

**DISTRIBUTION, ANTIMICROBIAL SUSCEPTIBILITY PATTERN AND  
DETECTION OF BIOFILM FORMATION IN ENTEROCOCCUS SPECIES  
ISOLATED FROM VARIOUS CLINICAL SPECIMENS, WITH PHENOTYPIC AND  
MOLECULAR CHARACTERISATION OF VANCOMYCIN RESISTANT  
ENTEROCOCCUS**

**ABSTRACT**

**BACKGROUND**

The emergence of *Enterococcus* species as a causative agent of Health care associated infections and acquired resistance to commonly used antibiotics, pose a great challenge to the clinicians. Vancomycin Resistant *Enterococci* pose an emerging problem in hospitals which significantly contributing to patient morbidity and mortality. The present study was undertaken to determine the prevalence, risk factors, speciation, antimicrobial resistance, biofilm formation and phenotypic with genotypic characterization of Vancomycin Resistant *Enterococci* isolated from patients attending Rajiv Gandhi Government General Hospital, Chennai.

**MATERIALS AND METHODS**

One hundred patients with clinical diagnosis of various infections from whom Enterococci were isolated from appropriate specimens were included in the study. The Enterococci were phenotypically characterised by standard microbiological techniques. The antimicrobial susceptibility pattern of all isolates including vancomycin resistant Enterococci were studied. Vancomycin resistance among the *Enterococci* were detected by screening tests namely vancomycin disc diffusion test and vancomycin screen agar which was confirmed by determination of Minimal Inhibitory Concentration(MIC) by Microbroth dilution assay. All the VRE isolates were tested with third line supplemental drugs teicoplanin and linezolid. Genotyping of VRE isolates were carried out by Polymerase Chain Reaction (PCR).

**RESULTS**

Enterococci (n=100) isolated from various clinical specimens of patients diagnosed with infections -UTI (77%) including 29% of CAUTI, blood stream

infections(14%) including 35.7% of CLABSI, SSI (6%) , ASOM(1%), Suppurative lymphadenitis (1%) and biliary tract infection (1%), were speciated phenotypically. The predominant species was *E.faecalis* (72%) followed by *E.faecium* (19%), *E.dispar* (8%) and *E.durans* (1%). On antimicrobial susceptibility testing for urinary isolates 93% of Enterococcus faecalis and 92% of Enterococcus faecium were found to be susceptible to Vancomycin and 82% and 77% of *E.faecalis* and *E.faecium* respectively were susceptible to Nitrofurantoin. The Vancomycin resistance was observed to be 8% among the Enterococci in the study. *E.faecium* exhibited more resistance to vancomycin than *E.faecalis* i.e 10.5% of *E.faecium* and 8.3% of *E.faecalis* were vancomycin resistant. All the VRE were sensitive to Linezolid and Quinupristin-dalfopristin (Q/D). Genotypic characterisation of VRE isolates confirmed the presence of van A gene in all. Detection of biofilm by standard techniques revealed the presence of biofilm in 67% of enterococci, among which 17% were strong producers and 50% were moderate producers. Mortality rate in the study population was 25%.

## CONCLUSION

This study demonstrates an increase in the prevalence of Enterococcal infections among the health care associated and community acquired infections. Emergence of Vancomycin resistant enterococci (VRE) poses therapeutic failure and increase in the mortality and morbidity. Hence, regular screening and confirmation of VRE should be included in the laboratory testing protocol. Stringent infection control measures and regular surveillance would help constrain the spread of vancomycin resistant enterococci.

**Key words:** Enterococci , VRE, Biofilm.