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Clinico-Pathological Features and Management of Necrotising Fasciitis- A Prospective Study

Authors
Prof Dr Braja Mohan Mishra[1], Assoc Prof Dr Ashok Kumar Nayak[2], Dr S.B. Srinibash[3]
[1]Professor and HOD, Department of General Surgery, VIMSAR, Burla, Odisha, India
[2]Associate Professor, Department of General Surgery, VIMSAR, Burla, Odisha, India
[3]Post Graduate Student, Department of General Surgery, VIMSAR, Burla, Odisha, India
Corresponding Author
Dr S.B. Srinibash
Mob No: 9439718719, Email: *dr.s.bsrinibash@gmail.com*

Abstract

Introduction: *Necrotizing fasciitis (NF) is a rapidly progressing, inflammatory infection of the superficial fascia with the secondary involvement of skin, subcutaneous tissue and muscle. High mortality and morbidity associated with NF makes it an emergency in which early debridement will have a favorable outcome. Hence it is important to study the clinic-pathological features and management of necrotizing fasciitis.*

Methods and Results: *This study was carried out in the Department of General Surgery, VIMSAR, (VSS Medical College & Hospital), Burla during November 2015 to October 2017, to evaluate the clinico-pathological features and management of necrotizing fasciitis.*

Out of 11,000 cases admitted to the surgical ward during this period, 100 cases belong to necrotizing fasciitis. Mean age of presentation was 50 yrs, where, male was 85% and female was 15%.Etiology of trauma presents in 60%, spontaneous 35%, post op 5%.All the patients presented with in duration, inflammation and necrosis. 10 patients had wound crepitus. 20 patients presented with shock, 40 patients with tachycardia and Hypotension. 60 patient had leukocytosis (60%) among these 55 patient had more than 15400 cell/cm^3. 54% of patient had sodium less than 135 mEq/l. Raised renal parameter was encountered 50% of patient. Kidney is most common organ involved. Diabetes mellitus was the most common predisposing factor present in 40%, followed by alcohol and smoking, PVD, HIV.20% had monomicrobial and 75% had poly microbial infection most common organism is pseudomonas, followed by staphylococcus, proteus, klebsiella, E.coli, citrobacter.

Aggressive fluid therapy, oxygen inhalation, correction of hypovolumia and hypotension by plasma expanders, pressure agents and some time steroid in cases of hemodynamic instability, maintaining and monitoring renal function followed by higher generation antibiotics was the initial intervention, then early aggressive debridement and if required repeated debridement with surgical excision was carried out.95% underwent debridement, 70% skin grafting, 25% secondary suturing, 5% Amputation and overall mortality was 10%.

Conclusion: *Thus study of the disease and its various attributes to understand the disease process better with refinement of various treatment modalities will definitely serve the patient and provide satisfactory control over this life threatening condition.*

Introduction

Necrotizing fasciitis (NF) is a rapidly progressing, inflammatory infection of the superficial fascia with the secondary involvement of skin, subcutaneous tissue and muscle.[1,2] Necrotizing soft tissue infections (NSTI) are less common than subcutaneous abscess and cellulitis but are much more serious conditions whose severity may initially be unrecognized[3,4,5] Even with rapid recognition and intervention, current mortality rates remain approximately 30 to 50%.[6]

NF is recognized as dreaded disease from the days of Hippocrates; Fournier in late eighteen century documented necrotising infection of perineal and genital area which is still known as Fournier's gangrene. Wilson in 1952 gave the term "Necrotising Fascitis" to describe the disease and it is the preferred terminology in these days, as it describes the most consistent and key feature of the disease; the fascial necrosis. Necrosis means death of a portion of the tissue and fascia that encloses muscle.

NSTIs have been described by a variety of different labels, including gas gangrene, Meleney's synergistic gangrene, rapidly spreading cellulitis, gas gangrene, and necrotizing fascitis, among others have also been described. NF in last century occurred sporadically mainly during war time, but recently its occurrence in civilian population is on rise & now 70-80% of such infections are polymicrobial and remainder being caused by a single organism.[6,8,9]

High mortality and morbidity associated with NF makes it an emergency in which early debridement will have a favorable outcome. Local findings include tense and tender soft tissue associated with ecchymosis or blistering of the skin or both[3]. More than 90% of NF patients need intensive care and organ supportive therapy, that makes NF a medical emergency. All above explanations dictate that the NF is life threatening surgical as well as medical emergency.

Aims and Objective

1) Clinical profile of patients suffering from necrotising fasciitis.
2) Etiopathological profile of patients
3) Better modalities of management of patients

Materials and Methods

Source of Data: Patient presenting at VSS Institute of Medical sciences & Research, Burla with necrotizing fasciitis to General surgery department from November 2015 to October 2017.

Sample Size: Total numbers of patients were 100

Method of Collection: Data collected by meticulous history taking, careful clinical examination, appropriate radiological, blood and serological examination; aggressive surgical debridement, culture of pus, tissue biopsy, antibiotic therapy, treatment of complication, amputation and skin grafting were taken into consideration.

Inclusion Criteria

All patients presenting with necrotizing fasciitis at Department of General Surgery, VIMSAR, Burla.

Exclusion Criteria

1. Patients of pediatric age group.
2. Pregnant women.

Management

- All patients managed in emergency ward or ICU
- Aggressive fluid resuscitation
- Early and prompt debridement in all patients
- Crystalline penicillin, aminoglycoside and metronidazole were started empirically and later changed according to C/S report.
- Multiple debridements
- Daily dressing
- General condition improvement of anemia, hypo albuminemia, and other nutritional support
- Skin grafting
- Amputations
- Proper management of multiorgan failures, ARDS, septicemia in ICUs.

Observation

Table – 1 Age Distribution

AGE GROUPS (YEAR)	NUMBER OF PATIENTS	PERCENTAGE (%)
0-10	0	0%
11-20	1	1%
21-30	10	10%
31-40	15	15%
41-50	25	25%
51-60	43	43%
61-70	4	4%
71-80	2	2%

Table – 2 Sex Ratio

SEX	NUMBERS OF PATIENTS	PERCENTAGE (%)
Male	85	85%
Female	15	15%

Table – 3 Etiological Factors

CAUSES	NUMBER OF CASES	PERCENTAGE %
Trauma	60	60%
Spontaneous	35	35%
Post OP	5	5%

Table 4 Predisposing Factors

FACTORS	NUMBER OF PATIENTS	PERCENTAGE (%)
Diabetes mellitus	40	40%
Alcohol	25	25%
PVD	10	10%
HIV	5	5%
Smoking	20	20%
No risk factors	15	15%

Table 5 Site Involved

SITE INVOLVED	NO. OF PATIENTS	PERCENTAGE (%)
Extremity	75	75%
Abdominal wall	5	5%
FG	20	20%

Table 6 Microbiology

MICROBIOLOGY	NO. OF PATIENTS	PERCENTAGE (%)
Polymicrobial	75	75%
Monomicrobial	20	20%
Anerobic	5	5%

Table 7 Organism Isolated

NAME OF BACTERIA	NUMBER OF PATIENTS	PERCENTAGE (%)
Staphylococcus	50	50%
Proteus	40	40%
Pseudomonas	60	60%
E.coli	38	38%
Citrobacter	10	10%
Klebsiella	40	40%

Table 8 Treatment Given

MODES OF INTERVENTION	NO. OF PATIENTS	PERCENTAGE (%)
Skin grafting	70	70%
Secondary suturing	25	25%
Amputation	5	5%
Death during resuscitation	5	5%

Table 9 Outcome

OUT COME	NUMBER OF PATIENTS	PERCENTAGE (%)
ALIVE	90	90%
Death	10	10%

Discussion

NSTI is more common in the range of 20 to 80 years with average being 50 years.

Table – 10 Age Distribution

Study	Present	Anaya et al [39]	Daniel et al [17]
Age in years	50	45	56

NSTI is more common in males present in about 85% of patient in study. In our study finding, male affected more than female. The difference in male and female ratio may be due to poor exposure to environment among females then males or due to poor reporting by female cases at the health centre.

Table 11 Sex Distribution

Study	Present	Anaya et al [39]	Elliot et al [33]	Daniel et al [17]
Male %	85	60	57	61
Female %	15	40	43	39

Etiology of trauma present in 60% of patients, spontaneous in 35%, & 5% had recent surgery [1,14]. In one of the most important and striking observations it has been seen that irrespective of

etiology factors there are few precipitating factors after that the practice of which the real player of sudden spear had started. These factors of mal treatment of the resulted wound or skin lesion like-

- Application of some herbs
- Improper surgical maneuver in unskilled hands, with unsterile instruments.
- Resorting to some other home remedies or quackery.
- Application of soil or other traditional medicines by patients him or herself or by quacks on the resulted wound or skin infection.
- In our study we have not come across any work depicting these points & this requires to be thoroughly follow up.

Table 9 Etiology

Study	Present	Anaya et al (39)	Elliot et al (33)
Trauma in %	60	46	27
Spontaneous %	35	18	42
Post op %	5	11	-

Most common predisposing factor was diabetes mellitus (40%) as compared to other studies in which it is 18-60% (14). Alcohol intake was 25% as compared with 9-31% in other studies. Other risk factors were PVD (10%), smoking (20%) HIV (5%), no risk factors (15%).

Table 10 Predisposing Factors

Study	Present	Elliot et al (13)	Korhan et al (13)	Daniel et al (17)	Kuncier et al (14)
Diabetes	40	56	-	38	18-60%
Alcohol intake	25	-	-	-	9-31%

Extremity was most common site involved followed by perineum & scrotum, abdomen.

Table 11 Site of Involvement

Study	Present	Anaya et al (39)	Elliat et al (33)
Extremity in %	75	57	64
Abdomen in %	5	20	36
FG	20	20	-

All the patient presented with inflammation, indurations and necrosis, while 10 patients presented with crepitus, 20 patients with shock, 40 patients with tachycardia and hypotension.

60 patient had leucocytosis (66%) among these 55 patient had count more than 15400 cells/ cm^3.

54% of patients had sodium less than 135mEq/l.

Raised renal parameter was encountered in 50% of patients; kidney was most common organ involved.

20 patients (20%) had monomicrobial infection as compared with 15-29% in various study [12]. 75 patients (75%) had polymicrobial infection as compared to 70-80% in other series [6].

Table 12 Microbiology

Study	Present	Anaya et al (39)	Elliot et al (33)	Kuncier et al (14)
Monomicrobial in %	20	43	15	15-29
Polymicrobial in %	75	57	85	71-85

Monomicrobial organism isolated was staph. aureus, pseudomonas, klebsiella, proteus, candida. [6]

Polymicrobial organism isolated was staph. aureus in 50% as compared with 15-37% in other series.[12] proteus 40%, pseudomonas 60%, kliebsiella 42%, E.coli 38%, citrobacter 10% as compared with 2-12%. [14]

Table 13 Organism Isolated

Study in %	Present	Kuncier et al (14)	Elliot et al (33)	Kundil et al (10)
Staph. aureus	50	15-37	27	35
Proteus species	40	-	38	20
Pseudomonas	60	9-10	28	20
Klebsiella	40	-	58	31
E.coli	38	8-28	50	10
Citrobacter	10	-	5	-

Table – 14 Organism and Sensitivity

Study	Present	Kundil et al (10)
Staph. aureus	Vancomycin, linezolid	Cefotaxime, amikacin
Proteus species	Gentamicin, amikacin, ciprofloxacin	Gentamicin, amikacin
Pseudomonas	Netilmicin, imipenem	Amikacin, ampicillin
Klebsiella	Gentamicin, amikacin	Ciprofloxacin, amikacin
E.coli	Gentamicin, amikacin	Gentamicin
Citrobacter	Imipenem, cefotaxime	-

Early and aggressive debridement [37] pivotal in out come with 95 patient underwent debridement. Avg. no of debridement in skin grafting patient was 70 and in amputed patient was 5.

Mortality was 10% compared with 20-40% in many series. [6]

Table – 15 Mortality

Study	Present	Richard et al [1]	Kundil et al [10]	Kuncir et al [14]
Mortality in %	22	20-60	35	15-52

Conclusion

The 100 patients of necrotizing fasciitis were admitted to the Department of Surgery, VIMSAR, Burla and study of these patients revealed that the knowledge of a precise NSTI classification, high clinical suspicion of such infection early in its course, and initial and aggressive surgical treatment constitute the principles for successful management.

Maximum cases presented to the hospital in 6-8 days, due to –

a) Local application of some herbs, soils, other unhygienic remedies due to lack of health awareness.
b) Erroneous surgical maneuver by inexperienced hand.
c) Quackery
d) Poor socio economic status.

Finally understanding the gravity of the disease and various intricacies of it in the part of surgeon is necessary to undertake timely intervention like-

- Remove sources of systemic toxins by immediate debridement or excision with primary suturing.
- Specified antibiotics
- Proper ICU care
- Treating associated factors like Diabetes mellitus, liver dysfunction, alcohol abuse, malnutrition, and anemia.
- When wound heals, wound closure by various methods like skin grafting, secondary suturing was carried out.

The above interventions will decrease the morbidity and mortality and reduce the hospital stay of the patient and last but not the least relentless study of the disease and its various attributes to understand the disease process better with refinement of various treatment modalities will definitely serve the patient and provide satisfactory control over this life threatening condition.

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