

J P C V S E F O W T " O U J C J P H S B N P G % J B C F U J D ' F

Jasmine Janifer¹, Geethalakshmi Sekkizhar², Satgani Kumpatla¹ and Vijay Viswanathan^{1*}

¹M.V. Hospital for Diabetes and Prof. M. Viswanathan Diabetes Research Centre [WHO Collaborating Centre for Research, Education and Training in Diabetes], Chennai, Tamil Nadu, India

²Stanley Medical College, Chennai, Tamil Nadu, India

Abstract

Background: Proper management of diabetic foot infection requires appropriate selection of antimicrobials based on culture and antimicrobial susceptibility testing. The aim was to determine the optimal antimicrobial susceptibility to various commonly used antimicrobials for *Gram Positive Cocci* (GPCs) and *Gram Negative Bacilli*

***Corresponding author:** Dr. Vijay Viswanathan, MD, PhD, FRCP (London & Glasgow), M.V. Hospital for Diabetes and Prof. M. Viswanathan Diabetes Research Centre, [WHO Collaborating Centre for Research, Education and Training in Diabetes], No:4, Main Road, Royapuram, Chennai-600 013, Tamil Nadu, India, Tel: 91-44-2595 49 13-15; Fax: 91-44-2595 49 19; E-mail: drvijay@mvdabetes.com

Received September 28, 2013; **Accepted** November 19, 2013; **Published** November 25, 2013

Citation: Janifer J, Sekkizhar G, Kumpatla S, Viswanathan V (2013) Bioburden vs. Antibigram of Diabetic Foot Infection. Clin Res Foot Ankle 1: 121. doi: 10.4172/2329-910X.1000121

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detection was done as per CLSI guidelines. Quality control procedures were incorporated to assure the quality of stains by gram stained smears (gram positive and gram negative pathogens). Quality control strains like ATCC (American Type Culture Collection) *S. aureus*, *E. coli*, *Pseudomonas aeruginosa* were used to check the quality of both plating and biochemical media. Quality control for antibiotic discs was done by CLSI guidelines.

Statistical analysis

Data are expressed as percentages. Chi square was used to identify the most prevalent species among GPCs and GNBs and also to determine the most sensitive antibiotic among the classes of antibiotics for GPCs and GNBs. A p value of <0.05 was considered as statistically significant. Statistical analysis was performed using statistical package SPSS version 16.0 (SPSS, Chicago, IL).

Results

The mean age of total study subjects was 57.4 years and the duration of diabetes varied from 1-30 years with a mean duration of 11.9 ± 7.9 years. 502 (52.2%) patients had ulcer in the left foot and 459 (47.8%) in the right foot. 152 (15.8%) were

Proteus spp. About 17% of Pseudomonas Spp were isolated in the present study, which is consistent with the finding of Abdul kadir et al. [20], who reported about 19% of Pseudomonas Spp in Brunei.

Another study from South India showed only the antimicrobial susceptibility pattern of Pseudomonas aeruginosa in a diabetic foot ulcer [21]. 1.4% of DFI was with candida spp. total isolates [22]. We have isolated 10 cases of Candida spp. the percentage of 1.1% in our study.

Prevalence of MRSA in DFIs ranged from 5% to 30% and there is an alarming trend for increase in many countries [23]. An increase in the incidence of multi-drug resistant (MDR) organisms, namely MRSA and ESBL-producing gram negative bacteria, is threatening the outcome of anti-infectious therapy in the community and in hospitalized patients [24]. 1.35% of MRSA were isolated in our study. In recent years, there has been an increase in the incidence and prevalence of ESBLs also. Currently there was paucity of data on ESBL-producing organisms from DFI especially in this part of world. Our study from South India found 3.12% of ESBL-producers.

It was reported that literature regarding antibiotic therapy is inadequate to determine the best antimicrobial agent [25]. In the current study, it was observed that Imipenem was the best choice for both GPCs and GNBs with sensitivity of 99.7% and 96.8% respectively and thus can be used to treat severe foot infection and it can also be used as best choice for ESBL producers. Another recent study by Banashankari et al. [10] also reported 100% susceptibility to imipenem when tested for Enterobacteriaceae family. Other antimicrobials such as amikacin, ce pime-tazobactam, cefaperazone-sulbactam, meropenem and piperacillin-tazobactam also showed considerable sensitivities against both GPCs and GNBs in our study. Similar findings have been reported in another study from Africa where amikacin was 77.5% sensitive for Pseudomonas spp and 58.3% sensitive for E. coli [26]. A recent study from North India showed that piperacillin-tazobactam showed the highest sensitivity for polymicrobial nature of foot infection [27].

Amikacin can be a better choice for E. coli, Proteus and Klebsiella spp which can be used for severe and moderate grade of foot infections as noted in our study.

Ce pime-tazobactam combination, showed more than 80% sensitivity against Enterobacteriaceae family [28]. Ce pime-tazobactam combination showed 75.7% susceptibility to GPCs and 85.6% susceptibility for GNBs in our study. An important finding in the present study was that cefuroxime, which was commonly used only against GNBs, was more than 70% sensitive against GPCs, as well. This implies that the clinicians can incorporate cefuroxime in their panel of antibiotics against both GPCs and GNBs. Doxycycline was more than 75% sensitive against GPCs, which indicates its potential use against GPCs, including infections caused by MRSA. The present study showed that GPCs were more than 50% susceptible to the quinolones (levo oxacin) than GNBs.

Among the oral forms of antimicrobials tested for GPCs in our study, Clindamycin was found to be highly sensitive than erythromycin and cephalexin. Among the intravenous (IV) anti-MRSA antimicrobials, linezolid and vancomycin showed higher sensitivities against GPCs, with the latter showing significantly higher potential. This finding indicates that patients with known MRSA infection can be directly treated with the IV drugs instead of starting with the oral forms, since MRSA is known to have contact transmission. The most probable cause for MRSA as a cause of DFI is a previous history of

Meropenem (6.2) Beta-lactam\

MRSA infection [29] but one of the limitation of the current study was nonavailability of data on previous history of MRSA.

In vivo (response) changes that happen whenever an antimicrobial drug is administered is still unclear. erefore, in vitro studies are necessary to derive at an appropriate decision on the use of antimicrobials in the treatment of DFIs.

In conclusion, among the most potential antimicrobials, Imipenem was found to be the best drug of choice against both GPCs and GNBS. Among the combinations, ce pime-tazobactum was the best, among quinolones: o oxacin was a better choice, and among the cephalosporins: ce azidime can be used for mild infections. Appropriate us