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General Surgery

SEVERE NECROTISING FASCIITIS COMPLICATED BY ADMINISTRATION OF NSAIDS - A CASE SERIES

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ABSTRACT Necrotising fasciitis can be described as a severe soft tissue infection that results in progressive destruction of subcutaneous fat and fascia. Necrotising fasciitis is commonly due to Streptococcus pyogenes infection but often due to mixed infections like anaerobes, coliforms and gram negative organisms. The capacity of NSAIDs of disregulating the production of inflammatory mediators (such as cytokines, proteases, etc.) by leucocytes is a plausible biological mechanism to explain how these drugs might predispose to Necrotising Fasciitis or impede its timely recognition and management. Furthermore, intramuscular injection of NSAID can provoke severe tissue trauma, such as aseptic tissue necrosis, representing a local portal of entry for infection that can progress to NF, potentially masking symptoms of Necrotising fasciitis leading to delaying in diagnosis. This study aims to establish an association between Severe Necrotising fasciitis in patients with administration of NSAIDs. This study described 14 cases of Necrotizing fasciitis admitted in JSS hospital, severity complicated by administration of NSAIDS. A detailed description of the patients was done in the case report.

KEYWORDS :

INTRODUCTION

Necrotizing fasciitis is known as "flesh-eating disease". The disease was first discovered in France, 1783 although, the term *necrotizing fasciitis* was coined by B Wilson, an American surgeon in the 1950's. It means necrosis of the fascia and subcutaneous tissue with relative sparing of the underlying muscle. It is characterized by rapid destruction of tissue, systemic toxicity if not treated aggressively causes gross morbidity and mortality.

Necrotizing fasciitis had different types of classifications and terminology based on depth of infection, anatomical sites and microrganisms. *Necrotizing fasciitis, myonecrosis, and necrotizing adipositis were classified based on the depth of infection*. The Gram-positive organisms are *Staphylococcus aureus, S pyogenes,* and enterococci; Gram-negative organisms are *Escherichia coli* and *Pseudomonas* species; and anaerobic organisms, such as *Bacteroides* or *Clostridium* species. .

Necrotizing fasciitis starts with trauma to the skin surface followed by entry of bacteria. Infection starts in the deep tissue planes where epidermis might not be initially affected.

The clinical symptoms starts when infective organisms spread through the tissue along the deep fascia. Bacteria rapidly multiply within viable tissue, although fibrous attachments between subcutaneous tissues and fasciae limit spread to areas like the hands, feet, and scalp. Lack of fibrous attachments in the trunk and limbs, causes widespread infection and destruction to the tissues. Infection also spreads to venous and lymphatic channels, leading to edema. The spread of bacteria results in thrombosis of blood vessels in dermal papilla, resulting in ischemia and gangrene of subcutaneous fat and dermis. If the fascia is breached, infection of the muscle occurs leading to myositis.

Necrotizing fasciitis initially presents with patchy discoloration of the skin with pain and swelling, but without a defined margin. Progression of Necrotizing fasciitis is marked with the development of tense edema, a grayish-brown discharge, vesicles, bullae, necrosis, and crepitus. Later, presents with constitutional symptoms like fever, tachycardia, altered mental state, diabetic ketoacidosis.

Clinical stages of Necrotizing fasciitis:

Stage-1	Stage-2	Stage-3
Tenderness	Blisters	Tissue Necrosis
Erythema	Bullae formation	Hyposensitivity
Oedema		Anaesthesia
Warm skin		Tissue Crepitation
Fever		Haemorrhagic bullae

Worldwide necrotizing fasciitis in adults is 0.40 cases per 100,000 people/year. According to the Center for Disease Control there is an estimated 9,000-11,500 cases of necrotizing fasciitis occuring each year in the United States, with a resultant 1,000-1,800 deaths annually.

NSAIDS were used for pain management which can lead to Necrotizing fasciitis causing cellular function depression, TNF enhancement, impairing phagocytosis and bactericidal activity which is a plausible biological mechanism to explain how these drugs might predispose to Necrotizing fasciitis or impede its timely recognition and management. So, objective of the study was to assess the severity of the Necrotizing fasciitis complicated by NSAIDs administration.

MATERIALS AND METHODS

This study represents management of 14 confirmed cases of acute necrotising fasciitis patients admitted in JSS hospital, through the period of August 2021 to june 2022. To assess the relationship between NSAIDS and Necrotising fasciitis, cases were analysed for presence of risk factor, ports of entry of organism, timing of nsaids use relative to onset of symptoms of necrotising fasciitis, development of complications including organ failure, shock, death, Initial diagnosis given to patients getting NSAIDs who later developed obvious Necrotising Fasciitis. The results were summarized in tabular form.

Following history taking, physical examination, patients were subjected to routine laboratory investigations. Following initial resuscitation, standard treatment after admission included cardiovascular stabilisation and assessment of extent of infection. Broad spectrum antibiotics were administered to cover gram positive cocci, gram negative rods and anaerobic flora.

Patients were taken to operating room for surgical exploration of the fascia in the affected site under adequate anesthesia. The classic operative features include serosanguinous discharge, thrombosed vessels, undermining skin, sparing of underlying muscle as well as dull, edematous necrotic or gangrenous fascia confirming the diagnosis of necrotising fasciitis.

Fluid was sent for culture sensitivity, radical debridement was performed and necrotic tissues were excised. Critical support was required for most of the patients due to delayed presentation in advanced stage. Prolonged mechanical ventilation, invasive monitoring and ionotropic support were frequently necessary.

Repeated debridement was performed according to wound status, dressed twice daily with betadine and peroxide wash. Following improvement of general condition and wound, patients were subjected to secondary suturing and split skin grafting in follow up.

3. RESULTS

3.1 Location : (table 1)

Out of 14 patients included in the study 11 are men and 3 are women. Their age ranged from 13 to 85 years with a mean of 50 years. The infection involved upper limb in 7 % cases, lower limb in 85 % cases. Head and neck in 7% cases, as shown in the table 1.

Table 1 : Anatomical sites involved with necrotising fasciitis	
Anatomical location	Number of cases
Lowerlimb	85%
Head and neck	15%
Upper limb	7%

3.2 Bacterial etiology:

Hemolytic streptococci was the major organism cultured from the wound 4 cases (28%). MDR Klebsiella is predominant organism in 4 cases (28%). 4 out of these 14 cases had both organisms in significant quantity. 2 (14%) cases have pseudomonas aerogenosa MDR. The remaining cases have proteus in 7% and gram negative e coli in 7% cases.

3.3 Predisposing factors:

Necrotising fasciitis developed post trauma and self fall in 35 % cases and spontaneously in 4 (28%)cases. A 13 year male child developed necrotising fasciitis involving deeper structures of neck, required repeated major debridements. One case developed necrotising fasciitis of left lower limb following snake bite with delayed presentation to hospital required bedside faciotomy, repeated debridements, hemodialysis in view of AKI and prolonged icu care.

Table 3: Predisposing factors for acute necrotising fasciitis in this study	
Predisposing factors	Number of cases
Trauma	5 (35%)
Spontaneous	4 (28%)
Unknown etiology	2 (14%)
Diabetic infection	2 (14%)
Snake bite	1 (7%)

3.4 Associated illness:

8 out of 14 cases in this study suffered from diabetes mellitus and in association with other diseases. 4 patients had acute Renal failure. 1 patient had SLE and one patient with urinary candidiasis

3.5 Diagnosis (signs and symptoms)

Necrotising fasciitis occurred in all ages from 13 to 85 years . The signs and symptoms of necrotising fasciitis are varied. Cellulitis was present in all cases. Brown echymotic discoloration with cutaneous gangrene. The number of cases with cutaneous gangrene were large due to misdiagnosis by primary treating physician or late presentation.

3.6 Laboratory data

Hemoglobin levels were monitored because the red cell mass was frequently diminished by thrombosis, echymosis, sequestration by the reticuloendothelial system and hemolysis. Production of red cells by the bone marrow was often depressed by infection and toxemia in these patients. In 68% of cases the hemoglobin level was below 10gm%. White cell count, serum electrolytes, creatinine showed non specific changes of other acute infections.

3.7 Management

Once the diagnosis of necrotising fasciitis was suspected cultures were obtained, patient was given combination antimicrobial therapy. Correction of fluids, electrolytes and red cell mass deficiencies were carried out . After resuscitation and under adequate anesthesia multiple incisions were made over affected area and carried beyond the fascial extension as determined by finger dissection in that plane.

After infection was controlled and granulation tissue covered the wound sides of wound are closely approximated. 3 patients out of 14 were expired. 4 patients required multiple debridements, one patient underwent above knee amputation, one patient underwent only bedside debridement in view of poor general condition of the patient. Patients further underwent regular bedside debridements and wound dressings in follow up, few patients required split skin grafting for closure of the wound and in other cases the raw area was left to heal by secondary intention.

3.8 Morbidity and mortality

The average period of hospitalization was 3 weeks. The mortality rate in 14 patients was 21% (3 cases). All the 3 patients were expired in view of septic shock and MODS. Several factors were responsible for mortality in this study including, diabetes mellitus, hypertension, associate ischemic heart disease, liver cirrhosis chronic kidney disease, acute renal injury, and multiple organ dysfunction.

The most important factor in survival was related to rapidity of diagnosis and institution of therapy. The average time from the onset of the disease to the diagnosis and institution of therapy was 2 weeks. However this period averaged less than a week in survivors compared to more than 3 weeks in those who died.

DISCUSSION

Necrotizing fasciitis (NF) is a life-threatening infection of soft tissues spreading along the fasciae to the surrounding musculature, subcutaneous fat and overlying skin areas that can rapidly lead to septic shock and death.

The relationship between NSAIDs and necrotising fasciitis has been suspected from previously published cases, suggesting suppression of host defences , impaired wound healing and increased postoperative infection. NSAIDs have been reported to inhibit polymorphonuclear leucocyte functions which may contribute to host defences against the bacterial infection. It have also been reported to increase promotion of tumor necrosis factor, a cytokine that could predispose patients to shock and organ failure.Other possible explanations for necrotising infections in patients receiving nsaids include, NSAIDs may not promote necrotising infection but mask signs of infection and delay treatment. The coincidental overlap between increasing use of NSAIDs and rising prevalence of virulent streptococci.The indication for giving an NSAID could also be an early sign of complication, like patients with varicella infection who are developing complications may be more likely to have fever and pain unresponsive to other measures and to receive an NSAID.

Distinguishing necrotising fasciitis from other less severe infections is crucial, since necrotising fasciitis is a surgical emergency. A majority of patients present with an erythematous, tender, swollen area resembling cellulitis with disproportionately severe pain at the site of involvement without enlargement of draining lymphnodes, with constitutional symptoms. As the infection progresses the skin charecteristically becomes more erythematous, painful and swollen with indistinct borders. The skin develops violaceous hue, may become necrotic with bullae formation and eventually appears hemorrhagic and gangrenous. There may be involvement of more than one area separated by lands of normal skin.

In this study all included patients presented with cellulitis. Oedema present in 11 cases, brown echymotic patch and skin gangrene present in 8 cases skin vesicles in 5 cases. The high incidence of skin gangrene was presumably due to delay in diagnosis and institution of therapy from physician side, due to difficulty in diagnosis and lack of awareness of the condition and the proper way of setting up an early diagnosis.

Patients expected of having necrotising fasciitis should be started on empirically on broad spectrum antibiotics covering the most commonly encountered pathogens. Subsequent antibiotic management is guided by the sensitivities of the organisms identified from intraoperative cultures and should be continued until the infection is under control.

Once the diagnosis of necrotising fasciitis is made, treatment should be instituted promptly. The patient should be brought to the operating room without unnecessary delay and undergo aggressive and extensive debridement. The first operative debridement is the most important one for the survival of the patient. Once the infection is controlled daily dressings can be done bedside with sedation followed by secondary suturing of the wounds with or without split skin grafting to cover the exposed soft tissues. Recently vacuum assisted wound closing was found to be effective. It has much lower morbidity compared to the conventional wound dressing technique. The role of amputation in necrotising fasciitis is controversial. If infection can only be eradicated by amputation, it should be done promptly without hesitation.

Results from prospective studies suggest that the incidence of Necrotising fasciitis is not increased in patients receiving therapy with NSAIDs, and their use doesnot adversely impact the severity once the

necrotising fasciitis is established. NSAIDs are also anti inflammatory agents that could reduce antimicrobial defences by dysregulating production of anti inflammatory molecules, bin this light, Some authors contend that NSAIDs not merely suppress the symptoms of necrotising fasciitis but contribute to invasive streptococcal pathogenesis. Further studies are required to establish a causal link between NSAID use and enhanced streptococcal virulence.

CONCLUSION

Nsaids are often employed to treat the pain, inflammation and fever associated with early necrotising fasciitis . The present study suggests that NSAIDS may alleviate the symptoms of necrotising fasciitis, resulting in delay in appropriate diagnosis and treatment. Leading to need for extensive debridement, morbidity and mortality in patients. Knowledge of early symptoms of necrotising fasciitis and rational approach to patients presenting with localised soft tissue pain will enhance detection and therapy of this rapidly progressive life threatening disease.

REFERENCES.

1. Brun-Buisson CJL, Saada M, Trunet P, Rapin M, et al. Haemolytic streptococcal gangrene and non-steroidal anti-inflammatory drugs. *BMJ* 1985;290:1786.
2. Krige JEJ, Spence RAJ, Potter PC, Terblanche J. Necrotising fasciitis after diflunisal for minor injury. *Lancet* 1985; No.8469/70:1432-3.
3. Rimailho A, Riou B, Richard C, Auzepy P. Fulminant necrotizing fasciitis and nonsteroidal anti-inflammatory drugs. *J Infect Dis* 1987;155:143-6.
4. Rietveld JA, Pilmore HL, Jones PG, Theis J-C, Bowie DA, et al. Necrotising fasciitis: a single centre's experience. *NZ Med J* 1995;108:72-4.
5. Frankish PD, Mason GH, Allen PR, Milsom FP, Christmas TI. Acute streptococcal necrotising fasciitis. *NZ Med J* 1988;101:625-6.
6. Zerr DM, Alexander ER, Duchin JS, Koutsky LA, Rubens CE. A case-control study of necrotizing fasciitis during primary varicella. *Pediatrics* 1999;103:783-90.
7. Peterson CL, Vugia DJ, Meyers HB, Chao SM, Vogt J, et al. Risk factors for invasive group A streptococcal infections in children with varicella: a case control study. *Pediatr Infect Dis J* 1996;15:151-6.
8. Bell AL, Adamson H, Kirk F, McCaigue MD, Rotman H. Diclofenac inhibits monocyte superoxide production ex vivo in rheumatoid arthritis. *Rheumatol Int* 1991;11:27-30.
9. Spinas GA, Bloesch D, Keller U, Zimmerli W, Cammisuli S. Pretreatment with ibuprofen augments circulating tumor necrosis factor-α, interleukin-6, and elastase during endotoxinemia. *J Infect Dis* 1991;163:89-95.
10. Bernard GR, Wheeler AP, Russell JA, Schein R, et al. The effects of ibuprofenon the physiology and survival of patients and sepsis. *N Engl J Med* 1997;336:912-8.
11. Zerr DM, Rubens CE. NSAIDS and necrotizing fasciitis. *Ped Infect Dis J* 1999;18:7245.