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Original Article

Emergence of multidrug resistant enterococci at a tertiary care centre



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ABSTRACT

Background: Enterococci have assumed great clinical importance because of their increasing resistance to various antimicrobial agents. Thus, knowledge about the antibiogram of these multidrug resistant isolates is of utmost importance in formulating an effective antibiotic policy to treat these infections and reducing the morbidity and mortality. Aim of this study was to assess the antimicrobial resistance pattern of enterococci and determine the prevalence of multidrug resistance among them.

Methods: This cross sectional study was carried out from August 2011 to February 2014, in which 200 non-repetitive clinical isolates of enterococci were included. Antimicrobial susceptibility testing was done by disc diffusion method. Minimum inhibitory concentration (MIC) of gentamicin, streptomycin, vancomycin, teicoplanin and linezolid was determined by E-test method.

Results: The prevalence of multidrug resistance among enterococcal isolates was found to be 63%. Varying levels of resistance was seen to various antibiotics. Most of the isolates were resistant to penicillin (95%), ampicillin (95%) and cotrimoxazole (90%). High level aminoglycoside resistance (HLAR) and glycopeptide resistance was seen in 39% and 14% isolates respectively. Only 4 isolates (2%) were found to be resistant to linezolid.

Conclusion: The prevalence of multidrug resistance among enterococci was found to be 63%, the resistance being more common in *Enterococcus faecium* as compared to *Enterococcus faecalis*. The study highlights the emergence and increased prevalence of multidrug resistant enterococci which pose a serious therapeutic challenge.

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Introduction

Enterococci are a part of the normal human fecal flora. Over the past few decades, they have evolved from being an intestinal commensal organism of little clinical significance to becoming one of the most common nosocomial pathogens associated with significant morbidity and mortality.^{1,2} The enterococci are now receiving increased attention because of its resistance to multiple antimicrobial drugs, which probably explains a large part of its prominence in nosocomial infections. The most common nosocomial infections caused by enterococci are urinary tract infections followed by surgical site infections.³⁻⁵ Development of antimicrobial resistance in enterococci has posed enormous challenges for clinicians in recent years. Prolonged stay in hospital, empirical use of antibiotics and lack of sufficient information and programs to control rapid spread of enterococci has led to increased mortality caused by enterococcal infections.⁶

The antimicrobial therapy of enterococcal infections is problematic because of the inherent resistance shown by enterococci to several commonly used antibiotics such as cephalosporins, low-level aminoglycosides, low-level clindamycin, trimethoprim-sulfamethoxazole. This problem is amplified because of their acquired resistance to all currently available antibiotics that leaves the clinicians with very limited treatment options and results in the selection and spreading of multidrug-resistant (MDR) strains in hospitals.⁶⁻⁸

Complete antimicrobial susceptibility testing and knowledge of the antibiogram is extremely essential to formulate therapeutic approach for the treatment of enterococcal infections in order to control the spread of such multidrug resistant bacteria.

This study was conducted with an aim to determine the antimicrobial resistance pattern and the prevalence of multidrug resistance among enterococcal isolates at a tertiary care centre.

Materials and methods

Isolation and identification of enterococci: A cross sectional study was carried out from August 2011 to February 2014. A total of 200 non-repetitive clinical isolates of enterococci from various clinical specimens received in a microbiology laboratory of a tertiary care centre were obtained. These isolates were identified at the species level with the help of conventional phenotypic methods which included Gram's stain, colony morphology, catalase test, bile esculin test, growth in 6.5% NaCl, mannitol fermentation, arginine dihydrolase test, motility test, arabinose fermentation, lactose fermentation and sucrose fermentation.

Antimicrobial susceptibility testing: All enterococcal isolates were tested for their susceptibility to various antibiotics by Kirby Bauer disc diffusion method. For high level aminoglycoside resistance testing, high-level gentamicin disc of 120 µg and high-level streptomycin disc of 300 µg was used. Minimum inhibitory concentration (MIC) of gentamicin, streptomycin, vancomycin, teicoplanin and linezolid was also determined by using E-test method (Figs. 1-3). All the results were interpreted according to the Clinical and Laboratory Standards Institute (CLSI) guidelines.

Results

In the present study, the age of the patients from whom enterococci were obtained varied from 19 years to 78 years of age. Maximum number of cases was from age group more than 60 years comprising 30.5% of total cases followed by 21-30 years (25%) and age group 31-40 yrs (23.5%). It was noticed that amongst the 200 isolates, 108 samples were from female patients and 92 samples were from male patients. Male to female ratio was 0.85:1. Table 1 shows the age and sex wise breakup of the various isolates of enterococci. In this



Fig. 1 – E-test showing high-level gentamicin and high-level aminoglycoside resistance.

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