



DETECTION OF VANCOMYCIN RESISTANCE AMONG ENTEROCOCCUS FAECALIS ISOLATED FROM DENTAL CARIES POPULATION

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ABSTRACT

Vancomycin resistance among Enterococcus isolates is a major problem in most of the western world. Thus, our study is to find out the vancomycin resistant strains of E. faecalis from dental caries population. Using this method, all our isolates were found to be uniformly sensitive to vancomycin in a concentration of 6µg/ml, which indicates that there was no Vancomycin Resistant Enterococci (VRE). This indicates the promptness of agar screening method with vancomycin. Hence it can be concluded that this method may be included in the routine drug susceptibility pattern of Enterococci for the better treatment modalities.

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INTRODUCTION

The human dental cavity is colonized with large groups of aerobic and anaerobic bacterial species. Enterococcus faecalis as a nosocomial pathogen can cause serious infections that are frequently isolated (30-90%) from root canal treated patients. [1] The high prevalence of this species in root canal treated patients evidenced by culturing methods, and molecular detection tools suggested that it may be the reason for most of the endodontic treatment failures. [2] Vancomycin resistance among Enterococcus isolates is a major problem in most of the western world, especially in the United States where according to the National Nosocomial Infections Surveillance (NNIS) data [3] Some of the adverse outcomes associated with the infections caused by VRE are extended length of hospital stay, increased cost and increased mortality. [4] Thus, our study is to find out the vancomycin resistant strains of E. faecalis from dental caries population.

MATERIALS AND METHODS

Clinical isolates

A total of 20 different non-repetitive dental caries isolates of E. faecalis were collected included in this study. These isolates were identified by standard biochemical parameters as described by elsewhere. Isolates were preserved in semi-solid brain heart infusion medium and stored at 4°C until further use.

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Antimicrobial susceptibility test

Antibiotic susceptibility test was determined for these strains to routinely used antibiotics such as ampicillin (10µ), vancomycin (30µ), teicoplanin (30µ), erythromycin (15µ), ciprofloxacin (5µ), amikacin (200µ), gentamycin (10µ), tetracycline (30µ) and linezolid (30µ) (Hi Media, Mumbai) by kirby-bauer disc diffusion method. [5]

Detection of vancomycin resistance

Overnight grown cultures of Enterococci species were adjusted to 0.5 Mc Farland standard. 10 µl of culture suspension was spot inoculated on Mueller Hinton Agar containing 6µg/ml of vancomycin. Plates were incubated at 37°C for 24 hours. Strains were found to be resistant if there is a growth in the spot inoculation. [6]

RESULTS

Antibiotic susceptibility pattern

We found increased percentage of isolates were shown to be resistant to all the antibiotics used in this study.

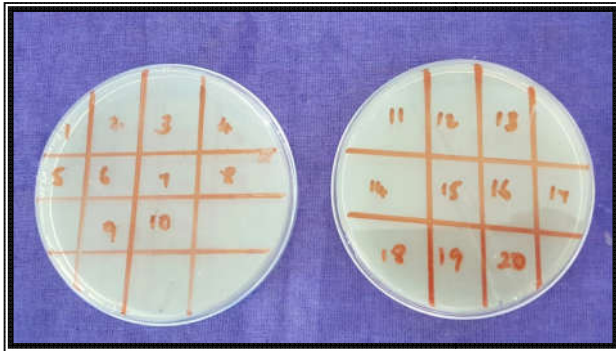
Table 1 Results of antibiotic sensitivity pattern of Enterococci

Antibiotics	Sensitivity	Intermediate	Resistance
Ampicillin	1(5%)	2(10%)	17(85%)
Vancomycin	15(75%)	1(5%)	4(20%)
Teicoplanin	12(60%)	3(15%)	5(25%)
Erythromycin	2(10%)	0	18(90%)
Ciprofloxacin	6(30%)	0	14(70%)
Amikacin	1(5%)	1(5%)	18(90%)
Gentamycin	2(10%)	2(10%)	16(80%)
Tetracycline	4(20%)	4(20%)	12(60%)
Linezolid	18(90%)	1(5%)	1(5%)

For ampicillin, amikacin, erythromycin, gentamicin, our isolates were found to resistant between 80-90%. Better sensitivity was observed in linezolid, teicoplanin and vancomycin antibiotics. The detailed results of antibiotic sensitivity patten of Enterococci was given in table 1.

Results of vancomycin resistance

Isolates that showed resistance to vancomycin in disc diffusion method was detected for the same by agar screening method using vancomycin powder. Using this method, all our isolates were found to be uniformly sensitive to vancomycin in a concentration of 6µg/ml, which indicates that there was no Vancomycin Resistant Enterococci (VRE).



Pic 1 Agar screening plates with vancomycin showed uniform sensitivity

DISCUSSION

Vancomycin Resistant Enterococci are being reported from different parts of the world with increasing frequency, although the distribution of such isolates varies widely in different areas.[7] The percentage of Enterococci with vancomycin resistance have been increased from 0.3% in 1989 to 11% in 1996.[8] In this study we did not get even a single strain with vancomycin resistance. Detection of vancomycin resistance is very tedious in clinical microbiology setting. Disc diffusion method by placing 30 microgram vancomycin in disc that frequently misidentify the actual status of vancomycin resistance. MIC determination by broth or agar dilution by E test method are considered to be the gold standard for determining vancomycin resistant status. However these methods are not adapted for the routine use in clinical diagnostic techniques. [9]

CONCLUSION

In this study we did not find any Vancomycin Resistant Enterococci. By disc diffusion method, it showed lesser percentage of vancomycin resistance. However these strains were confirmed to be vancomycin sensitive strains. This indicates the promptness of agar screening method with vancomycin. Hence it can be concluded that this method may be included in the routine drug susceptibility pattern of Enterococci for the better treatment modalities.

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