



DIABETIC FOOT INFECTIONS – OCCURRENCE AND ANTIBIOTIC SENSITIVITY OF THE CAUSATIVE MICROORGANISMS

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Abstract: The study has aimed to check the effectiveness of regularly used antibiotics against identified common pathogen in diabetic foot infection from patient's specimen. During the three months study, specimens were collected from 26 male and 4 female having 15 years past diabetic history. The study was conducted on 50-60 years age range patients that were on treatment in Lalitha hospital, Guntur. Cefoperazone combined with sulbactam, Cefotaxim, Ceftriaxone, Ceftazidim, Amoxicillin, Clavulanic acid, Amikacin, Gentamicin, Tobramycin, Ciprofloxacin, Ofloxacin and Piperacillin combined with Tazobactam antibiotics were used in disc plate method to evaluate antibacterial activity. *Pseudomonas aeruginosa*, *Escherichia coli*, *Proteus* and *Klebsiella* species infections are found in these patients and are of gram negative category. Almost half of the patients are infected with *Pseudomonas aeruginosa*. Two patients are claimed with no bacterial growth and 1 with anaerobic spore growth. Cefoperazone in combination with Sulbactam was found 100% effective where as Amoxicillin, Amikacin, Tobramycin and Ciprofloxacin founds 100% resistant against *Pseudomonas aeruginosa*. Combination of Cefoperazone with Sulbactam and Amikacin were found 100% effective against *Escherichia coli* but 100% resistance was found in case of Amoxicillin and Ciprofloxacin. Piperacillin in combination with Tazobactam showed 100% effectiveness against *Proteus* and *klebsiella* species in all patients. 70% of drugs that were tested against *Proteus* and *klebsiella* species were 100% resistive in all patients. *Pseudomonas aeruginosa* was found as a common pathogen. Microorganisms that were isolated from patients belong to gram negative category. Multi Drug Resistance was found predominantly in *Proteus* and *Klebsiella* species.

Introduction: Diabetes foot infection is a secondary and far worst implication for diabetic patients with prolonged history. Foot infections in patients diabetes become more severe and takes longer to cure than they do in equivalent infections in non diabetic patients. (Tsfaye, 1996) Diabetic foot infection occurs mainly due to the impaired micro vascular circulation and complication which limits the circulation of macrophages and other phagocytic cells to the infected area. Diabetic neuropathy is the common major factor effecting more than 90% of diabetic patients. In diabetic patients nerve damage effects the motor, sensory and autonomic fibers. Muscle weakness, atrophy, paresis are caused due to motor neuropathy. Loss of sensation of pain, pressure and heat caused due to sensory neuropathy. Vasodilatation and decreased sweating is caused due to autonomic dysfunction. (Kumar, 1994). Peripheral arterial disease are more common in diabetic patients, and progress more rapidly and usually more severe than general population. It commonly effects the segments between the knee and the ankle. the minor injuries when complicated by infections demand of blood flow to the foot is increased and inadequate blood supply leads to foot ulceration leading to limb amputation. (Tsfaye, 1996) (Prompers, 2007). In this study our objective is to identify and isolate the most common microorganism which are contributing in diabetic foot infection in hospitalized patients (Brem H, 2004). To evaluate the effectiveness of different anti microbial agents on the isolated organisms from the patients.

Methods:

Patient criteria: 30 patients with diabetes foot infection having Diabetes from at least 15 years have selected for study. Out of 30 patients 26 are male and 4 are females. These patients are of age range from 50-60 years. This study has carried out in 5 months duration.

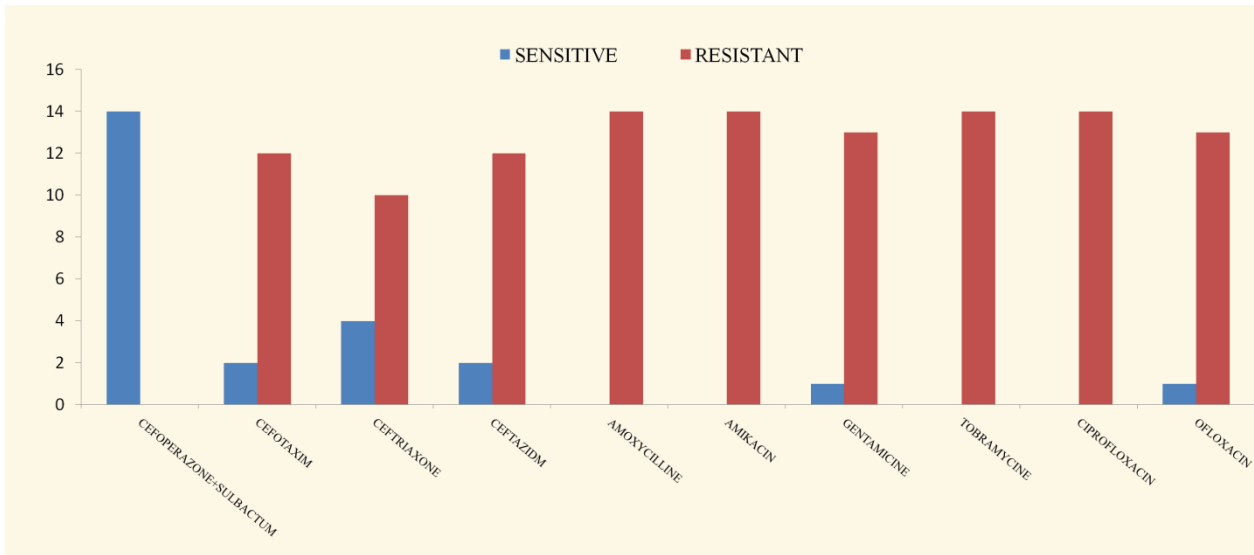
Specimen collection: Pus discharges and debris of necrotic tissues were collected from individual patient. using a sterile techniques aspirated or collected from the drained tube which was upto 5ml. in few patients swab technique was used to collect the sample. The swab was immersed in the transport medium and sent to the laboratory which were maintained in the room temperature. The specimens were subjected to Gram staining and was simultaneously inoculated on blood agar and Mac Conkey agar media for isolation of aerobic bacteria. After 24 hours incubation at 37°C, the bacterial isolates were identified (McCartney, 2016) (Elmanama, 2007). The differentiation of micro organisms are done by gram staining and morphology. The disposable 3.75

inches plastic petri dishes and antibiotic discs of 0.25inches diameter were used. Common microorganism found from patient specimens were *Pseudomonas aeruginosa*, *E. coli*, *Proteus* and *klebsiella* species. These are all under enterobacteriaceae family. Anti microbial efficacy has studied by disc plate method. Anti microbial efficacy of Cefoperazone + Sulbactam, Cefotaxim, Ceftriaxone, Ceftazidm, Amoxicillin, Amikacin, Gentamicin, Tobramicin, Ciprofloxacin and Ofloxacin antibiotics has studied for *Pseudomonas aeruginosa*. Anti microbial efficacy for *Escherichia coli* microorganism has studied by Cefoperazone + Sulbactam, Cefotaxim, Ceftriaxone, Amoxicillin, Amikacin, Gentamicin, Tobramicin, Ciprofloxacin and Ofloxacin antibiotics. Cefoperazone + Sulbactam, Cefotaxim, Ceftriaxone, Amoxicillin, Amoxicillin + Clavulanic acid, Amikacin, Gentamicin, Cephalexine, Piperacillin + Tazobactum and Cotrimoxazole antibiotics has used against *Proteus* species where as Cefoperazone + Sulbactam, Cefotaxim, Cephalexine, Amoxicillin + Clavulanic acid, Amikacin, Gentamicin, Ciprofloxacin, Ofloxacin and Piperacillin + Tazobactum ware against *Klebsiella* species.

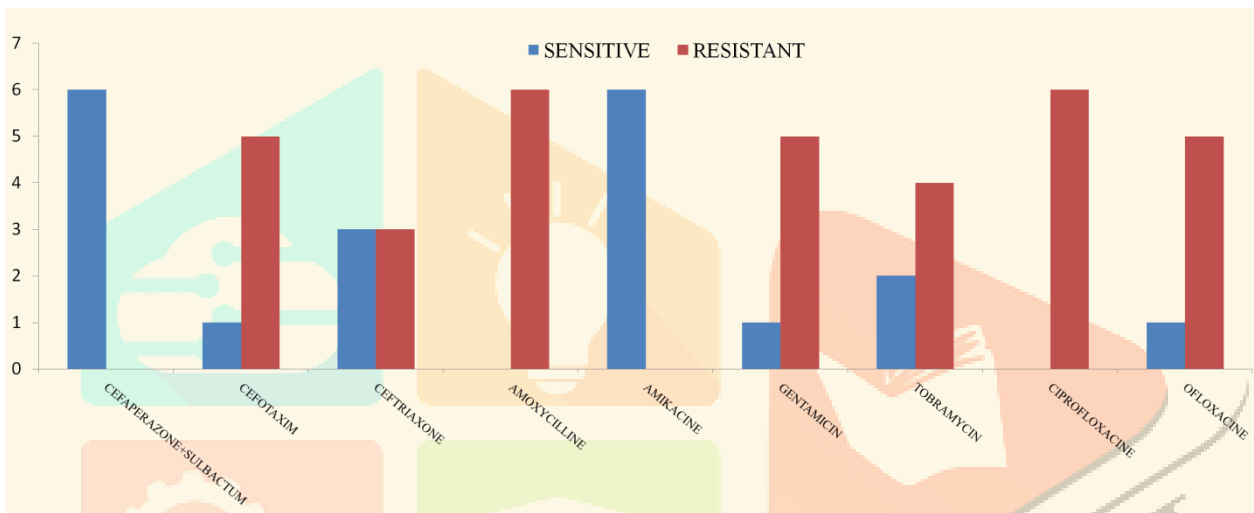
Results: *Pseudomonas aeruginosa*, *Escherichia coli*, *Proteus* and *Klebsiella* species infections are found in these patients and are of gram negative category. Almost half of the patients are infected with *Pseudomonas aeruginosa*. 20% of population is having *E. coli* infection. 16.4% of population is having infection with *Proteus* and *Klebsiella* species. 2 patients are claimed with no bacterial growth and 1 with anaerobic spore growth. Cefoperazone in combination with Sulbactam was found 100% effective where as Amoxicillin, Amikacin, Tobramicin and Ciprofloxacin founds 100% resistant against *Pseudomonas aeruginosa*. Remaining other antibiotic that has evaluated against *Pseudomonas aeruginosa* shows grater ratio of resistance. Cefotaxim and Ceftazidm showed resistance to 86% of patients, Ceftriaxone showed resistance to 71% of patients where as Amikacin and Ofloxacin achieved 93%. Combination of Cefoperazone with Sulbactam and Amikacin were found 100% effective against *Escherichia coli* but 100% resistance was found in case of Amoxicillin and Ciprofloxacin. Ceftriaxone showed equal proportion of sensitivity and resistance to patients. Cefotaxim, Gentamicin and Ofloxacin showed similar percentage of sensitivity and resistance to patients against *Escherichia coli*. 33% of patients were sensitive to Tobramicin where as remaining showed resistance against *Escherichia coli*. Piperacillin in combination with Tazobactum showed 100% effectiveness against *Proteus* and *klebsiella* species in all patients. 70% of drugs that ware tested against *Proteus* and *klebsiella* species were 100% resistive in all patients. 2/3rd of the patients showed sensitivity for Cefoperazone and Sulbactam combination and resistance to Amikacin in contrast remaining 1/3rd of the patients showed opposite results for this drug treatment against *Proteus* species. 1/3rd of the patients showed sensitivity for Cefoperazone and Sulbactam combination and resistance to Amikacin in contrast remaining 2/3rd of the patients showed opposite results for this drug treatment against *klebsiella* species.

Microorganism	Antibiotic
<i>Pseudomonas aeruginosa</i>	Cefoperazone + Sulbactam, Cefotaxim, Ceftriaxone, Ceftazidm, Amoxicillin, Amikacin, Gentamicin, Tobramicin, Ciprofloxacin and Ofloxacin
<i>Escherichia coli</i>	Cefoperazone + Sulbactam, Cefotaxim, Ceftriaxone, Amoxicillin, Amikacin, Gentamicin, Tobramicin, Ciprofloxacin and Ofloxacin
<i>Proteus Species</i>	Cefoperazone + Sulbactam, Cefotaxim, Ceftriaxone, Amoxicillin, Amoxicillin + Clavulanic acid, Amikacin, Gentamicin, Cephalexine, Piperacillin + Tazobactum and Cotrimoxazole
<i>Klebsiella Species</i>	Cefoperazone + Sulbactam, Cefotaxim, Cephalexine, Amoxicillin + Clavulanic acid, Amikacin, Gentamicin, Ciprofloxacin, Ofloxacin and Piperacillin + Tazobactum

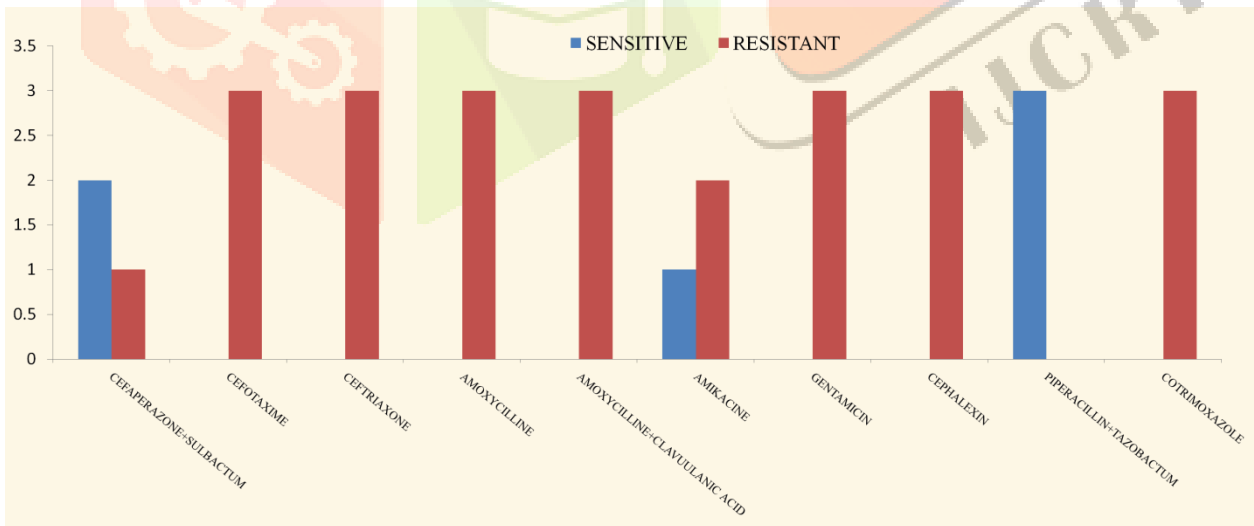
ANTIBIOTIC SENSITIVITY FOR *PSEUDOMONAS*

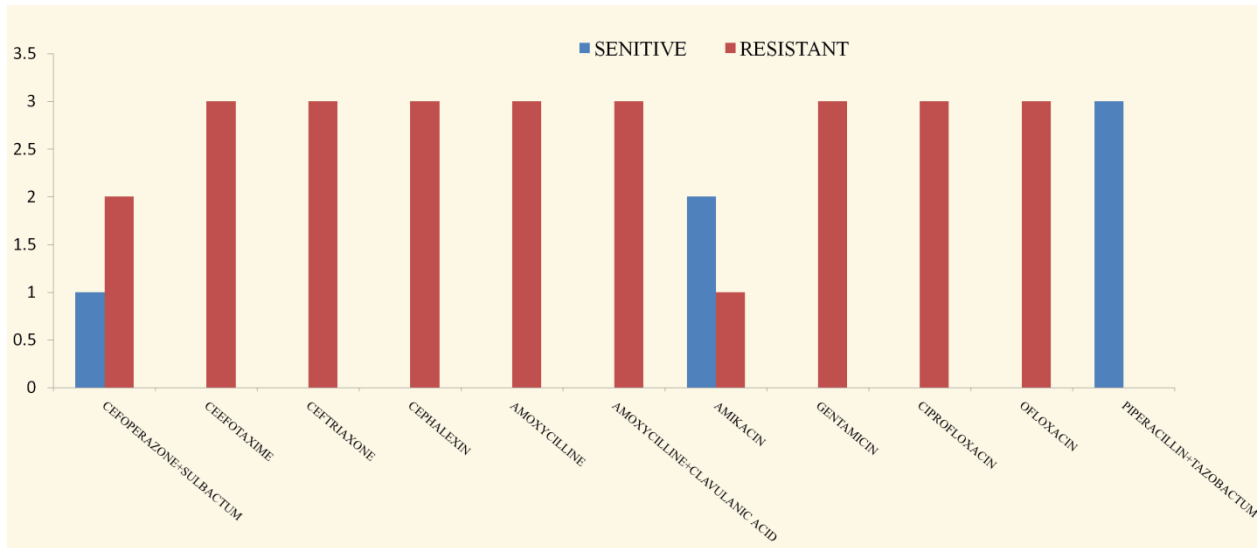


ANTIBIOTIC SENSITIVITY FOR *E. COLI*



ANTIBIOTIC SENSITIVITY FOR *PROTEUS SPECIES*



ANTIBIOTIC SENSITIVITY FOR *KLEBSIELLA* SPECIES**Conclusion:**

Microorganisms that were isolated from patients belong to gram negative category. *Pseudomonas aeruginosa* was found as a common pathogen. Cefoperazone and Sulbactam combination were effective against *Pseudomonas aeruginosa* and *Escherichia coli*. Piperacillin and Tazobactam combination were effective against *Proteus* and *Klebsiella* species. Multi Drug Resistance was found predominantly in *Proteus* and *Klebsiella* species. The interesting observation was found that 2 Diabetic Foot Infection patients were off from the microbial contamination.

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