



“Critical Study of Etiology, Diagnosis and Management of Skin and Soft Tissue Infections

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ABSTRACT

Introduction: Skin and soft tissue infections (SSTIs) result from a compromise of the skin's defences and microbial invasion and resulting interactions. SSTIs occur as a result of infection by bacteria, fungi, viruses or parasites. The barrier of skin is usually breached by trauma or surgery. Primary SSTIs result from an invasion of healthy skin by pathogenic organism; secondary SSTIs occur when pathogens invade an already damaged skin, probably after trauma or chronic disease. The most common cause of SSTIs involving the healthy skin are aerobic Grampositive cocci especially *Staphylococcus aureus* and streptococcal species. 75% cellulitis are caused by Beta-hemolytic streptococci.

Aim: This study aims to evaluate the aetiology of skin and soft tissue infections, to evaluate the role of various investigation modalities in patients with skin and soft tissue infections, to evaluate management strategies in these patients.

Materials and Methods: 102 patients with skin and soft tissue infections admitted to our institution between December 2020 to August 2022 were enrolled. Patient data was collected from attending, general surgery and other departments outdoorpatient department, casualty and inpatient departments, irrespective of gender background socioeconomic status.

Results: Maximum numbers of cases were seen with a mean age of 40.14 ± 18.62 years. Males were affected more than females. Most common site of infection among the patients included in our study was lower extremities. 101 patients required surgical intervention of which debridement was the most commonly done for skin and soft tissue infections. 97 patients survived with a mortality rate of 4.9%.

Conclusion: The outcome of patients included in our study depended on site of infection, presence of anaemia, systemic comorbidities, and offending pathogen determined by culture. The diagnosis of SSTIs is clinical, which is often pattern recognition. Treatment decisions are based on these

factors but subject to revision if the patient does not appear to be on the path towards convalescence.

Key words: SSTIs, cellulitis, signs of inflammation, abscesses.

I. INTRODUCTION:

Skin and soft tissue infections (SSTIs) result from a compromise of the skin's defences and microbial invasion and resulting interactions. SSTIs occur as a result of infection by bacteria, fungi, viruses or parasites. Approximately 75% of SSTI cases are treated in OPD itself. Due to the self-limiting character of mild infections, many patients don't seek formal medical care. SSTIs are commonly encountered in Emergency Department. Approximately 59% of infections are caused by MRSA and 11.5–60% of patients having to be admitted to the hospital for an expensive multi day admission. 1

Usually, aerobic Gram-positive cocci are normal commensals, but Gramnegative species are encountered below the waist as commensals. Anaerobic bacterial infections occur with impaired immune function, recent antibiotic use, and long-standing skin ulcers. 2

The most common cause of SSTIs involving the healthy skin are aerobic Grampositive cocci especially *Staphylococcus aureus* and streptococcal species. 75% cellulitis are caused by Beta-hemolytic streptococci. *Staphylococcus aureus* causes purulent infections like abscesses. SSTIs can be monomicrobial or polymicrobial. 3

SSTIs can alternatively be classified based on anatomic tissue layers involved. Cellulitis involves dermis and subcutaneous tissue, necrotizing infections involve deep fascia, dermis, or the muscle. SSTIs can also be classified according to the presence or absence of suppuration. 4

SSTIs are associated with signs of inflammation and loss of function in addition to other local and systemic signs. Presence of erythema alone points to localised mild infection. Presence of fever, hypotension, or tachycardia point to a more severe infection. *Staphylococcal*



toxic shock syndrome (TTS), appears superficial, but is associated with signs of shock. therefore, the complete patient profile is necessary for assessing severity.⁵

Plain radiographs usually have limited utility in the diagnosis and treatment of SSTIs. Ultrasound might be useful in evaluation of fascial inflammation, and abscesses. MRI and CT also image fascial planes, but usually don't impact outpatient management. However, obtaining a basic metabolic profile, complete blood count, and C-reactive protein is useful in cases of patients being transferred to a higher centre. Blood cultures are also less useful, unless risk factors are present. Cultures are of greater importance in hospitalized patients and in febrile patients with or without an underlying disease.

Antimicrobials are usually started before confirmation of a specific etiology. Thus, the appropriate regimen selection is mostly empirical, depending on the severity and location of infection. The general consensus recommends the use of oral antibiotics for mild infections and parenteral antibiotics for severe infections.⁶ SSTIs in immunocompromised individuals come with multiple other etiologies like bacterial, viral, fungal, parasitic or autoimmune causes. A biopsy may be helpful.⁷

AIMS AND OBJECTIVES:

1. To study the aetiology of skin and soft tissue infections.
2. To evaluate the role of various investigation modalities in patients with skin and soft tissue infections.
3. To evaluate management strategies in these patients

Materials and Methods: 102 patients with skin and soft tissue infections admitted to our institution between December 2020 to August 2022 were enrolled. Patient data was collected from attending, general surgery and other departments outdoor patient department, casualty and inpatient departments, irrespective of gender background socioeconomic status

INCLUSION CRITERIA

1. All patients willing to give consent and continue with treatment
2. All patients irrespective of age or gender clinically diagnosed with NSTI

EXCLUSION CRITERIA

1. Patient not giving consent for the study.
2. Patient not giving consent for the surgery.

3. Patients with osteomyelitis, malignant lesions of skin, ischaemia, venous ulcers and arterial ulcers.

II. RESULT:

The age of patients included in our study ranged from 1 to 92 years with a mean age of 40.14 ± 18.62 years. Our study population comprised of 83 males and 19 females. Most common site of infection among the patients included in our study was lower extremities. Among the patients included in our study 67 had erythema. 93 patients had swelling. 99 patients had pain. 44 patients had blisters. 36 patients had hemorrhagic bullae. 15 patients had crepitus. 87 patients had skin necrosis. 78 patients had pus discharge. 45 patients had fever. 58 patients had tachycardia. 34 patients had hypotension. 49 patients had tachypnoea. 63 patients had leucocytosis. 22 patients had anemia. 101 patients required surgical intervention. 97 patients survived with a mortality rate of 4.9%

Chi squared test was performed to see the association between outcome and age. It had a p value >0.05 and hence did not show any statistically significant association. Chi squared test was performed to see the association between outcome and site of infection. It had a p value 0.05 and hence did not show a statistically significant association. Chi squared test was performed to see the association between outcome and systemic manifestations. Chi squared test was performed to see the association between outcome and surgical intervention. It had a p value >0.05 and hence did not show a statistically significant association. Chi squared test was performed to see the association between outcome and wound culture. It had a p value <0.05 and hence showed a statistically significant association. Chi squared test was performed to see the association between outcome and site of infection. It had a p value <0.05 and hence showed a statistically significant association.

The findings of our study were similar to the study by **Christina M. Herbosa BA et al** of the Division of Dermatology, Washington University School of Medicine, St. Louis, MO, United States. Our results were also in alignment with the review of epidemiology, pathogenesis, diagnosis, treatment and site of care of SSTIs by **V Ki, C Rotstein** published in *A. Can J Infect Dis Med Microbiol* 2008. It stated that SSTIs involve microbial invasion of the skin and underlying soft tissues. They have variable presentations, etiologies and severities. Approximately 7% to 10% of hospitalized patients are affected by SSTIs, and they are very common in the emergency care



setting. The skin has an extremely diverse ecology of organisms that may produce infection. The clinical manifestations of SSTIs are the culmination of a two-step process involving invasion and the interaction of bacteria with host defences.

The cardinal signs of SSTIs involve the features of inflammatory response, with other manifestations such as fever, rapid progression of lesions and bullae. The diagnosis of SSTIs is difficult because they may commonly masquerade as other clinical syndromes. To improve the management of SSTIs, the development of a severity stratification approach to determine site of care and appropriate empirical treatment is advantageous. The selection of antimicrobial therapy is predicated on knowledge of the potential pathogens, the instrument of entry, disease severity and clinical complications. For uncomplicated mild to moderate infections, the oral route suffices, whereas for complicated severe infections, intravenous administration of antibiotics is warranted. Recognition of the potential for resistant pathogens causing SSTIs can assist in guiding appropriate selection of antibiotic therapy. 10

There were similar results in the study by **Larissa May MD et al**, 145 patients were enrolled. Most SSTIs were single (80.4% abscesses), most commonly on the extremities (29.8%). Both I & D and antibiotics were used 79.9% of the time, with the largest predictor for the addition of antibiotics being erythema more than 2 cm (odds ratio, 4.52; 95% confidence interval, 1.39-14.7); I & D technique varied by provider-type and experience. Providers suspected MRSA in 75% of cases, despite only 48% demonstrating MRSA on culture. Many patients received antimicrobials after I & D, even in those with 2 cm or less abscesses (57.5%). Practice patterns vary significantly, especially antibiotic overuse, at least in this urban academic ED. Further study should be undertaken to evaluate factors that influence management strategies for SSTI. 11

Similar results were also observed by **B. A. Lipsky et al** in their paper —Skin and soft tissue infections in hospitalised patients with diabetes: culture isolates and risk factors associated with mortality, length of stay and cost.

III. CONCLUSION:

Skin and soft tissue infections were commonly encountered in the outpatient setting and in the emergency setting and varied greatly on a case-to-case basis with regards to their etiology, risk factors, clinical presentation, severity, sensitivity or resistance of the offending agent, and the requisite of appropriate conservative or surgical

intervention. A diagnosis of SSTI was aided by the presence of local symptoms and signs such as redness, edema, increase in local temperature, and presence of tenderness or pain. There were instances of resultant dysfunction of the part affected by SSTI like hands and legs depending on the severity and spread of infection. Presence of comorbidities like diabetes mellitus, HIV infection, immunosuppressed state resulted in more severe presentation.

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