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Original Research Article

A Clinical Study of Assessment of the Various Risk Factors and Outcome of Two Different Management Methods of Lower Limb Cellulitis

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Abstract:

Aim: The present study aimed at determining the incidence of cellulitis of lower limbs, demographic and clinical risk factors, clinical course and complications of the patients which helps healthcare professionals in better understanding of the condition and plan preventive treatment.

Methods: The present prospective, observational, clinical study included 150 patients who were admitted to the department of general surgery, Jawaharlal Nehru medical college and hospital, Bhagalpur, Bihar, India, with lower limb cellulitis either unilateral or bilateral for a period of eight months.

Results: One hundred fifty patients with cellulitis consisting 90 males and 60 females were included in the study. The age of the patients was between 20 years to 85 years and the average age of incidence was 54.61 years. The incidence of cellulitis is high among males (60%) than to females (40%). Unilateral limb is involved in 95% of the patients while bilateral involvement is seen in 5% of patients.

Conclusion: TRAUMA is the most common cause of lower limb cellulitis in nondiabetics, young adults of 18-40 years of age are most commonly affected which can be due to trauma at work place or transit. Most of these patients are managed very well conservatively successfully. Surgical intervention if needed is also uneventful if no other comorbidities are associated.

Keywords: Cellulitis, Lower Limb, Sepsis

Introduction

Cellulitis is simply defined as an acute infection of the skin involving the dermis and subcutaneous tissues. Erysipelas classically refers to a more superficial cellulitis of the face or extremities with lymphatic involvement, classically due to streptococcal infection.

Cellulitis (sel-u-LIE-tis) is a common, potentially serious bacterial skin infection. The affected skin appears swollen and red

and is typically painful and warm to the touch. [1] Cellulitis usually affects the skin on the lower legs, but it can occur in the face, arms and other areas. [4] It occurs when a crack or break in the skin allows bacteria to enter. [3] Left untreated, the infection can spread to lymph nodes and bloodstream and rapidly become life-threatening. It isn't usually spread from person to person. The common symptoms and signs with which the patient presents are erythema, swelling, pain, fever, blisters, local part warmth and tenderness. Common underlying etiology is the bacterial infection, most commonly streptococcus and staphylococcus, which enter through a crack or break in the skin. [2]

More often, diabetic patients are susceptible population for developing cellulitis due to underlying vasculopathy, neuropathy and hyperglycemia [5], but there is a section of non-diabetic population which is prone to develop cellulitis due to various other etiological factors. [6]

Lower limb cellulitis more often requires emergency admission and hospitalization especially of the patients with comorbodities and elderly patients. Though the lower limb infection is rarely fatal and shows better recovery with timely and precise treatment with antibiotics, delay in treatment could lead to life threatening complications such as necrotizing fasciitis, septic shock and even death in extreme cases. [7-9] Treatment of these infections has also become more difficult in the last decade due to the emergence and rapid spread of antibiotic resistant microorganisms.

The classic presentation of rubor (redness), dolor (pain), tumor (swelling), calor (heat) are the hallmarks of cellulitis. The spectrum of severity ranges from localised erythema in a systemically well patient to the rapidly spreading erythema and fulminant sepsis seen with necrotising fasciitis. Pain out of proportion to the clinical signs, in particular, if accompanied by a history of rapid progression should prompt consideration of a necrotising fasciitis. [10]

The present study aimed at determining the incidence of cellulitis of lower limbs, demographic and clinical risk factors, clinical course and complications of the patients which helps healthcare professionals in better understanding of the condition and plan preventive treatment.

Methods

The present prospective, observational, clinical study included 150 patients who were admitted to the department of general surgery, Jawaharlal Nehru medical college and hospital, Bhagalpur, Bihar, India, with lower limb cellulitis either unilateral or bilateral for a period of eight months

We had used graph pad software for calculation of results. The study was approved by institutional ethics committee and informed consent was obtained from all the recruited patients.

Inclusion criteria

Patients admitted to department of general surgery with cellulitis of lower limbs, either unilateral or bilateral irrespective of etiology were included in the study.

Exclusion criteria

Patients who were not willing for admission and patients who received treatment on an outpatient department (OPD) basis; patients with cellulitis in other areas of the body other than lower limbs; patients suffering from Hansen's disease; patients who presented with necrotizing fasciitis or deep-seated infections, with ulcers over the lower limbs; and children/young adults less than 18 years of age were excluded.

Data collection

Details of demographic data, underlying diseases, clinical features, microbiological data, antibiotic treatment, and medical outcomes were taken in a structured

questionnaire and by thorough physical examination.

The patients who were recruited were first managed with the conservative treatment, and when there was no response to conservative management, patients were treated with surgery in the form of subcutaneous release incisions. Fasciotomy with debridement was done for patients who progressed to necrotizing fasciitis.

Indications for surgery, pre-operative work up, operative details, findings, procedure done and post-operative progress were noted. Patients were monitored through the entire period of stay in the hospital and complications, if any, were treated appropriately. After discharge, follow up of the patients was done till full resolution of cellulitis.

Result

Table 1: Demographic data of patients

Demographics	**N=150**
Sex	
Male	90
Female	60
Risk factors	
Trauma	80
Toe web infection	40
Venous insufficiency	15
Diabetesß	10
Chronic lymphoedema	5
Groups of management	
Conservative	75
Surgery	75
Final outcomes in two groups of management	
Good	140
Poor-skin grafting	8
Grafting	2

One hundred fifty patients with cellulitis consisting 90 males and 60 females were included in the study. The age of the patients was between 20 years to 85 years and the average age of incidence was 54.61 years. The incidence of cellulitis is high among males (60%) than to females (40%). Unilateral limb is involved in 95% of the patients while bilateral involvement is seen in 5% of patients.

Table 2: Bacteriology

Bacteriology	
No growth	50
Pus sent for culture	80
Growth	20
Citrobacter	2
Coag -ve staph	4
Coag +ve staph	5
E. coli	3
Klebsiella	4
Peudomonas	2

Table 2 displays the bacteriology of the patients. A total of 80 cases were suspected to have bacterial growth and sent for microbial examination. Only 20 cases were found to have positive growth to different forms of bacteria and remaining 60 cases were negative.

Table 3: Comparison of risk factors in two groups of management

Risk factors	Conservative (n=75) %	Surgical (n=75) %	P value
Trauma	32 (42.66)	48 (64)	0.001
Toe web infection	25 (33.33)	15 (20)	<0.001
Venous insufficiency	8 (10.66)	7 (9.33)	0.205
Diabetics	8 (10.66)	5 (6.66)	0.450
Chronic lymphoedema	2 (6.66)	0	1.000

Among the recruited 150 patients, 50% were given conservative treatment and other 50% were underwent surgical intervention to resolve cellulitis.

Table 4: Comparison of hospital stay in two groups of management

Duration of hospital stays	Conservative (n=75) %	Surgical (n=75) %
Min-max	4-10	4–28 days
Mean±SD	4 .80±1.90	10.25±5.80

Table 4 confers patients with conservative treatment received 4-10 days of hospital stay when compared to patients with surgical intervention who received 4-28 days of hospital stay.

Discussion

Cellulitis is a superficial, diffuse, spreading bacterial infection involving dermis and the subcutaneous layer, which occurs when the physical skin barrier, the immune system and/or the circulatory system are impaired. Assessment of baseline liver and renal function may be useful for assessing end-organ dysfunction in patients with sepsis and for dosing of antimicrobials. Cultures of blood, aspirates or biopsies are not recommended but should be considered in patients who have systemic features of sepsis, who are immunosuppressed or for cases associated with immersion injuries or animal bites. [11]

In a study of Dupuy et al 167 lower limbs cellulitis patients were studied of which 52% were males and 48% were females and showed the risk factors as disruption of the cutaneous barrier, venous insufficiency, obesity and trauma which was similar to the present study with 57% males and 43% females with the risk factors mentioned earlier and also no significance of the side involvement and diabetes was found for lower limbs. [12]

A total of 60 cases were suspected to have bacterial growth and sent for microbial examination. Organisms isolated in the positive growths are Klebsiella, coagulase positive Staphylococci, coagulase negative Staphylococci, Pseudomonas, E. coli and Citrobacter. Only 20 cases were found to have positive growth to different forms of bacteria and remaining 40 cases were negative. A study was conducted by Carratala et al including 332 adult cellulitis hospitalized patients and found 39% cases with S. aureus and S. pyogenes pathogens. [13]

The present study observed relatively lesser days of hospital stay in conservative treatment of cellulitis than surgical interventions which resembled the Halpen case control study of 150 patients where the mean duration of hospital stay was 10 days. [14] The major complication noticed in the present study was cellulitis progressing to necrotizing fasciitis. Out of 100 patients, 15% were progressed to necrotizing fasciitis and remaining 85% is confined to subcutaneous tissue without

fascial involvement. [15] The rate of mortality was 3% and was attributed to elderly age, renal failure and sepsis.

Conclusion

TRAUMA is the most common cause of lower limb cellulitis in nondiabetics, young adults of 18-40 years of age are most commonly affected which can be due to trauma at work place or transit. Most of these patients are managed very well conservatively successfully. Surgical intervention if needed is also uneventful if no other comorbidities are associated. Hospital stays in cellulitis harness the years of healthy life leading to a reduction in income, aggravation of poverty levels and reduction in socioeconomic development of an individual. Proper understanding of the risk factors and factors associated with the complications of lower limb cellulitis will help healthcare professionals in implementing preventive strategies and consequently curb both the financial and health burden associated with the disease.

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