

Abstract

Diabetic Foot Infections due to Biofilm forming and other Aerobic Microbiota at the National Hospital of Sri Lanka: A Microbiological Study

Introduction

Diabetic foot infections (DFIs) have increased partly due to the rising incidence of multidrug-resistant organisms. Some of them produce biofilms which further aggravates the problem by tolerance to antimicrobials compared with planktonic bacteria. Aggressive source management and use of appropriate antibiotics could be done after detection of biofilm which ultimately reduce mortality and morbidity.

We studied the prevalence of biofilm formation among common pathogens in DFIs, their antibiotic susceptibility and association with antibiotic susceptibility pattern and biofilm formation.

Method:

A hospital-based, descriptive, cross sectional study was carried out in 2019 on 168 biopsy or curettage specimens of DFIs at the National Hospital, Sri Lanka. Isolation of microorganisms was done on blood agar, chocolate agar and MacConkey agar. Routine biochemical tests and manual identification/automated Phoenix identification system were used for species identification. Antibiotic susceptibility of organisms was determined by CLSI (2020) disc diffusion method and Stokes method. Biofilm formation was detected from both the tube method and the Congo red agar method.

Results

Prevalence of mono microbial infections (70.5%) was more than polymicrobial infections (29.5%). and the majority were Gram-negatives (83.7%). *Pseudomonas* species were the commonest isolates (30.4%) followed by *Escherichia coli* (21.3%). Seventy three percent of *Staphylococcus aureus* were methicillin resistant *S.aureus* and 26.7% were methicillin

sensitive *S.aureus*. None of the Gram-positive isolates was resistant to glycopeptides. Gram-negative isolates were resistant to ampicillin (94.7%) and amoxicillin-clavulanate (85.27%). Biofilm was detected in 58.8% of isolates. Highest biofilm formation was seen in *Escherichia coli* (71%) followed by *Pseudomonas* species (70%). High degree of antibiotic resistance was exhibited by biofilm-producing isolates compared with non-biofilm producers in both Gram-positive and negative isolates.

Conclusion

Average antibiotic resistance was high in biofilm-producing isolates compared to non-biofilm producing isolates in both Gram-positive and negative microorganisms. Significant association was seen with biofilm formation and antibiotic resistance including methicillin resistant *S.aureus*, and extended-spectrum beta-lactamases producing microorganisms in DFIs.

Key words

Diabetic foot infections, biofilm formation, antibiotic resistance