



## A STUDY FOR DRAFTING ANTIBIOTICS POLICY BASED ON MICROORGANISMS IN DIABETIC ULCER AT GOVERNMENT TIRUVANNAMALAI MEDICAL COLLEGE

### General Surgery

**Nagarajan. V**

Senior Assistant Professor, Department of General Surgery, Govt. Tiruvannamalai Medical College & Hospital.

### ABSTRACT

Diabetic Ulcer is the commonest encountered surgical complication in Diabetes Mellitus (DM). This complication is further aggravated by infection with microorganisms. The condition can be better managed by devising an Antibiotic policy based on microorganism cultured, thereby reducing mortality and morbidity.

### KEYWORDS

Diabetic Ulcer, Antibiotics, microorganisms

#### INTRODUCTION:

Diabetes Mellitus is one among the commonest Non-Communicable disease in South India. The disease per se causes increased mortality and morbidity. In addition to that, complications arising out of inadequate blood sugar control and management leads to increased morbidity and mortality. Diabetic ulcer is one among those complications which is encountered in almost all the undertreated diabetic patients. The diabetic ulcer is aggravated by peripheral neuropathy microvascular changes and infection by microorganisms thereby rendering the condition difficult to treat. A cluster of microorganisms may infect the ulcer and a good outcome depends upon strict control of blood sugar and identifying the infecting organism and its antibiotic susceptibility.<sup>[10]</sup> We cannot expect a better outcome without devising an antibiotic policy taking the local prevalence of microorganisms into account.<sup>[3,12]</sup> This prevents unnecessary delay in the management of this complication and development of antibiotic resistance.

#### AIMS OF THE STUDY:

To find the common organisms infecting diabetic ulcer.  
Antibiotic sensitivity by culturing the organism.  
Devising a local antibiotic policy.

#### MATERIALS AND METHODS:

**Study Design:** Prospective observational study

#### INCLUSION CRITERIA:

Diabetic patients with ulcer.  
Diabetic patients with wet gangrene.  
Diabetic patients with cellulitis.

#### EXCLUSION CRITERIA:

Patients on immunosuppressive agents.  
Patients on chemotherapy.  
Patients who had been on antibiotic cover for more than two weeks.

This study was conducted at Govt. Tiruvannamalai Medical College Hospital between November 2017 and February 2019.

After applying the inclusion and exclusion criterias, a total of 246 patients were included in the study.

Once a diabetic patient gets admitted with ulcer, routine investigations such as CBC, blood sugar, HbA<sub>1c</sub>, urine acetone, RFT, LFT, ECG and X-ray of the involved region were taken. After sending swab for culture and sensitivity, patients were started on empirical broad-spectrum antibiotic. Other management modalities like blood sugar control, wound debridement and dressing were followed. All the diabetic ulcer patients were started on Insulin with the advice of physicians irrespective of blood sugar level. After obtaining culture and sensitivity report, antibiotics were changed accordingly. Repeat swab was taken after seven days of initiation of sensitive antibiotic and sent for culture. The results were reviewed and the infecting organism, their sensitivity for the antibiotic were analyzed.

This study did not take into account the anaerobic organisms, since we administer anaerobic antimicrobial treatment for all patients with diabetic ulcer.

#### OBSERVATION AND RESULTS:

Of the total 246 patients 5 patients turned culture negative for organisms. Of the remaining 241 patients 84% of the culture showed single organism and remaining 16% were polymicrobial.

From the data we came to know that gram-positive staphylococcus aureus is the commonest organism (54%) followed by Streptococcus pyogenes (26%) pseudomonas aeruginosa (18%), Klebsiella sp (6%), Enterococcus sp (6%), Proteus sp (2%), E. coli (2%) and Acinetobacter sp (1%) (**Table1**).

TABLE 1

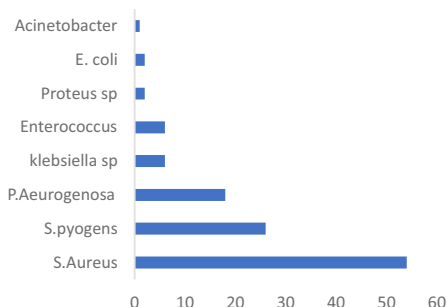
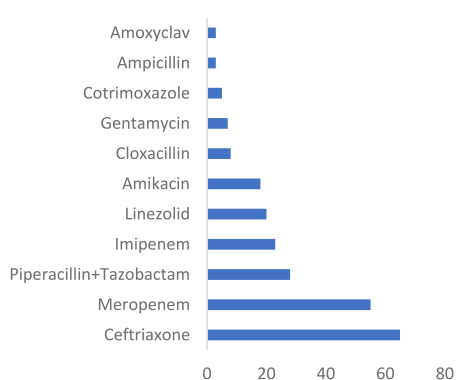


TABLE 2



As for as antibiotic sensitivity is concerned, out of 241 patients, Ceftriaxone was sensitive in 65% of patients followed by Meropenem (55%). Least sensitivity was found with Amoxiclav and Ampicillin. (**Table 2**)

#### DISCUSSION:

There are an ample number of studies that correlate the infective pathogens of diabetic ulcer and its antibiotic sensitivity. Most of the studies are aimed at providing knowledge about the common infective organism in Diabetic ulcer in a particular locality since the infective organism and their frequency vary from region to region.<sup>[4,6,8]</sup> Out of the total 241 patients in our study, staphylococcus aureus was the commonest organism causing infection in this locality.<sup>[4,9]</sup> Similarly, third generation cephalosporins proved a promising agent for the

treatment of diabetic ulcer infection.<sup>[5,7]</sup>

Ravi Shekhar Gadepalli in his study showed higher predominance of Gram-Negative aerobic organisms as the main infective agents in Diabetic ulcer, contrary to most other studies which showed a predominance of gram-positive organisms.<sup>[1]</sup> This clearly shows the bacterial prevalence entirely depends upon the Geographic locality and other factors also, even though they are out of the scope of this study. Raja et al in study showed a higher preponderance of staphylococcus aureus as the infective agent (44%) followed by Streptococcus (25%)<sup>[11]</sup>. He also states that Imipenem and Amikacin are more effective antibiotic agents in treating diabetic ulcer. In another study by Viswanathan et al the results showed higher prevalence of Enterobacteriaceae (48%) followed by staphylococcus (18%)<sup>[2]</sup>.

## CONCLUSION:

Commonest microorganism infecting Diabetic ulcer patients in our locality is Staphylococcus aureus followed by Streptococcus. The most sensitive antibiotic for treatment of Diabetic Ulcer is Ceftriaxone followed by Meropenem.

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