ORIGINAL RESEARCH PAPER

Surgery

CLINICAL STUDY ON CELLULITIS IN A TERTIARY CENTRE

KEY WORDS: Cellulitis, Grading, Treatment, Outcome.

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ABSTRACT

INTRODUCTION: Cellulitis is a non-suppurative, invasive infection caused by bacteria that is characterized by specifically affecting the dermis and subcutaneous fatty layer by normal skin flora or exogenous bacteria. The lower limbs are affected commonly following a breach due to cracks, breaks, blisters, surgical wounds, ulcers in the skin. Untreated conditions will lead to sequential changes causing severe morbidity and sometimes mortality.

AIM: To study the age and sex distribution, risk factors, treatment modalities of patients admitted as cellulitis cases in Department of General Surgery, Government Tirunelveli Medical College Hospital from August 2017 to February 2018.

RESULTS: In this study on 100 patients, 76 had lower limb cellulitis and 24 had upper limb cellulitis. Age group commonly affected was from 40 - 60 yrs of age. Most of the patients had Grade III cellulitis. Among the patients with risk factors of Diabetes mellitus, snake bites, the site of bite or the toes or the metatarsal below showed lytic changes, or destruction due to the gangrenous changes. It is observed that 75 patients in the study group required surgical debridement, 48 of them required decompression of the muscular compartment by means of a fasciotomy.

INTRODUCTION

Cellulitis is a non-suppurative, invasive infection caused by bacteria that is characterized by specifically affecting the dermis and subcutaneous fatty layer by a normal skin flora or an exogenous bacteria In contrast to cellulitis, erysipelas is a streptococcal bacterial infection of superficial layers of the skin is characterised by sharp demarcation, a palpable edge and salmon-red erythema and is accompanied by high fever. Although cellulitis can affect any part of the body, the most common sites involved are upper limb, lower limb and face. The lower limbs are affected commonly following a breach due to cracks, breaks, blisters, surgical wounds, ulcers in the skin. These breaks need not be visible. Group A Streptococcus and Staphylococcus are the normal flora of the skin, but normally will not cause any infection until the skin surface is intact. Other risk factors include diabetes, obesity, old age, immune compromised individuals, insect bite, animal bite, tattoos, injecting drugs (especially subcutaneous or intramuscular injection) and pregnancy. Diabetics are the most commonly prone for leg cellulitis mainly because of the poor blood sugar control, bare foot walking resulting in trauma and immune compromise. The microbial growth in the ulcers will cause cellulitis because of poor glycemic control status. Non diabetics, renal failure, congestive cardiac failure are also prone for the development of cellulitis and its complications. In Grade IV serious infections necrotizing fasciitisor underlying bone infection should be ruled out. Grade 1 cellulitis can be treated in out patient department with oral analgesics, oral antibiotics and treating the cause. But cellulitis of grade II, grade III, grade IV, presenting with systemic complications and various other comorbidities requires hospital stay, IV antibiotics and surgical management.

AIM OF THE STUDY

To study the age and sex distribution, risk factors, treatment modalities of patients admitted as cellulitis in Department of General Surgery, Government Tirunelveli Medical College Hospital from August 2017 to February 2018

MATERIALS AND METHODS

STUDY DESIGN: Cross sectional study

SOURCE OF DATA:

100 patients with Cellulitis admitted in surgical wards of Tirunelveli Medical College Hospital.

STUDY PERIOD:

August 2017 to February 2018

INCLUSION CRITERIA:

Patients with cellulitis of lower limb and upper limb aged above 12 years of age presenting with or without abscess and ulcers.

EXCLUSION CRITERIA:

Patients less than 12years of age.

METHODOLOGY

All the 100 patients presenting with features of cellulitis whose diagnosis were made by clinical findings admitted in the General Surgery wards of Tirunelveli Medical College Hospital after getting approval from Ethical Commitee. Details of the patient were noted by detailed history regarding the presenting illness, pain, reddening of the region, swelling of the local part, any ulcerations, blister/ bleb formation, history of any trauma, unknown bites including the comorbid conditions , smoking and alcoholic history.

In the clinical examination, general examination ,examination of the cardiac system, respiratory system, abdominal examination and central nervous system was also done. Careful assessment for complications like compartment syndrome, fasciitis, myositis, subcutaneous abscess, septicaemia.Duplex USG of the affected limb and X-ray of the affected limb was taken to rule out osteomyelitis. Treatment were started as soon as diagnosis is made by intravenous fluids, iv antibiotics and wound debridement. And bacteriological cause is identified by culture which is done for both aerobic and anaerobic bacteria. Following initial debridement the wound was inspected daily and surgical wound debridement done periodically and thorough wash given by povidone iodine, hydrogen peroxide, EUSOL bath and normal saline. Fasciotomy was done when there was a tension and swelling at the site of cellulitis and threat of

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compartment syndrome. The resultant raw area was managed with either delayed primary closure or are allowed to heal by the secondary intention. split thickness skin grafting.

RESULTS & OBSERVATION

1. AGE DISTRIBUTION

Out of 100 patients studied 64 patients were belonging to the age group of 41-60 and it is evident that the incidence of cellulitis increases as the age increases.In my study of 100 patients the incidence of cellulitis common among the male individuals and female with 15%. Out of 100 patients 76 patients had lower limb cellulitis and 24 patients upperlimb cellulitiscandidates presented in my study.

2. GRADE OF CELLULITIS:

Cellulitis has been graded based on CREST criteria.

Table : 1, Grades of cellulitis

Sl no	Grade	No of cases
1	II	24
2	III	67
3	IV	9

3. THE CAUSE OF CELLULITIS

The causes for the cellulitis in the study group such as diabetes mellitus, bites, infected venous ulcers, web space infections, infected traumatic ulcers, cellulitis imposing on the edematous and lymphedematous limb and in the patientsof the renal and cardiac failure.

4. MICRO-ORGANISMS CULTURED

78 patients had monomicrobial infections, the infection is poly-microbial in 18 patients and no growth in culture has been observed in 4 individuals.Staphylococcus and streptococcus species were the common organisms responsible for the cellulitis and other organisms include klebsicllaSP, proteusSP, pseudomonas SP, Ecoil also contribute in the considerable proportion in causing infections

5. CIRCULATORY CHANGES OBSERVED

The arterial Doppler and venous Doppler done to the patients in our study group had no DVT and monophasic flow pattern seen in 14 patients and no flow pattern in 1 patient and normal triphasic flow pattern in 85 individuals.

6. BONE INVOLVEMENT

Out of 100 patients 12 patients showed osteolytic changes which required forefoot amputation. Among the patients with risk factors of diabetes mellitus, snake bites at site of bite or the toes or the metatarsal below showed lytic changes, or destruction due to the gangrenous changes and no other bony changes were observed in the patients.

7. TREATMENT

Treatment of the individuals varied according to the severity of the disease, some patients were managed conservatively with parenteral antibiotics, the anti-inflammatory agents and limb elevation so as to reduce the associated edema, while majority of the others required surgical wound debridement with or without decompression of the fascial compartment by a fasciotomy. Very few patients needed forefoot amputation of the limb.

Table :2, Cause of cellulitis

Caiuse	No of patients
Diabetes Mellitus	46
Infected traumatic wounds	14
Chronic kidney disease	12
Bites	10
Web space infections	7
Cardiac edema	5
Lymphedema	3
Unknown	3

Table :3, Treatment

Sl no	Management	No of cases
1	Conservative	13
2	Wound debridement	27
3	Wound debridement with Fasciotomy	48
4	Amputation	12

It is observed that around 75 patients in the study group required surgical debridement, 48 of them required decompression of the muscular compartment by means of a fasciotomy. Around 12% of individuals in the study group required amputation

It is observed that 6 patients of grade I cellulitis out of 24 upper limb patients and7 patients of grade I cellulitis out of 76 lower limb patients managed conservatively. It is observed that 9 and 29 patients of grade II and grade III cellulitis out of 76 lower limb patients and 10 patients of grade III cellulitis out of 24 upper limb patients required fasciotomy.

It is observed that 8 patients of grade III cellulitis out of 24 upper limb patients and 2 patients of grade II, 9 patients of gradeIII, 8 patients of grade IV cellulitis out of 76 lower limb patients required wound debridement. It is observed that 11 and 1 patients of grade III and grade IV cellulitis out of 76 lower limb patients required amputations.

DISCUSSION

100 patients were included in my prospective study who got admitted for cellulitis and its complications, in Tirunelveli Medical College Hospital under general surgical unit for a period of one and half years and the results were observed from the study and discussed below. Out of 100 patients studied 64 patients were belonging to the age group of 41-60 and it is evident that the incidence and severity of cellulitis increases as the age increases.

The diabetes mellitus, congestive cardiac failure and renal failures with long standing edema are common risk factors and minor contribution from immunocompromised patients, old age and obesity can cause cellulitis. In my study of 100 patients the incidence of cellulitis common among the male individuals and female with 15%.

Higher grades of cellulitis in lower limb and with bilateral involvement of lower limb in chronic long standing edema are the common presentation. The most early forms of grade 1 cellulitis are managed on the outpatient basis with oral analgesics, oral antibiotics and to follow up regularly.

The lower limb presentation is more common and with high incidence than the upper limb as the breach in the skin is high in lower limb because of bare foot walking and poor hygiene and 3 patients had unknown etiology. Culture positivity was found in 96 patients among 100 patients observed. 78 patients had mono microbial infections, the infection is poly-microbial in 18 patients and no growth in culture has been observed in 4 individuals. Staphylococcus and streptococcus species were the common organisms causing the cellulitis and other organisms include klebsiella SP, proteus SP, pseudomonas SP, E.coli also contribute in considerable proportions in causing infections and the results with literature.

Piperacillin tazobactam and imipenem, cephalosporin group of antibiotics, amikacin, ciprofloxacin and gentamycin are the antibiotics sensitivity to most of the microorganism cultured and piptaz, imipenem are the antibiotics with maximum sensitivity. Showing the resistance to common antibiotics which we routinely follow have started evolving.

The arterial Doppler and venous Doppler done to the patients in our study group had no DVT and monophasic flow pattern seen in 14 patients and 1 patient had no flow pattern and normal triphasic flow in majority of individuals and venous insufficiency in 4% of individuals. Out of 100 patients 12 patients showed osteolytic changes which required amputation among the patients which showed osteolytic changes.It is observed that majority of patients required surgical management such as the wound debridement, fasciotomy, ray's amputation as most of the patients presenting with higher grades of cellulits.

It is observed from study that 6 patients of grade I cellulitis out of 24 upper limb patients and 7 patients of grade II cellulitis out of 76 lower limb patients managed conservatively.And 9 and 29 patients of grade II and grade III cellulitis out of 76 lower limb patients and 10 patients of grade III cellulitis out of 24 upper limb patients were managed by fasciotomy.And 8 patients of grade III cellulitis out of 24 upper limb patients and 2 patients of grade II, 9 patients of grade III, 8 patients of grade IV cellulitis out of 76 lower limb patients were managed by wound debridement. And 11 of grade III and 1 of grade IV cellulitis out of 76 lowerlimb patients were amputated.

It is observed that almost all the patients managed conservatively, had an uneventful recovery and among those needed surgical intervention, 61 patients had the residual wound that needed further attention, 11 patients remained with disability computation being done and around 1 patient died because of the disease. It is analyzed that among 61 patients with residual areas ,28% of patients were managed with split skin grafting and remaining 72% of the wounds healed by secondary intention.

CONCLUSION

This study on cellulitis found that diabetes mellitus is the most common cause followed by traumatic infected ulcer, post bite cellulitis, chronic kidney disease. Hence early diabetes mellitus screening and good glycaemic control prevent the incidence of cellulitis. Educating the people regarding proper foot care, foot wear usage can prevent cellulitis occurring due to web space infections, cracks in the sole, trivial trauma in the foot. Hospital admission for the severe forms of cellulitis, appropriate and emergency surgical intervention as needed, employing culture directed antibiotics, managing the comorbidities can salvage the limbs and lives.

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