

The clinico-demographic and etiologic profile of lower limb cellulitis in non-diabetics: a hospital based study

Rajnish Kumar^{1*}, Prem Prakash², Nameer Faiz³

¹Senior Resident, Department of General surgery, IGIMS, Patna, Bihar, India

²Associate Professor, Department of General surgery, IGIMS, Patna, Bihar, India

³Senior Resident, Department of General surgery, IGIMS, Patna, Bihar, India

Received: 14-05-2020 / Revised: 20-06-2020 / Accepted: 20-07-2020

Abstract

Aim: studied the clinico-demographic-etiological profile of lower limb cellulitis in non-diabetics. **Materials and Methods:** This prospective study was conducted among 41 non-diabetic patients with lower limb cellulitis attended the Department of General Surgery of IGIMS, Patna, Bihar from January 2015 to Dec 2015. The severity of cellulitis was graded as per the CREST guidelines. **Results:** Mean age of the study population was 45.01 years. Cellulitis was more common in females (53.6%) and old age group. It was more unilateral (70.7%) and resulted more from post bite wounds (39.0%). 43.9% of the patients required wound debridement alone followed by of them wound debridement with fasciotomy (21.9%), while (4.7%) of patients required amputation. **Conclusions:** Non-diabetic elderly patients are at higher risk of development of cellulites. Recognition of cellulites in early stages can minimize hospital admission and expenditure.

Keywords: Cellulitis, Lower limb, Non-diabetic

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

Introduction

Cellulitis is defined as the non-necrotising cutaneous inflammatory condition also involving the subcutaneous tissue, manifests with erythema, warmth, pain and swelling, the process actually related to the acute infection[1]. In classical considerations, it is the inflammatory process without the formation of abscess or purulent discharge, or involvement of the underlying muscle, fascia or bones. But the recent texts define cellulitis along with its overlapping complications like frank abscess formation, ulcerations, involvement of the underlying fascia and the muscles[2]. Lower limbs are the most commonly involved sites as the skin over there is much susceptible to the injuries mentioned[3]. As commonly known, diabetics are the most susceptible population for the lower limb cellulitis

primarily because of the fact they have more incidence of foot ulcers (due to the neuropathy and vasculopathy which ensues in the form of sensory loss and poor distal circulation) and also because they are immunocompromised[4]. Poor glycemic control aids the growth of organisms in the ulcers which develop and eventually results up in cellulitis. Yet, there is a significant section of the population who are nondiabetics and also more prone to the development of lower limb cellulitis and its complications[5]. Early cellulitis in the Non-diabetics can be managed in out-patient unit with oral antibiotics, analgesics and treating the primary cause. But cellulitis of higher grades, with its complications like blisters, myositis, and fasciitis needs hospital admission, parenteral antibiotics, and surgical management[6]. Cellulitis is more common in patients with Diabetes and its co-morbidities. But many non-diabetics have lower limb cellulitis that has a better prognosis than diabetic patients. But this group is often overlooked and studies on cellulitis are sparse in the Indian setup. This study was instigated to find out the clinico-demographic and etiologic profile of lower limb cellulitis in non-diabetics.

*Correspondence

Dr. Rajnish Kumar

Senior Resident, Department of General surgery,
IGIMS, Patna, Bihar, India

Materials and methods

Study Design -This prospective study was conducted among 41 non-diabetic patients with lower limb cellulitis attended the Department of General Surgery of IGIMS, Patna, Bihar from January 2015 to December 2015. The severity of cellulitis was graded as per the CREST guidelines.

Ethical approval and Informed consent -The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance. After explaining the purpose and details of the study, a written informed consent was obtained.

Inclusion and exclusion criteria

- Patients who had completed 18 years

Results

Table 1: Demographic distribution of the study population

| Age | N | % |
|--------------|------------|--------------|
| <40 | 9 | 21.9 |
| 41-60 | 11 | 26.8 |
| >60 | 21 | 51.3 |
| Mean±SD | 45.01±2.38 | |
| Sex | | |
| Female | 22 | 53.6 |
| Male | 19 | 46.3 |
| Total | 41 | 100.0 |

Table 2: Distribution according to involvement of the limb in the study population

| Limb involvement | N | % |
|------------------|-----------|--------------|
| Unilateral | 29 | 70.7 |
| Bilateral | 12 | 29.3 |
| Total | 41 | 100.0 |

Table 3: Distribution of etiology of cellulitis in the study population

| Etiology | N | % |
|-------------------|-----------|------------|
| Post bite | 16 | 39.0 |
| Space infection | 12 | 29.3 |
| Traumatic ulcer | 8 | 19.5 |
| Unknown | 3 | 7.3 |
| Immunocompromised | 2 | 4.9 |
| Total | 41 | 100 |

Table 4: Distribution of management outcome in the study population

| Management | N | % |
|-----------------------------------|----|------|
| Conservative | 12 | 29.3 |
| Wound debridement | 18 | 43.9 |
| Wound debridement with fasciotomy | 9 | 21.9 |

- Those willing to give informed consent

Methodology

Patient demographics and general condition were recorded in the preformed questionnaire. All patients had relevant blood investigations along with the bacterial culture of the wounds. Doppler studies and X-rays were performed where necessary and patients were managed according to the severity. The severity of limb involvement was graded as per the CREST guidelines for cellulitis[7].

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 19 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages.

| | | |
|--------------|-----------|------------|
| Amputation | 2 | 4.9 |
| Total | 41 | 100 |

Discussion

Infectious cellulitis is a common disease seen by a variety of physicians in both outpatient and hospital practice[8,9]. Some patients with cellulitis require multiple hospital admissions because of the recurrent nature of this infection[10,11]. Cellulitis is thought to be associated with limited mortality. Nevertheless, this infection involves an increasing number of elderly and debilitated patients. Recent studies dealing with cellulitis have analyzed predisposing factors, causative pathogens, and the usefulness of microbiological investigations and diagnostic imaging methods[12-17]. However, comprehensive information regarding medical outcomes for patients hospitalized for this infection is lacking. In the present study most of the patients were in the elder age group which showed that as the age increases, the incidence of cellulitis increases. This result was similar to the result obtained in the study conducted by Rongey C et al[18] observed mean age of 48.8 years in the cellulitis group but lower than the mean age (66.7 years) obtained by Sigridur et al[19] It was also found that as the age of the patient increases, the severity of cellulitis also increases. In the present investigation females were more affected group 53.6% while males were more affected in the previous studies[18,19]. In the present study, we have observed that 70.7% of the patients had unilateral lower limb involvement and 29.3% of the patients had bilateral lower limb involvement, but according to the study conducted by Smith et al. he observed the incidence of bilateral lower limb involvement is extremely rare[20]. Cellulitis superimposed on lower limb resulting post-bite cellulitis followed by traumatic ulcers space infections constituted a considerable proportion of the present study. This is supported by the study by Roujeau et al who showed that onychomycosis and dermatophyte infection in the web space can be a risk factor for cellulitis[21]. Also, in about 3 patients the exact cause responsible for the cellulitis was unknown which shows that patients had a very trivial injury, or the organisms were not cultivable by routine aerobic cultures. It was observed that 43.9% of the patients required wound debridement alone followed by of them wound debridement with fasciotomy (21.9%), while (4.9%) of patients required amputation.

Conclusion

In the present study concluded that Non-diabetic elderly patients are at higher risk of development of cellulites for that they have to be motivated to take care

of their feet as the diabetic patients, as neglect of minor trauma or bites can lead to morbid illness necessitating major treatment like skin grafting. Recognition of cellulites in early stages can minimize hospital admission and expenditure.

References

1. Stevens DL, Bisno AL, Chambers HF, Everett ED, Dellinger P, Goldstein EJ, et al. Practice guidelines for the diagnosis and management of skin and soft-tissue infections. *Clin Infect Dis.* 2005;41(10):1373-406.
2. Clinical Research Efficiency support Team guidelines on the management of cellulitis in adults ISBN 1-903982-12-X.
3. Lazzarini L, Conti E, Tositti G, de Lalla F. Erysipelas and cellulitis: clinical and microbiological spectrum in an Italian tertiary care hospital. *J Infect.* 2005;51:383-9.
4. Dupuy A, Benchikhi H, Roujeau JC, Bernard P, Vaillant L, Chosidow O, et al. Risk factors for erysipelas of the leg (cellulitis): a case-control study. *BMJ.* 1999;318:1591-4.
5. Eriksson B, Jorup-Ro'nstrom C, Karkkonen K, Sjo`blom AC, Holm SE. Erysipelas: clinical and bacteriologic spectrum and serological aspects. *Clin Infect Dis.* 1996;23:1091-8.
6. Lipsky BA, Berendt AR, Deery HG. Diagnosis and treatment of diabetic foot infections. *Clin Infect Dis.* 2004;39(7):885-910.
7. Guidelines on the management of cellulitis in adults. Clinical Resource Efficiency Support Team (CREST) June 2005;2(3):560-5.
8. Bisno AL, Stevens DL. Streptococcal infections of skin and soft tissues. *N Engl J Med.* 1996; 334:240-245
9. Baddour LM. Cellulitis syndromes: an update. *Int J Antimicrob Agents.* 2000; 14:113-116
10. Baddour LM, Bisno AL. Recurrent cellulitis after saphenous venectomy for coronary bypass surgery. *Ann Intern Med.* 1982; 97:493-496
11. Kremer M, Zuckerman R, Avraham Z, Raz R. Long-term antimicrobial therapy in the prevention of recurrent soft-tissue infections. *J Infect.* 1991; 22:37-40.
12. Dupuy A, Benchikhi H, Roujeau JC, Bernard P, Vaillant L, Chosidow O, Sassolas B, Guillaume JC, Grobb JJ, BastujiGarin S. Risk factors for

- erysipelas of the leg (cellulitis): case-control study. *BMJ*. 1999; 318:1591-594
13. Brewer VH, Hahn KA, Rohrbach BW, Bell JL, Baddour LM. Risk factor analysis for breast cellulitis complicating breast conservation therapy. *Clin Infect Dis*. 2000; 31:654-59
 14. Brook I, Frazier EH. Clinical features and aerobic and anaerobic microbiological characteristics of cellulitis. *Arch Surg*. 1995;130:786-92
 15. Semel JD, Goldin H. Association of athlete's foot with cellulitis of the lower extremities: diagnostic value of bacterial cultures of ipsilateral interdigital space samples. *Clin Infect Dis*. 1996;23:1162-1164
 16. Perl B, Gottehrer P, Raveh D, Schlesinger Y, Rudensky B, Yinnon AM. Cost-effectiveness of blood cultures for adult patients with cellulitis. *Clin Infect Dis*. 1999; 29:1483-88
 17. Schmid MR, Kossmann T, Duewell S. Differentiation of necrotizing fasciitis and cellulitis using MR imaging. 1998; *AJR Am J Roentgenol* 170:615-20.
 18. Rongey CA, Runyon B. Cellulitis in patients with cirrhosis and edema: an under-recognized complication more common than spontaneous bacterial peritonitis. *Am J Gastroenterol*. 2003;290- 4.
 19. Björnsdóttir S, Gottfredson M, Thórisdóttir AS. Risk factors for acute cellulitis of the lower limb: a prospective case-control study. *Clin Infect Dis*. 2005:1416-22.
 20. Smith SR, Reed JF. Prevalence of mixed infections in the diabetic pedal wound: a perspective based on a national audit. *Int J Lower Extremity Wounds*. 2002;1(2):125-8.
 21. Roujeau JC, Sigurgeirsson B, Korting HC, Kerl H, Paul C. Chronic dermatomycoses of the foot as risk factors for acute bacterial cellulitis of the leg: a case-control study. *Dermatol*. 2004;209:301-7.

Source of Support: Nil

Conflict of Interest: Nil