ORIGINAL ARTICLE

PREVALENCE OF ENTEROCOCCI WITH HIGHER RESISTANCE LEVEL IN A TERTIARY CARE HOSPITAL: A MATTER OF CONCERN

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ABSTRACT

Aims: Enterococcus species are major nosocomial pathogen and are exhibiting vancomycin resistance with increasing frequency. Continuous monitoring and determination of antimicrobial susceptibility pattern is a necessity. The present study aims to determine the prevalence and susceptibility pattern of Enterococci in tertiary care hospital.

Methods and Material: Total of 92 enterococcal strains isolated from various samples were identified and speciated as per scheme of Facklam and Collins. Antibiotic susceptibility was determined for various drugs by Kirby Bauer disc diffusion method. Results were interpreted as per CLSI guidelines and were even compared with Vitek2 automated system.

Results: 69 strains were E. faecalis, 21 were E. faecium and two were E. gallinarum. High level resistance to penicillin, ampicillin, gentamicin and streptomycin were observed. All strains were sensitive to linezolid and teicoplanin. 8% strains showed vancomycin resistance which was detected by Vitek2 automated system.

Conclusions: High rate of resistance to penicillin and aminoglycosides is observed in our tertiary care hospital and emergence of VRE has further worsened this situation. So, there is an urgent need for more rational and restricted use of antimicrobials.

Keywords: Antimicrobial susceptibility, VRE

INTRODUCTION

Enterococci have become increasingly important not only because of their ability to cause serious infections but also because of their increasing resistance to many antimicrobial agents. Serious enterococcal infections are often refractory to treatment and mortality is high.¹ Infections by Enterococci have traditionally been treated with cell wall active agents in combination with an aminoglycoside however emergence of high level resistance to aminoglycosides, β-lactam antibiotics and to vancomycin by some strains together with association of HLA with multidrug resistance has led to failure of synergistic effects of combination therapy.¹,²,³

Since the advent of VRE by Utley et al ⁵ in 1988, enterococcal infections have been a cause of great concern among the health professionals. Therefore, VRE along with HLA is making the treatment of such infections extremely difficult and pose a great challenge to clinicians.

Although 12 species in genus Enterococcus have been recognized, most common species is E. faecalis followed by E. faecium. E. faecium predominantly is more resistant species than E. faecalis and emergence of vancomycin resistance in it has caused an increase in frequency of its isolation.⁶

Considering these, the present study was conducted in tertiary care hospital to determine the susceptibility pattern of enterococcal strains.

METHODOLOGY

The present study was conducted in department of microbiology. Total of 92 enterococcal strains were isolated from various clinical samples (urine, blood, csf). The strains were identified and speciated according to standard laboratory procedures as per the scheme of Facklam and Collins.⁷
Antimicrobial susceptibility was determined by Kirby Bauer disc diffusion Method. Various antibiotics tested were: Penicillin (10U/disc), Ampicillin (10 μg), High level gentamicin (120 μg), High level streptomycin (300 μg), Ciprofloxacin (5 μg), Vancomycin (30 μg), Teicoplanin (30 μg) and Linezolid (30 μg). The minimum inhibitory concentrations of vancomycin were detected by automated Vitek2 system.

The source of media and antibiotic discs were Hi-media ltd. Standard strains E. faecalis ATCC 29212 was used as control.

RESULTS

Total 92 enterococcal strains isolated, 69 strains were E. faecalis, 21 were E. faecium and 2 were E. gallinarum. Antibiotic susceptibility tests showed high level resistance to various antibiotics tested. [Table 1] all the strains were sensitive to linezolid and teicoplanin. 8% strains showed vancomycin resistance which were even compared with Vitek2 automated system. Similar results were observed in study by Anbumani et al. [Table 2]

<table>
<thead>
<tr>
<th>Antibiotic tested</th>
<th>% Sensitive</th>
<th>% Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Gentamicin [HLR]</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>Streptomycin [HLR]</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>92</td>
<td>8</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Linezolid</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

DISCUSSION

Recent years have witnessed increased interest in Enterococci not only because of their ability to cause serious infections but also because of their increasing resistance to many antimicrobial agents.1,2,3 In the present study, E. faecalis (75%) was predominant isolate. E. faecium (23%) in our tertiary care hospital. Most of the studies done on Enterococci support the same findings. Reason could be predominance of E. faecalis in the endogenous flora of the body.9

Table 3-Total VRE isolation from different samples

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>No. of samples</td>
<td>444</td>
<td>52</td>
<td>685</td>
<td>92</td>
</tr>
<tr>
<td>VRE (%)</td>
<td>5(1%)</td>
<td>12(23%)</td>
<td>10(1.4%)</td>
<td>8(8%)</td>
</tr>
<tr>
<td>Phenotype</td>
<td>Van A, Van B</td>
<td>Van B</td>
<td>Van A</td>
<td>Van A, Van B</td>
</tr>
<tr>
<td>MIC values (µg/ml)</td>
<td>26-512</td>
<td>&gt;4</td>
<td>62-256</td>
<td>8-32</td>
</tr>
</tbody>
</table>

*Sample size not mentioned.

In present study, HLAR was seen in 53% of the strains for gentamicin (High level) and 40% for streptomycin (High level). HLAR was more in E. faecium than E. faecalis. These finding also reported in some study,10,12 HLAR in these strains can well nullify the efficacy of combination therapy. Therefore, distinguishing HLAR
from simple intrinsic resistance is important and should be adopted as a part of routine microbiology laboratory.

Present study showed 8% vancomycin resistance. Table 36% strains were E. faecalis and 2% were E. faecium. Results were also compared with automated Vitek2 system which is based on MIC values. VanA and VanB phenotype were found to be predominant with MIC value 8-32µg/ml. Previously from India, there are few reports of emergence of VRE strains with increased MIC values.12,13,14,15[Table 4]

All isolates were susceptible to linezolid and teicoplanin. So; these drugs are choice of treatment.

CONCLUSION

High rate of resistance to penicillin and amino glycosides along with increased MIC values is observed in our tertiary care hospital and emergence of VRE strains has further worsened this situation. Prompt diagnosis and efficient infection control measures can restrict its spread. There is a need to study the antibiogram of enterococcal strains in order to minimize the selection and spread of such strains.

REFERENCES