



## ASSESSMENT OF VARIOUS ANTIBIOTICS USED IN THE TREATMENT OF CELLULITIS AT A TERTIARY CARE TEACHING HOSPITAL

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### ABSTRACT

**Background:** Cellulitis is a common bacterial infection or injury of tissues resulting an inflammation of the skin and subcutaneous tissues. Antibiotics are the main class of treatment. Antibiotics are selected based on the susceptibility and severity of infection. **Aim:** The aim of the study is to assess the various antibiotics used in the treatment of cellulitis at a tertiary care teaching hospital. **Method:** This is a prospective study in cellulitis patients admitted to Government Cuddalore Medical College and hospital (GCMCH), Chidambaram. Participants were patients referred by General surgeons with acute and complicated cellulitis. Demographic data, clinical and biochemical data, time taken for the impairment of symptoms and length of stay were analyzed. **Result:** A count of 120 patients were included in the study of which male patients were 78 (68%) and 42 (35%) patients were female. Patients with left leg cellulitis 25 (28.83%). The total length of stay (mean  $\pm$  SD) of all patients observed was (32.1  $\pm$  7.5 days), patients with diabetes (26.4  $\pm$  4 days) have higher length of stay and the wound healing process is also slower. **Conclusion:** Patients with cellulitis have been treated with mono or dual antibiotic therapy on surgical treatment. From the study, patients with comorbid condition, particularly diabetes have slow healing process and required prolonged length of stay and therapy in the hospital. Antimicrobial stewardship and rational use of antibiotics can provide better results and decrease the length of stay in the hospital and further improvement in the patients with cellulitis.

### KEYWORDS :

#### INTRODUCTION

Cellulitis often presents as a warm, erythematous area, accompanied by edema and pain on palpation. This is an acute bacterial infection that causes inflammation in the deep dermis and surrounding subcutaneous tissues. Infection progresses without abscesses or purulent discharge. Beta-hemolytic streptococci commonly cause cellulitis, usually group A streptococcus (i.e., *Streptococcus pyogenes*), followed by methicillin-sensitive *Staphylococcus aureus*. Patients who are immunocompromised, have methicillin-resistant *Staphylococcus aureus* infections, have been bitten by animals, or have comorbidities such as diabetes may be susceptible to other bacterial infections. If a clinician correctly identifies and treats cellulite promptly, the condition usually resolves with appropriate antibiotic treatment.

#### METHODS

Prospective observational study was carried out for a period of 8 months (Oct 2023- May 2024) in a tertiary teaching care hospital in Chidambaram, India

The inpatients who are eligible for the inclusion criteria were selected for the study. The clinical examination was done and demographic details such as age, gender, family history, previous history of infection, co-morbidities conditions were obtained. Biochemical data such as fever, WBC count microbial culture and sensitivity, urea, serum creatinine were recorded.

Initially patients were treated with empirical antibiotics therapy before the culture and sensitivity test was until done. Once results were obtained, antibiotics were given based on the susceptibility of the organism. Incision and drainage, debridement and fasciotomy were performed based on the severity of patient.

#### Inclusion Criteria

- Patients above 18 years of age, both gender diagnosed

with cellulitis, patients with or without co-morbidities who receive oral or IV antibiotics for the cellulitis.

#### Exclusion Criteria

- Patients without cellulitis.
- Patients with conditions mimicking cellulitis such as erysipelas, burns, ischemic ulcers, gas gangrene.

#### Statistic Analysis Of The Study

The data was analyzed using descriptive statistics by Microsoft excel and described as averages, SD or percentages. Antibiotics usage was analyzed as per IDSA guidelines.

#### RESULTS

A total of 120 patients were included in the study based on the inclusion criteria. The clinical profile of the patients were mentioned in Table 1. The mean (SD) for age in years was tend to be 39.5 (12.698%). Male cases accounts for about 78(65%) and female cases segregated into different age groups where 3(2.5%) patient were observed in the age group 18-24, 25 (20.83%) patients were observed in the age group 25-35, 30 (25%) patients were observed in the age group of 36-45, 50 (41.6%) patients were observed in the age group of 46-60, 12(10%) patients were observed in above 60 years of age.

Cellulitis predominantly affects the lower extremities in most of the patients i.e, 42 (35%) cases, left leg cellulitis was found in 38(31.6%) cases, right leg cellulitis was found in 25(20.83%) cases and hand cellulitis was found in 15((12.5%).

Most common systemic symptoms include fever, nausea, fatigue accounts for about 62(51.6%) cases and 40(33.3%) of patients had previous infection of cellulitis.

#### Gender

GENDER	NO. OF PATIENTS (PERCENTAGE)
Male	78 (68%)

Female	42 (35%)
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**Age Group**

AGE IN YEARS	NO. OF PATIENTS (PERCENTAGE)
18-24	3 (205%)
25-35	25 (20.83%)
36-45	30 (25%)
46-60	50 (41.6%)
Above 60	12 (10%)

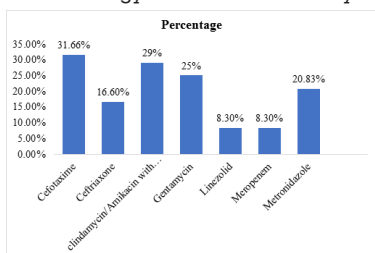
**Affected Area**

AFFECTED PART OF BODY	NO. OF PATIENTS (PERCENTAGE)
Right leg	25 (20.83%)
Left leg	38 (31.6%)
Lower extremities	42 (35%)
Hand	15 (12.5%)

**Conditions**

CONDITIONS	NO. OF PATIENTS (PERCENTAGE)
Systemic general symptoms	62 (51.6%)
Temperature $\geq 37.88^{\circ}$	43 (35.83%)
WBC $\geq 12 \times 10^9$ cells/L	85 (70.83%)
Previous episode of cellulitis	40 (33.33%)
Negative culture	78 (5%)
Positive culture	25 (20.83%)
History of cellulitis	21 (17.5%)
Diabetes mellitus	56 (46.6%)
Hypertension	52 (43.33%)
Kidney disease	5 (4.16%)
Metal injury	28 (23.3%)
Trauma	60 (50%)
Prick	22 (18.3%)
Unknown	10 (8.3%)

Figure 1 shows the distribution of antibiotics to the patients based in the microbiology culture and sensitivity report



**Figure 1:** Distribution of antibiotics to patients

The microbiological culture and sensitivity test was tend to be negative in most of the cases i.e, 78 (65%) and positive culture were obtained in 25 (20.83%), Streptococcus was found to be positive in 10 (8.33%) cases, Staphylococcus was found to be positive in 5 (4.16%) cases, gram negative organisms such as Pseudomonas 4 (3.38%), E.coli 3 (2.5%), Klebsella 3 (2.5%) was also observed.

Treatment was provided based upon the severity of infection and susceptibility of organisms to the antibiotics.

Monotherapy with cefotaxime was prescribed to 38 (31.66%), ceftriaxone was given to 20 (16.6) patients; dual therapy with clindamycin/ amikacin with piperacillin tazobactam was given to 35 (29%), gentamycin was given to 30 (25%) patients, linezolid was given to 10 (8.3%) patients. 10 patients (8.3%) presenting with more deep and severe infection or multiple organisms meropenem was given, metronidazole was given to 25 (20.83%) patients. Topical silver compounds were also applied to improve the wound care in all patients.

**Table 2: Consumption of antibiotics involved in the**

**treatment of cellulitis**

Antibiotics	No. of patients (percentage)
Cefotaxime	38 (31.66%)
Ceftriaxone	20 (16.6)
Dual therapy with clindamycin/ Amikacin with piperacillin tazobactam	35 (29%)
Gentamycin	30 (25%)
Linezolid	10 (8.3%)
Meropenem	10 (8.3%)
Metronidazole	25 (20.83%)

**Table 3: Surgical therapy involved in the treatment of cellulitis**

Surgical therapy	No. of patients (percentage)
Debridement	48 (40%)
Incision & drainage	22 (18.33%)
Fasciotomy	10 (8.3%)

**Table 4: Complications involved in cellulitis patients**

Complication	No. of patients (percentage)
Formation of abscess	18 (15%)
Ulcer formation	26 (21.66%)
Necrosis	10 (8.33%)
Sepsis	4 (3.33%)

**Table 5 shows the disease condition and their length of stay (LOS) in the hospital**

Disease condition	No. of patients (percentage)
Diabetes	26.4 $\pm$ 4
Hypertension	18.4 $\pm$ 2
Kidney disease	11.1 $\pm$ 1

Total length of stay (mean  $\pm$  SD ) of all patients observed was 32.1  $\pm$  7.5.

**DISCUSSION**

This study was involved in 120 patients of which 78 male and 42 female patients. This dominance of male proportion was similar to that found in study published by Ingibjörg Hilmarsdóttir et al.

Higher incidence of cellulitis 50(41.6%) was observed in the age group of 46-60 years. This findings was found to be similar to the study published by Sarah E Simonsen et al.

The prevalence of lower limb cellulitis 42(35%) was higher than upper lib among both right and left limb. This prevalence was similar to the study published in JAMA that revealed that the most common site of occurrence of cellulitis occurred in the lower limb in 98% of patients.

The most common risk factors such as diabetes were observed in 56 (46.6%). Patients with history of cellulitis were observed in 21 (17.5%). This was consistent with the study published by Frank-Leonel Tianyi et al, Tsi njim et al.

In this study higher number of negative culture was observed when compared to the culture. All the patients were treated with antibiotics, monotherapy and dual therapy. This was similar to study publication by Nahyeni Bassah et al.

Patients whose condition are cured by antibiotics, those patients undergone surgical procedures such as debridement, incision and drainage, fasciotomy and the comorbidity condition increases the length of stay in the hospital. Selection of antibiotics in case of negative culture still stands as a challenge for the prescribers. Evidence based therapies shall be preferred to improve the clinical outcomes.

**CONCLUSION**

Patients with cellulitis was treated with mono/ dual combination antibiotics therapy or surgical treatment based

on the clinical response of the patients. According to this study patients with comorbidities especially diabetes have slow recovery of wound and they are required for prolonged treatment in the hospital.

Antibiotics are essential to treat or prevent any further infection in future but the rational use of antibiotics is advisable in order to reduce the emerging resistance of antibiotics.

The impact of antibiotics involved in the treatment of cellulitis provided positive outcome i.e., more than 85 (70.8%) patients conditions was improved & relieved by taking antibiotics.

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