



General Surgery

A STUDY OF RISK FACTORS AND COMPLICATIONS OF LIMB CELLULITIS IN RURAL MEDICAL COLLEGE, MAHABUBNAGAR, TELANGANA STATE

Dr. Jeevan Kenche

Associate Professor, Department Of Surgery, Government Medical College, Mahabubnagar, Telangana State

Dr. E. Chandrashekar Reddy*

Associate professor, Department of Surgery, Government Medical College, Mahabubnagar, Telangana State *Corresponding Author

ABSTRACT

Cellulitis is a common infection of the skin and subcutaneous tissues. It is associated with significant morbidity. The identification of risk factors and complications can help to reduce the morbidity, mortality, financial burden and to improve the management.

AIM: To study the risk factors and complications of lower limb cellulitis inpatients at rural medical college, Mahabubnagar, Telangana State.

METHODS: We conducted a prospective study on 50 patients with cellulitis in either limb, who were admitted in surgical wards, medical wards, surgical and medical intensive care units of Government general hospital/ Government Medical college, Mahabubnagar, Telangana state, between period of April 2018 to September 2018. Detailed history and clinical examination of all patients were noted. Relevant investigations were done and were appropriately managed. They were managed conservatively or surgically depending on severity and followed up till complete recovery or 30 days after discharge whichever was earlier.

RESULTS: The present study had 50 patients with male to female ratio of 2.8:1. Males were affected more than females. Most common age group affected was 51-60 years (16 patients, 32%) range between 24 to 80 years. Out of 50 patients 36 patients (72%) had lower limb involvement and 14 patients (28%) had upper limb involvement. In lower limb, leg was affected in 38 patients (76%) whereas foot was involved in 12 patients (14%). All patients had swelling, redness and pain as presenting features whereas fever was present in 35 patients (70%). Most cultures from the local site (28 patients, 56%) had negative growth. Most common organism grown was E. coli. Most common risk factor was bare foot walking as seen in 35 patients (70%) patients followed by alcohol intake and smoking (30 patients each, 60%), diabetes (15, 30%), hypertension (13, 26%), direct trauma (10, 20%). Local complications including compartment syndrome (6 patients, 12%) and necrotizing fasciitis (4 patients, 8%) were seen in 10 patients (20%). Systemic complication of multiple organ dysfunction syndromes was seen in 4 patients (8%) patients.

CONCLUSION: Creating awareness among the rural population regarding the entity of cellulitis, risk factors associated with it especially walking bare foot, alcohol, smoking and diabetes mellitus and the need for early recognition and treatment to prevent serious complications is an important aspect to be followed.

KEYWORDS : cellulitis, risk factors of cellulitis, complications of cellulitis

INTRODUCTION

Cellulitis is a common infection of the skin and soft tissues. It is an acute inflammation of the skin that is characterized by local pain, erythema, swelling and heat of the affected area and/or systemic signs like malaise, fever, nausea or vomiting.

It can be caused by indigenous flora colonizing the skin and appendages (eg., *S. aureus* and *S. Pyogenes*) or by a wide variety of exogenous bacteria^{1,2}.

Cellulitis is a common infection skin and soft-tissue infection caused most often by *Streptococci*.^{1,2} It is characterized by inflammatory signs such as pain, swelling, redness and warmth of the affected area and/or systemic signs like malaise, fever, nausea or vomiting.^{1,3, 4} Cellulitis affects the lower limbs in 88% of cases.^{5,6}

Differential diagnosis of cellulitis includes lower leg edema, hematoma, necrotizing fasciitis, lymphedema, deep venous thrombosis, compartment syndrome, pyodermagangrenosum and pretibial myxoedema (Cox et al).⁷

Cellulitis is a clinical diagnosis but may require investigations to know the severity as in leucocytosis, raised CRP levels, ASO titres in suspected Streptococcal infections, X-ray to rule out gas gangrene or underlying osteomyelitis (Trubo R) or necrotizing fasciitis.⁸

Color Doppler is done to rule out DVT/ Venous insufficiency. Swab cultures are done to isolate the causative organism and blood cultures to know if bacteraemia is present.

Lower limb cellulitis is rarely fatal and usually responds well to proper antibiotherapy.⁹ Nevertheless, a delay in its diagnosis and appropriate treatment could lead to life-threatening and debilitating complications, including necrotizing hypodermatitis, necrotizing fasciitis, abscess formation, lymphangitis, lymphadenitis, shock, acute

glomerulonephritis and renal failure, acute respiratory distress syndrome, sub-acute bacterial endocarditis and, septic shock and even death in extreme cases.^{10,11,12}

Most cellulitis heals completely however in patients of venous insufficiency, lymphedema, diabetes mellitus, immunocompromised patients can have recurrences.

Cellulitis is associated with a prolonged hospital stay, considerable increase in the mortality rate and years of healthy life lost.^{13,14}

All this cumulate to a reduction in income, aggravation of poverty levels and reduction in economic productivity, hindering socioeconomic development and achievement of the sustainable development goals¹⁵

The risk factors of lower limb cellulitis are multiple, and can be grouped into general and local risk factors. General risk factors include obesity, diabetes, history of cellulitis, immunosuppression, chronic alcoholism and chronic use of non-steroidal anti-inflammatory drugs (NSAIDs), while disruption of the skin barrier, neglected wounds, toe-web intertrigo, leg ulcers, use of pigmentation drugs and leg oedema, were the most commonly reported local risk factors.^{16,17}

Proper understanding of the risk factors and factors associated with the complications of lower limb cellulitis in our rural medical college/ general hospital will help in implementing preventive strategies, and consequently curb both the financial and health burden associated with the disease.

METHODOLOGY

This was a prospective, hospital based, observational study carried out at Government Medical College (GMC/GGH), Mahabubnagar, Telangana state, between period of April 2018 to September 2018.

The study population consisted of patients aged >14 years who were hospitalized in surgical and medical wards because of acute cellulitis on upper or lower limbs. Inclusion criteria for patients were as follows: 1) presence of cellulitis, defined as a demarcated cutaneous inflammation that was associated with fever, chills or leukocytosis.

Exclusion criteria as follows: 1) hospitalization within the 4 weeks preceding the present admission. 2) Age less than 14 years. 3) Patients discharged within 3 days of admission and OP cases.

Detailed history was taken in all patients and the physical examination findings were noted. Laboratory investigations were carried out (complete blood count, liver and renal function test). Swab and blood cultures were sent for culture and antibiotic sensitivity. Additional investigations included X-ray and color doppler when indicated.

Patients were managed conservatively with glycerin magnesium-sulfate dressing and empirical intravenous antibiotics (inj Cefotaxime/ inj Gentamycin/ inj Metronidazole/ inj Amikacin) initially and then as per culture sensitivities or with surgical debridement with or without skin grafting and IV antibiotics. All patients were monitored for response to treatment and resolution of cellulitis.

RESULTS

A total of 50 patients with cellulitis were admitted to wards during the period studied. There were 37 male and 13 female patients with male to female ratio of 2.8:1. Males were affected more than females.

Age group (years)	No. of patients	Percentage
14- 20	Nil	Nil
21-30	4	8%
31-40	6	12%
41-50	5	10%
51-60	16	32%
61-70	14	28%
>70	5	10%

As shown in Table 1 most common age group affected was 51-60 years (16 patients, 32%) followed by 61-70 years (14 patients, 28%) with an age range between 24 to 80 years.

Out of 50 patients 36 patients (72%) had lower limb involvement and 14 patients (28%) had upper limb involvement. Right lower limb was most commonly involved (18 patients, 36%) followed by left lower limb (14 patients, 28%), right upper limb and left upper limb (7 patients each, 14% each). Bilateral lower limbs were involved in 4 patients (8%).

In lower limb, leg was affected in 38 patients (76%) whereas foot was involved in 12 patients (14%).

All patients had swelling, redness and pain as presenting features whereas fever was present 35 patients (70%). Less common features were discharge (15 patients, 30%), color change (12 patients, 24%), nausea (10 patients, 20%), malaise (10 patients, 20%) and vomiting in 4 patients (8%).

Most cultures from the local site (28 patients, 56%) had negative growth. Most common organism grown was *E. coli*.

Risk factor	No. of patients	Percentage of patients
Walking barefoot	35	70%
Alcohol intake	30	60%
Smoking	30	60%
Diabetes	15	30%
Hypertension	13	26%
Direct trauma	10	20%
dermatitis	4	8%
Snake bite	2	4%
Insect bite	1	2%
Venous insufficiency	1	2%

Most common risk factor was bare foot walking as seen in 35 patients (70%) patients followed by alcohol intake and smoking (30 patients each, 60%), diabetes (15, 30%), hypertension (13, 26%), direct trauma (10, 20%), dermatitis (4, 8%), snake bite in (2, 4%), insect bite (1, 2%) and venous insufficiency (1, 2%) depicted in Table 2.

Follow up status	No. of patients	Percentage of patients
Complete recovery	40	80%
Compartment syndrome	6	12%
Necrotizing fasciitis	4	8%
Acute respiratory distress syndrome	2	4%
Acute renal failure	2	4%
expired	2	4%

Local complications including compartment syndrome (6 patients, 12%) and necrotizing fasciitis (4 patients, 8%) were seen in 10 patients (20%). 40 (80%) patients had no local complications. Systemic complication of multiple organ dysfunction syndromes (acute renal failure and/or acute respiratory distress syndrome) was seen in 4 patients (8%) patients. Of these 4 patients, 2 (4%) patients succumbed to disease.

DISCUSSION

This study consisted of 50 patients of limb cellulitis admitted and managed at government general hospital/ government medical college, Mahabubnagar, Telangana state, between April 2018 to September 2018.

The cellulitis was more common in males (M:F ratio of 2.8:1) in the present study similar to studies by Swathi G. Deshpande et al¹⁸, (M:F=2.25:1), D S Chakravarthy et al¹⁹, (M:F=3.4:1)

Most common age group affected was 51-60 years (16 patients, 32%) followed by 61-70 years (14 patients, 28%) with an age range between 24 to 80 years comparable with studies by Swathi G. Deshpande et al¹⁸, D S Chakravarthy et al¹⁹, and Tsi Njim et al²⁰.

Out of 50 patients 36 patients (72%) had lower limb involvement and 14 patients (28%) had upper limb involvement. Right lower limb was most commonly involved (18 patients, 36%) followed by left lower limb (14 patients, 28%), right upper limb and left upper limb (7 patients each, 14% each). Bilateral lower limbs were involved in 4 patients (8%). In lower limb, leg was affected in 38 patients (76%) whereas foot was involved in 12 patients (14%). These findings were similar to the studies by Swathi G. Deshpande et al¹⁸, D S Chakravarthy et al¹⁹.

The presenting clinical features and the cultures reports were similar to the other studies.

Most common risk factor was bare foot walking as seen in 35 patients (70%) patients followed by alcohol intake and smoking (30 patients each, 60%), diabetes (15, 30%), hypertension (13, 26%), direct trauma (10, 20%), dermatitis (4, 8%), snake bite in (2, 4%), insect bite (1, 2%) and venous insufficiency (1, 2%).

As this study was from a rural background barefoot walking was the most common risk factor as majority are farmers, alcohol intake and smoking were common may because the poor socioeconomic status and lower level of education among the patients attending our rural hospital. It is worth mentioning that most of diabetic neuropathic foot ulcer patients in developing countries like ours are illiterate with little awareness and almost no diabetic education.²¹

The above findings were consistent with other studies by Swathi G. Deshpande et al., Tsi Njim et al., Morris A et al²², and Goettsch et al²³. Local complications including compartment syndrome (6 patients, 12%) and necrotizing fasciitis (4 patients, 8%) were seen in 10 patients (20%). Systemic complication of multiple organ dysfunction syndromes was seen in 4 patients (8%) patients and 2 (4%) patients succumbed to disease.

These findings were consistent with the study by Swathi G. Deshpande et al¹⁸.

CONCLUSION

The occurrence of limb cellulitis was common. The importance wearing foot ware among farmers needs to be emphasized among rural patients as it was the major risk factor. There is also need for the education among people regarding the consequences of alcohol intake, smoking and appropriate management of diabetes and hypertension. By creating awareness among rural patients probably we can reduce

the occurrence of cellulitis and also can treat the cellulitis at an early stage to prevent major complications.

REFERENCES

1. Dennis L. Stevens, Infection of the skin, Muscles and Soft tissues, Harrison's principles of internal medicine, page No. 827-833, Vol. 2, 19th Edition
2. Bisno AL, Stevens DL. Streptococcal infections of skin and soft tissues. *N Engl J Med* 1996;334:240-5.
3. Bonnetblanc JM, Bédane C. Erysipelas: recognition and management. *Am J Clin Dermatol* 2003;4:157-63.
4. Phoenix G, Das S, Joshi M. Diagnosis and management of cellulitis. *BMJ* 2012;345:e4955. *BMJ Open*: first published as 10.1136/bmjopen-2017-021175 on 23 July 2018. Downloaded from <http://bmjopen.bmj.com/> on 25 October 2018 by guest. Protected by copyright.
5. Crickx B, Chevron F, Sigal-Nahum M, et al. [Erysipelas: epidemiological, clinical and therapeutic data (111 cases)]. *Ann Dermatol Venerol* 1991;118:11-16.
6. Bernard P, Chosidow O, Vaillant L; French Erysipelas Study Group. Oral pristinamycin versus standard penicillin regimen to treat erysipelas in adults: randomised, non-inferiority, open trial. *BMJ* 2002;325:864.
7. Cox NH. Management of lower leg cellulitis. *Clin Med*. 2002;2(1):23-7
8. Trubo R, Bisno AL, Hacker SM, Roaten SP. Today's strategies for bacterial skin infections. *Patient Care*. 1997;31:78-94.
9. Bernard P, Chosidow O, Vaillant L; French Erysipelas Study Group. Oral pristinamycin versus standard penicillin regimen to treat erysipelas in adults: randomised, non-inferiority, open trial. *BMJ* 2002;325:864.
10. Chartier C, Grosshans E. Erysipelas. *Int J Dermatol* 1990;29:459-67.
11. Jorup-Rönström C. Epidemiological, bacteriological and complicating features of erysipelas. *Scand J Infect Dis* 1986;18:519-24.
12. Krasagakis K, Samonis G, Valachis A, et al. Local complications of erysipelas: a study of associated risk factors. *Clin Exp Dermatol* 2011;36:351-4.
13. Africa CIS; Pages. <http://global-disease-burden.healthgrove.com/1/82932/Cellulitis-in-South-Africa>
14. Kassebaum NJ, Arora M, Barber RM, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet* 2016;388:1603-58.
15. Transforming our world: the 2030 Agenda for Sustainable Development. Sustainable Development Knowledge Platform. <https://sustainabledevelopment.un.org/post2015/>
16. Björnsdóttir S, Gottfredsson M, Thórisdóttir AS, et al. Risk factors for acute cellulitis of the lower limb: a prospective case-control study. *Clin Infect Dis* 2005;41:1416-22.
17. Dupuy A, Benchikhi H, Roujeau JC, et al. Risk factors for erysipelas of the leg (cellulitis): case-control study. *BMJ* 1999;318:1591-4.
18. Swati G, Deshpande, Ankur Grover et al., Limb cellulitis in rural setting in India: a case control study. *International Surgery Journal Int Surg J*. 2017 Aug;4(8):2751-2755
19. Didde Sundara Chakravarthy, Kiran Kumar Gandeti et al., Prospective study on sociodynamics of cellulitis in general surgical unit. *International Journal of Research in Medical Sciences Int J Res Med Sci*. 2015 May;3(5):1052-1055
20. Tsi Njim, Leopold Ndemnge Aminde et al., Risk factors of lower limb cellulitis in a level two healthcare facility in Cameroon: a case-control study. *BMC Infect Dis*. 2017;17:418
21. Chandalia HB, Das AK. Detection of the diabetic foot at risk on diabetes 1988. Larkins RG, Zimmet PZ, Chisholm DJ, eds. *Excerpta Medica*. Amsterdam: ICS 800; 1989:1057-1062.
22. Morris A. Cellulitis and erysipelas. *Clin Evid*. 2003;9:1804-9.
23. Goettsch WG, Bouwes Bavinck JN, Herings RM. Burden of illness of bacterial cellulitis and erysipelas of the leg in the Netherlands. *J Eur Acad Dermatol Venerol*. 200;20(7):834-9.