotic skin, subcutaneous tissue, fascia and nonviable muscle were removed, the excised tissue was sent for culture and sensitivity in microbiology laboratory. All the viable skin and soft tissues were saved to aid later closure.

Result: the survival rate was 86.5% in patients who underwent surgical debridement in early stage of disease as compared to 61.5% mortality in patients who presented late. Septicemic shock and multiple organ failure was less in patients who presented at early stage of disease. Early and adequate nutritional support along with prompt recognition and treatment reduces the development of multiple organ failure and improves the outcome.

Conclusion: Mortality rate is decreased in those patients who are treated in early cause of disease by means of surgical and medical approach. The mortality rate is directly proportional to involved body surface area in patients of Necrotizing soft tissue lesion. Site of lesion and extent of lesion influences the mortality.

Keywords: necrotizing soft tissue lesion, malnutrition, diabetes, debridement

Introduction

Severe skin or soft tissue (SST) infections can involve fascia planes, thereby constitution necrotizing fasciitis. Necrotizing soft tissue lesions that cause necrosis are more serious because of there propensity for extensive tissue destruction and high mortality rates. Such infections are characterized by extensive necrosis and systemic toxicity [1, 2]. Early clinical diagnosis of necrotizing fasciitis and superficial SST infection (erysipelas or cellulitis), may be difficult [3, 4]. Necrotizing soft tissue lesions comprise spectrum of diseases that are characterized extensive, rapidly progressive soft tissue necrosis that usually involves the muscular fascia and subcutaneous tissue and can also affect the skin and muscle in late stage and destroying the tissue at the rate of three centimeters per hour [6].

Material and Methods

The present study was conducted in the Department of Surgery, S.R.N. Hospital, M.L.N. Medical College, Prayagraj during the session 2017-2018 on 28 patients presenting with necrotizing soft tissue lesions.

At the time of admission a detailed clinical history regrading presenting complaints, their duration, severity and associated symptoms and cause of lesions was taken, clinical examination was done to determine preexisting illness, site of organ of the necrotizing soft tissue lesions, extent and depth of the lesions, admission in emergency ward, intravenous fluid with broad spectrum antibiotics were administered to cover gram positive and, gram negative bacteria and anaerobic organism and for pain suitable analgesic was give. After stabilization of general condition, patients were taken to operating room for aggressive debridement of infected and necrotizing tissue.

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All necrotic skin, subcutaneous tissue, fascia and nonviable muscle were removed, the excised tissue was sent for culture and sensitivity in microbiology laboratory. All the viable skin and soft tissue were saved to aid later closure.

The wounds were then dressed loosely with gauze moistened with 10% povidine iodine lotion. Antibiotics were adjusted based on wound culture and sensitivity. Anaerobic coverage usually was continued despite lack of culture and sensitivity of anaerobic bacteria.

Wounds were inspected daily and debridement was done if necessary after giving supportive therapy, following investigations were done to assess general health of the patient. LRINEC scores were determined for all patients. Then, it was explored whether LRINEC (<6 vs ≥6) was associated with worse prognosis.

Observations

Twenty Eight patients were studied from February 2017 to February 2018 in two groups.

Group A: Included 15 patients who attended hospital in early stage of disease.

Group B: Included 13 patients who attended the hospital in advanced stage of diseases either due to lack of knowledge of attendants or self-medication by patients/attendants or rural doctor.

Age Distribution

The youngest patient in both study groups was 5 year old and the oldest was 72 years old. This series indicated that Necrotizing soft tissue lesion was more common among 61-70 years.

Sex Distribution

In this study the male female ratio was 2.5:1, with male being 71.4% and females being 28.6%, which indicated, that there is marked variation in male female ratio and this study shows that the necrotizing soft tissue lesion is more common in males.

Time From onset To Admission:

Table 1: Showing time of onset to admission

Onset (In days)	Total		Survived		Expired	
	No.	%	No.	%	No.	%
Early 0-5	15	86.7	13	86.7	2	13.3
Late 6-10	13	38.5	5	38.5	8	61.5
11-15	7		2		3	
16-20	5		2		3	
	1		1		-	

Table 1 indicates that survival was better in patients who presented early to seek surgical attention (86.7%), as compared to (61.5% mortality) in patients presenting late to hospital.

Anatomic Site of Lesion

Table 2: Showing Anatomic site of lesion

Site of Lesion	No. of Patients		Mortality	
	No.	%	No.	%
Extremities lesion	16	57.1	5	35.5
Perineal region	6	21.4	2	33.3
Chest wall	3	10.7	1	33.3
Abdominal wall	1	7.1	1	100
Other	1	3.6	1	100

Total No. of cases = 28; Total mortality = 10 (35.5%)

This study showed that commonest site of involvement is the

extremities (57.7%) and other common site is perineal involvement.

Pre-Disposing and Associated Conditions With Necrotizing Soft Tissue Lesion (Nstl):

In this study the common cause of Necrotizing soft tissue infection was skin and subcutaneous tissue sepsis (32.14%) followed by trauma (28.6%), Perineal Infection 21.4%, Post-Operative 3.6 and no cause 14.2%.

Involvement of Body Surgace Area (Bsa) In Necrotizing Soft Tissue Lesion

Table 3: Showing involvement of BSA

BSA involvement (%)	Total No. of cases	Mortality	
		No.	%
1-4.9	17	4	23.52
5-9.9	7	4	57.14
10-14.9	2	1	50.00
15-19.9	2	1	50.00

Table 3 clearly indicates that more the involved Body Surface areas greater the mortality rate. The mortality rate is directly proportional to involved BSA.

Table 4: Mortality rate

Associated	Total cases	Number Survived	Number Expired	% Mortality
Mal Nutrition	20	14	6	30.0
Diabetes	10	5	5	50.0
Obesity	4	3	1	25.0
Alcoholic	11	8	3	27.0
Peripheral vascular disease	6	4	2	33.3
Increasing age	10	5	5	50.0

Table 4 indicates association of various factors and the influence on outcome of necrotizing soft tissue lesions as shown above, malnutrition was present in most of patients (71.4%) followed by alcoholism (39.3%) and diabetes (35.7%); table VIII a indicates that mortality is higher in patients suffering from diabetes mellitus and increasing age 50% followed by peripheral vascular disease. There is no association of corticosteroid use or intravenous drug abuse with necrotizing soft tissue lesion.

Number of Debridement in Necrotizing Soft Tissue Lesion

Survival is higher (64.3%) in patients, undergoing multiple debridement (mean 3.5 ± 0.97) as compared to 35.7% mortality in the patients with mean debridement of 1.9. Out of 28 patients eighteen patients survived and 10 died total mortality rate was 35.7% even after vigorous management. 2 deaths (13.35) occurred in group A (15) in which patients attended hospital in early stage of disease. In group B, total 8 deaths (61.5%) occurred out of 13 Patients.

Table 5: Showing mortality rate in patients of NSTL

Total number of Patients	Survived	Non-Survived	Mortality
Female	8	3	5
Male	20	15	5
Total	28	18	10
Group A	15	13	2
Group B	13	5	8

Table 5 shows comparison between these two groups as, reveals that out of eight female patients 3 survived and 5 died, mortality rate in female was (62.5%). Out of 20 male patients 15 survived and 5 died, mortality rate was 25%. In Comparison female have higher mortality than male.

Discussion

In the present study, the youngest patient in both groups was 5 yrs old and oldest was 72 yrs of age. The necrotizing soft tissue lesions are more common in old age due to the associated systemic diseases like diabetes mellitus, peripheral vascular disease, malnutrition, alcoholism, obesity, corticosteroid use, HIV infection, carcinoma pulmonary disease, hypertension and hepatic disease [5]. In our study the NSTL was more common in old age (35.7%) and was having male predominance (71.4%). Male: female ratio in present series was 2.5:1.

NSTL is actually uncommon in female who have a better drainage of secretion in the perineal region than male.

The relatively low incidence of necrotizing soft tissue lesions in children can be explained on the basis the many of the predisposing factors such as diabetes, alcoholism and atherosclerosis increase with ageing.

In the present study the survival rate was 86.5% in patients who underwent surgical debridement in early stage of disease as compared to 61.5% mortality in patients who presented late. The better outcome was due to the early stage of disease as the infection was localized. Incidence of septicemic shock and multiple organ failure was less in patients who presented at early stage of disease. Early debridement of the infective tissue halted the progression of infection. Delay in treatment results in decreased survival time. In 1995 Mc Henry *et al.* [6] reported that only a prolonged time from onset to operative debridement was associated with an unfavorable outcome. Rouse (1981) reported that early and adequate nutritional support along with prompt recognition and treatment reduces the development of multiple organ failure and improves the outcome. Lillest *et al.* (1996) [7] reported 6% mortality rate in patients who were diagnosed and operated within 24 hours. These findings are comparable with our observations. Sudasky *et al.* (1987) [8] reported a mortality rate of 50% in adults with necrotizing soft tissue lesion, which was reduced to 0% in selected patients, with early and appropriate treatment. These findings are supporting with our observations.

In present study the commonly involved sites were extremities (57.75%) and perineum (21.4%) Extremities were involved in maximum patients because presence of peripheral vascular disease, decreases the blood flow to the tissue and causes ischemic necrosis, which predisposes it to infection.

Presence of Diabetes causes hypoesthesia due to which neglected minor traumas, leads to infection. Similar observations have been made by Giluliano A Lewis, (1977) [9] who reported that necrotizing soft tissue lesion more commonly involve extremities. Mc Henry *et al* (1995) [6] reported involvement of extremities 40% of cases.

In the present study the cause of lesion was skin and subcutaneous tissue sepsis, commonly present in 32.14% of cases and trauma in 28.6%. As commensals are present on skin they proliferate in environment of local tissue hypoxia caused due to trauma, recent surgery, or in medically compromised patients. These findings are compatible with Mc Henry *et al.* (1995) [6], who reported that necrotizing soft tissue lesions are caused due to cutaneous sepsis in 23% and trauma in 23% of cases.

In our study Malnutrition was present in most of the patients 71.4% Alcoholism in 39.3%, Diabetes in 35.7%, increasing age in 35.7% Peripheral vascular disease in 21.4% and obesity in 14.2% of cases. Malnutrition present in most of the patients in our study was due to low socio-economic status. Alcoholics, Diabetics and old patients have depressed cellular immunity, which predisposes them to infection. These findings contradicts the study of Paty R smith AD (1952) [11] who reported malnutrition in 20.6%

Diabetes mellitus in 74% and marked obesity in 65% of cases. It could be due to the fact they conducted their study in a developed country, where malnutrition is not commonly found. The other possible cause could be that they had more females in their study. Females are more prone to obesity, a high risk factor for diabetes mellitus.

In present study mortality was higher in patients suffering from diabetes mellitus 50% and in those, presenting with increasing age 50% (i.e.> 50 yrs). These findings are compatible with Elliott DC, Kufera JA, Myers RA, Davi DC(1996) [5] who reported that peripheral vascular disease was present in 30.3% Diabetes mellitus in 24.2% of cases. Mortality in Diabetics was 63% and in old age (above 50 yrs) was 42%. Freischlag JA (1985) [10] Paty R Smith (1992) [11] Ward RG, Walsh (1991) [12] reported that Diabetes mellitus and advancing age significantly affect the mortality rate in patients of Necrotizing soft tissue lesions, these findings are similar with our study.

Our study shows that mortality are is directly proportional to involved body surface area. Patients with <5% of body surface area involved are more likely to survive. In our study patients with involved body surface area less than 5% had 23.25% mortality while patients with more than 5% involved body surface area had 57.14% mortality. These findings are nearly similar to study conducted by Palmer LS *et al.* 1990, who observed that involved body surface area less than 5% had 20% mortality while more than 5% involved body surface area had 72.72% mortality.

In the present study every patient underwent surgical debridement of the involved area (mean 2.92 debridement). Survivors underwent mean 3.44 debridement's and non-survivors could undergo mean 1.9 debridement due to this early demise because of septicemia and multiple organ failure. These findings are similar with 5. Elliott DC, Kufera JA, Myers RA, Davi DC (1996) [5] who reported that survival rate in excess of 80% can be achieved with immediate and if required repetitive surgical debridement's. MD Julie A. Freischlag, MD George Ajalat, MD, PhD Ronald W. Busuttill (1985) [10], showed 35%; Brown *et al.* 1994 [13] found 35% mortality.

Early death were due to the consequences of sepsis. These patients died rapidly from systemic effects of infection. Late deaths were due to progressive multiple organ failure.

In our study mortality rate was 62.5% in females and 25% in males. High mortality in females was due to low hemoglobin level and presenting at late stage of disease. Other possible of cause high fat content of the wound resulting poorly vascularized tissue.

Attending the hospital early, in initial stage of disease and vigorous management by surgical debridement and antibiotic therapy will certainly improve the results in patients with Necrotizing Soft Tissue Lesions.

Conclusion

Survival rate increases in the patients who attend the hospital in early stage of disease. Skin and subcutaneous tissue sepsis are the commonest predisposing condition for the NSTL.

Malnutrition and Alcoholism, Diabetes Mellitus, increasing age and female increases the mortality rate in the patients of Necrotizing soft tissue lesion. Survival from Necrotizing soft tissue lesions was enhanced by early debridement and adequate, multiple debridement's. Mortality rate is decreased in those patients who are treated in early cause of disease by means of surgical and medical approach. Early diagnosis and vigorous management is necessary in necrotizing soft tissue lesion to reduce mortality and morbidity. The mortality rate is directly proportional to involved body surface area in patients of Necrotizing soft tissue lesion. Site of lesion and extent of lesion influences the mortality. After early diagnosis and aggressive therapy the mortality rate in NSTL was 35.7%. Patients with higher LRINEC scores were more likely to require mechanical ventilation in intensive care unit and longer hospitalization times and were more likely to die compared to patients with lower scores. LRINEC is capable of pointing out worse prognosis including mechanical ventilation requirement and mortality.

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