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Necrotizing soft tissue infections-A study in tertiary centre of North Bihar

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Abstract
Background: *Necrotizing soft tissue infection (NSTIs) are the infection of soft tissue associated with necrosis. It is relatively common infection with high morbidity and mortality rate. The purpose of this study is to assess the different diagnostic methods, different mode of treatment and their outcomes*
Method: *Retrospectively clinical details of 80 patients diagnosed with NSTI during February 2015 to January 2017 in SKMCH, Muzaffarpur were recorded. A detailed case sheet regarding age, sex, risk factor, association with hypotension, aetiology, microbiology, complication, different method of treatment and the final outcome was prepared for each patient.. Patients were managed with the broad spectrum antibiotic; repeated debridement or fasciotomy followed by culture based antibiotic and later reconstruction by skin grafting.*
Results and Conclusion: *Most of the patient presented with pain and swelling. Diabetes and trauma were the most common predisposing factor. Most common organism isolated was streptococci. Early diagnosis and treatment by repeated debridement were the keys to improve survival and decrease morbidity.*
Key words: *Necrotizing soft tissue, Antibiotic, Fasciotomy, Skin grafting, Morbidity.*

INTRODUCTION

NSTIs are life and limb threatening infection affecting 0.24 to 0.4 per 100,000 adults [1][2]. It generally affects soft tissue which leads to necrosis, toxicity, and high mortality rate if not diagnosed and treated ahead of time [3]. It was first described by Jones in1871 during US civil war [4]. It is a rapidly progressive infection which can involve the skin, subcutaneous tissue, deep fascia and muscle [6] [7]. The NSTIs can be classified into various types depending upon the involvement of anatomical locations, depth, and kind of infection [8][9]. In general Fournier's gangrene (perineal infection) and Ludwig's angina (connective tissue infection) covers more than 80% of all NSTIs [10]. These are polymicrobial infection which involves aerobic bacteria such as streptococci, staphylococci, enterococci and gram negative rods [11]. The next most common NSTI is necrotizing fasciitis which follows with the occurrence of cuts and wounds. This covers 10 to 15% of all NSTIs, the common microbes responsible for the infections are methicillin resistant Staphylococcus aureus[12] [13]. The other most prominent NSTIs are clostridial gangrene, gas gangrene which discharges gas in gangrene. This infection is commonly caused by Clostridium perfringens [14][15].

The clinical demonstration of NSTIs is usually varied and late. The laboratory techniques and test such as white blood cell (WBC) counts,

parameters of glucose, lactose, serum sodium are unreliable to be a prognosis of NSTIs. In 20% cases there is no visible association with any disease. Diagnosis is difficult in such cases and requires high index of suspicion. In such cases an early diagnosis and treatment has been challenging. Patients usually presents with symptom of pain and swelling of affected part. NSTIs are usually associated with dusky discolouration, blisters, necrosis of skin and crepitus. Patient with diabetes mellitus, advanced age, trauma, chronic renal failure (CRF), malnutrition, steroid use are prone to NSTIs [6][11][16].

The aim of this study is to assess different diagnostic method for early detection of cases, a course of the disease and to assess modality of treating NSTIs.

METHODOLOGY

Our medical college and hospital serve the patients from wide geographical areas of the northern and central state of Bihar, India. After obtaining the required approval from the ethical commitee, eighty patients aged were examined in a retrospective manner during February 2015 to January 2017. A detailed demographic data case of 80 patients was recorded with reference to age, sex, body mass index at the time of presentation. We documented variable related to initial presentation (vital signs, location, cause) of the patients. The associations of hypotension, aetiology, microbiology with the symptoms of NSTIs are compiled and analyzed. During the course of treatment, patients are managed with broad-spectrum antibiotics, repeated debridement or fasciotomy followed by culture based antibiotics and later reconstruction by skin grafting.

RESULTS & DISCUSSIONS

Pain and swelling were present in all the patients during the initial presentation. The distribution of predisposing factors related to NSTIs in 80 patients is described in Table 1. In our study Diabetes was a prominent factor for NSTI covering in 36 (45%) cases. In 16 cases (20%) there was no predisposing factor. The location of infections in our case studies are mapped in Table 2. A total of 52 patients (65%) had NSTI of the lower limb, 16 patients (20%) had infections involved of upper limb. Rest of patients had NSTI of perineum, groin, scrotum, and abdomen. Most of the infection was polymicrobial in nature. Table 3 shows the statsitics related to the treatment and related procedures given to the patients. In our study debridement was done in 56 patients (70%). Multiple release incision and the fasciotomy were done in 20(25%) cases. In two patients below knee amputation was done to save the life of the patient. However, two patients died during the course of treatment due to septicemia and multiple organ failures.

Table-1:-Distribution of predisposing factor

Factor	No. of cases	Percentage (%age)
Diabetes Mellitus	36	45%
Trauma	12	15%
DVT	4	5%
CRF	12	15%
Idiopathic	16	20%

Table 2: Location of tissue infection

Site	Number of NSTI (n=80)	%age of patients
Lower limb	52	65%
Upper limb	16	20%
Perineum ,groin,scrotum	10	12.5%
Abdomen	2	2.5%

Table 3:-Microbial infection in NSTI

Bacteria	Number of patients	%age of patients
B-hemolytic Streptococci	32	40%
Bacteroid	28	35%
Staph. Aureus	12	15%
Clostridium	4	5%
MRSA	2	2.5%
Pseudomonas	1	1.25%
Other	1	1.25%

Table 4: Mode of treatment

Management	Number of patients	%age of patients
Repeated debridement	56	70%
Multiple release incision& fasciotomy	20	25%
Amputation	2	2.5%
Death	2	2.5%

Multiple large series of observations in our patients have suggested an association between NSTI and presence of comorbidity, particularly presence of diabetes, trauma, obesity and CRF. High level of suspicion is required in diagnosing disease in an otherwise healthy patient. Early diagnosis is a key factor in the successful management of NSTI. Initial finding includes erythema and swelling followed by a blister, discharge of toxic fluid and necrosis. The presence of gas (crepitation) is found to be an ominous finding and sign of clostridium infection. The presence of hypotension was demonstrated in patients having a systemic spread of infection. The laboratory finding in our cases like TLC >15,000, serum sodium level<135mmol/l, high blood urea and serum creatinine level were found to be associated with NSTIs. The diagnostis tools in ours studies reveals that a plain x-ray can show subcutaneous gas. CT and MRI can show increased fascial thickness. Most of the infection are polymicrobial in nature. NSTI without predisposing factor has been found with commonly acquired methicillin resistance Staphylococcus infection. Broad spectrum antibiotic with early and timely debridement is key to successful treatment. Complete debridement is required to control the source of infection for complete and early recovery. In this series, broad spectrum antibiotic like imipenam, meropenam, piperacillin, and tazobact was successfully used. In our study debridement was done within 8 hours of admission. Then next debridement was done after 24 hours till no necrotic or infected tissue is seen. A high level of observation and suspicion is required in early cases of NSTI. A prompt and generous incision should be given to release fascial compartment on any doubt of infection. In our study mortality was low due to early and adequate debridement within and aggressive critical care.

CONCLUSION

Pain and swelling were the commonest symptoms. Diabetes mellitus and trauma were the predominant associated condition. Blisters, dusky discolouration and crepitation are strongly suggestive of NSTI. Laboratory parameters such as TLCs15, 000, S.creatinine. 1.5, S.Na<130mmmol/l, presence of gas is strongly suggestive of NSTI. Most of the infection is polymicrobial in nature with both aerobic and anaerobic gram-positive and negative organism. Resuscitation followed by early and adequate debridement remains the cornerstone of management of NSTI. The most important factor in survival is related to repeated debridement of necrotic tissue after initial resuscitation. By applying these method morbidity and mortality of patient with NSTI can substantially be reduced.

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