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Incidence of Necrotizing Fasciitis in Lower Limb Cellulitis

KEYWORDS: Necrotizing fasciitis, myonecrosis, septicemia, wound debridement, split skin grafting, amputations.

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ABSTRACT *Necrotizing fasciitis (NF) is a rare, life-threatening, mixed, synergistic gangrenous bacterial infection characterized by rapidly spreading inflammation and necrosis of the skin, subcutaneous tissue, and superficial fascia*

This study aims at early detection of necrotizing fasciitis by tissue biopsy for appropriate management. Tissue biopsies are taken for gram staining to identify organisms and culture and sensitivity for appropriate management with antibiotics. Grams staining are done to confirm mixed infections and rare pathogens.

INTRODUCTION:

Necrotizing fasciitis and myositis are rapidly progressive and destructive soft tissue infections involving the superficial fascia and muscle,respectively, with high mortality and long term morbidity. Early clinical suspicion of necrotizing fasciitis/myositis is crucial because patient survival is inversely related to the time interval between onset of infection and initiation of appropriate therapy.

Necrotizing soft tissue infections occur predominantly in patients predisposed by immune compromise, diabetes mellitus or vascular insufficiency and mortality from necrotizing soft tissue infections can be reduced by expeditious diagnosis and adequate early debridement.

An apparent cellulitis with ecchymoses, bullae, any dermal gangrene, extensive edema or crepitus suggests an underlying necrotizing infection and mandates operative exploration to confirm the diagnosis and definitively treat the infection.[4]

Here we intend to study the various modes of clinical presentation of necrotizing fasciitis and myonecrosis in our hospital. Also to study the various co-morbid conditions associated with it and use the available treatment and surgical options in our set up for the management of necrotizing fasciitis and myonecrosis. To study the residual morbidity and mortality after effective management.

Materials and Methods:

It is a prospective study done at SVS medical college, MBNR,Telangana, from September 2011 to September 2013 i.e., two years.number of patients studied were 50.

INCLUSION CRITERIA: Patient presenting with fever, pain, swelling, erythema, induration, skin blistering, skin discoloration limited to lower extremity.

EXCLUSION CRITERIA: Multifocal necrotizing fasciitis and cellulitis affecting upper limb, necrotizing fasciitis post surgery are excluded.

Name, age, occupation, socioeconomic status, residence were recorded in the proforma case sheet. The presenting complaints and details were recorded in chronological order.

Detailed physical examination including nutritional status, built, status of vascular system and neurological system were recorded. Detailed local examination of involved part done.

INVESTIGATIONS :

1. Hemoglobin, total leucocyte count, differential count

2. FBS, PPBS, and corresponding urine sugar

3. Urine analysis: Albumin, sugar, ketone bodies and microscopy

4. Blood urea and serum creatinine

5. Radiograph of affected part (lower limbs)

6. Wound discharge for culture and sensitivity

7. Biopsy of the affected part

8. Arterial and venous Doppler study (optional)

BIOPSY TECHNIQUE:

Affected lower limb is cleaned with povidone iodine. Local Anesthesia(1% lignocaine) was infiltrated. We took a skin and deep soft tissue biopsy from the suspected area and another from the leading edge of any erythema, induration and necrosis. . Tissue biopsies are taken immediately to pathology laboratory for culture-sensitivity, grams stain and for immediate examination early by frozen section biopsy. The frozen section is evaluated by hematoxylin-eosin stain.

The histologic criteria for diagnosis were necrosis of the superficial fascia, polymorphonuclear infiltration of the dermis and fascia, fibrinous thrombi of arteries and veins coursing through the fascia, angiitis with fibrinoid necrosis of arterial and venous walls, presence of microorganisms within the destroyed fascia and dermis and an absence of muscle involvement. Histology is important particularly in cases for which the operative findings are equivocal for early necrotizing fasciitis, as it determines the need for an

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early second look and repeat debridement.

TREATMENT PROTOCOL:
On admission, general and medical treatment of necrotizing fasciitis was done and followed by wound debridement as the definitive procedure . The patients were later managed by regular wound dressings , antibiotics , and supportive therapy for maintainence of blood pressure and renal status and in few cases vacuum assisted dressings were tried for faster healing . Once the wound was healthy split skin grafting and secondary suturing was done in most cases . Some cases healed by secondary intention . Some cases had to undergo major amputations for control of infection and its spread .

Diabetic patients were managed by diabetic treatment like diabetic diet, sugar restriction and anti diabetic treatment was given with oral hypoglycaemic drugs and insulin.

Patients who developed renal complications were managed by salt restrictions, dialysis and supportive renal treatment.

Supportive treatment was given for patients who had bed sores as a complication of NF by regular dressings and water beds .

Patients who went into septicemia were managed in intensive care units on ventilators under guidance of anesthetists and physicians.

Post discharge patients were followed up to one month regularly on out patient basis for dressings , further management of diabetes and hypertension and also to review liver and renal parameters.

Major amputation patients were advised for clutches and artificial Prosthesis four weeks after surgery.

Parameters evaluated: modes of presentation , predisposing factors , progression , co morbid conditions and complications and its management were analysed and discussed . Mortality rate was also studied and factors that contributed to it were analysed.

Statistical Method:
The histopathologically diagnosed cases of necrotizing fasciitis among cellulitis patients were collected and following data were subjected to analysis using the following methods and results were tabulated.

Incidence- No of new cases occuring during a specified period in a given population.

Prevalence(ratio)- All cases existing at a particular time in a given population Mean- Data arranged in arithmetic/geometric/exponential or harmonic progression.

Median-Data arranged in ascending and descending order when one or two extreme values.

Mode- There is clustering of data with 3-4 extreme values widely dispersed data.

Mortality- No of deaths for total no of cases

RESULTS :
1. The incidence of necrotizing fasciitis was seen highest in age group 41 to 60 years
2. Male to female ratio was 3 : 1
3. Most common predisposing factor was minor trauma (46%) followed by snake bites (22%) and idiopathic cause (22%)
4. Average duration between onset of symptoms and first surgery was 3.7days
5. Klebsiella was the most common microorganism grown on aerobic culture media.
6. Diabetes (38%) was the common co morbid condition came across in this study.
7. Duration of hospital stay was approximately 8 to 61 days with an average around 29 days.
8. Mortality rate was 14%.

DISCUSSION
Necrotizing fasciitis was first described as a rapidly spreading gangrene of the subcutaneous tissue caused by beta hemolytic streptococci group A. This disease was later considered as a clinical entity rather than a specific bacterial infection . Many virulent organisms can cause necrotizing fasciitis.[58]Necrotizing fasciitis is a surgical emergency. Early recognition and prompt aggressive surgical debridement of all necrotic tissue is critical forsurvival[59]

We have diagnosed necrotizing fasciitis and myonecrosis whenever there is a necrosis of subcutaneous tissues extending through the fascial planes and necrosis of underlying muscle tissue . Paucity of cutaneous findings early in the course of disease makes it difficult to diagnose the condition early . Often the disease is masqueraded as cellulitis or abscesses . In these patients diagnosis has been made when the infection progressed despite treatment with broad spectrum intravenous antibiotics.

This study was done as a cross sectional observational study to analyze the factors contributing to morbidity and mortality associated with necrotizing fasciitis and myonecrosis

Table comparing the studies done by other authors

	Hefny , Ashraf F. et al	Wong , Chin-ho et al	Rieger , Ulrich et al	Present **study**
Sample size	11	89	16	29
Mean age (years)	46	56	47.1	48
Male : Female	9:2	58:36	9:7	22:7
Mean no. of debridements	2	2.7	5.2	1.7
Mean duration of hospital stay (days)	45	40.6	46.6	29.4
Mortality	18%	21.3%	28.7%	14%

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CONCLUSION

- Necrotizing fasciitis was most common in the middle aged individuals
- Males were affected more than female
- Minor trauma and snake bites accounting for most cases
- Lower extremities was the most common site of involvement
- Diabetes type 2 was the most common co-morbid condition
- Septicaemia was the most common complication
- Klebsiella was the most common organism grown on culture media
- Wound debridement was the main mode of treatment , average number of 1.7 wound debridements were performed
- Mortality rate – 14 %

Hence patients with provisional diagnosis of necrotizing fasciitis and myonecrosis should be treated aggressively with wound debridements as early as possible , if necessary with major amputations and broad spectrum antibiotics .