



PREVALENCE AND ANTI MICROBIAL SUSCEPTIBILITY OF CLINICAL ISOLATES OF ENTEROCOCCUS SPECIES WITH SPECIAL REFERENCE TO VANCOMYCIN RESISTANCE

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ABSTRACT

Background: Among enterococcus species , 80 -90% and 5-10% of human infection are caused by enterococcus faecalis and faecium respectively .The rate of isolation of Enterococcus faecium and other species is increase at recent times from various clinical samples . Enterococcus faecium showing higher degree of drug resistance. Enterococcus gallinarum and Enterococcus casseliflavus are intrinsically resistant to vancomycin thereby inappropriate treatment can be avoided. **Materials and methods:** The clinical samples included blood, urine and exudates (pus,tissues, sterile body fluids) were collected aseptically and processed as per standard methods for isolation and identification of organism. Antimicrobial susceptibility testing was performed using Kirby Bauer disc diffusion method. **Result:** A total of 64 Enterococcus strains were isolated from clinical samples during the study period.The maximum number of Enterococcus isolates were obtained from Exudates 37(57.8%) ,urine 23(35.9%) followed by blood 4(6.2%) .Among Enterococcus species ,E.faecalis 59 (92.2%) and E.faecium 5 (7.8%) was isolated. The isolates from urine and exudates were predominantly resistance to antimicrobials like ampicillin, high level aminoglycoside, ciprofloxacin and sensitive to linezolid, vancomycin and nitrofurantoin for urine samples. Enterococcus faecalis isolates were uniformly sensitive to Ampicillin, Gentamicin, Ciprofloxacin, Linezolid and Vancomycin. Enterococcus faecium isolates were sensitive to Linezolid and Vancomycin and resistant to Ampicillin, Gentamicin, Ciprofloxacin. **Conclusion:** This study illustrates the prevalence and antibiotic susceptibility pattern of enterococcus species from various clinical samples . In our study Enterococci did not show resistant to vancomycin.

KEYWORDS : Enterococci, Normal flora, Intrinsic resistance, Antimicrobial susceptibility pattern.

INTRODUCTION

Enterococci are part of normal flora of the human intestine ,biliary tract, vagina , male urethra and being responsible for hospital acquired infection causing blood stream infections, urinary tract infection , endocarditis and surgical site infection. ¹Enterococci is the second leading causative agent of hospital acquired infection . ² Enterococcal colonization of the intestinal tract is the major predisposing factor for severe infection inspite of the low level of the virulence factors. ³ The risk factors for vancomycin resistant enterococci (VRE) includes antibiotic exposure especially vancomycin and cephalosporins which disrupts normal intestinal flora , prolonged hospital stay, diabetes, intensive care unit patients, immunocompromised patients, use of invasive devices.VRE can spread through contact with contaminated surfaces or equipment, contaminated hands of health care workers . ⁴ Among enterococcus species , 80 -90% and 5-10% of human infection are caused by enterococcus faecalis and faecium respectively . ⁵The rate of isolation of E.faecium and other species is increase at recent times from various clinical samples . E.faecium showing higher degree of drug resistance. E.gallinarum and E. casseliflavus are intrinsically resistant to vancomycin thereby inappropriate treatment can be avoided.⁶ The importance to isolate enterococcus species as nosocomial pathogens due to their intrinsic and transferable drug resistance to many antimicrobial agents which may lead to treatment failure.

OBJECTIVES:

- To determine the prevalence of Enterococcus species from various clinical samples.
- To determine antimicrobial susceptibility pattern.

MATERIALS AND METHODS

The present study was done at Pondicherry institute of medical sciences ,Puducherry from October 2019 to March 2020 among outpatients and inpatients.The clinical samples included blood, urine and exudates (pus, tissues, sterile body fluids) were collected aseptically and processed as per standard methods for isolation and identification of organism followed by their antimicrobial susceptibility testing using Kirby Bauer disc diffusion method as per Clinical and Laboratory Standards Institute (CLSI) guidelines .

RESULTS

A total of 64 Enterococcus strains were isolated from clinical samples during the study period.The maximum number of Enterococcus isolates were obtained from Exudates 37(57.8%) ,urine 23(35.9%) followed by blood 4(6.2%) .Among Enterococcus species ,E.faecalis 59 (92.2%) and E.faecium 5 (7.8%) was isolated.

The isolates from urine were predominantly resistance to antimicrobials like ampicillin, high level aminoglycoside,

ciprofloxacin and sensitive to linezolid, vancomycin and nitrofurantoin by the Kirby Bauer disc diffusion method (FIG 1).

The isolates from exudates were predominantly resistance to antimicrobials like ampicillin, high level aminoglycoside, ciprofloxacin and sensitive to linezolid, vancomycin by the Kirby Bauer disc diffusion method (FIG 2).

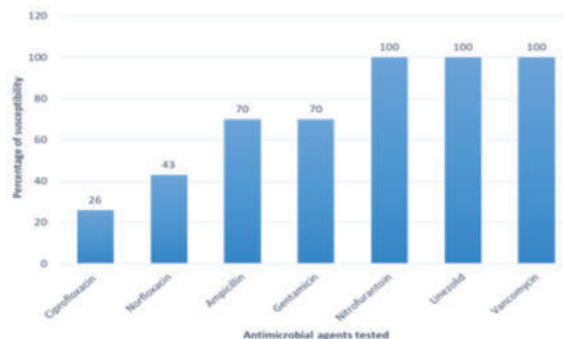


FIG 1 : Susceptibility of Enterococcus isolates from Urine sample (n=23)

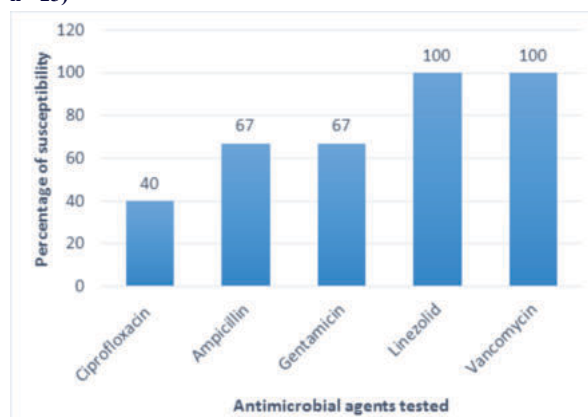


FIG 2 : Susceptibility of Enterococcus isolates from Exudates (n=37)

	Ampicillin	Ciprofloxacin	Gentamicin	Linezolid	Vancomycin
Enterococcus faecalis (2)	100%	100%	100%	100%	100%

	Ampicillin	Ciprofloxacin	Gentamicin	Linezolid	Vancomycin
<i>Enterococcus faecium</i> (2)	0%	0%	0%	100%	100%

FIG: 3 Susceptibility of Enterococcus isolates- Blood (n = 4)

Enterococcus faecalis isolates (n=2) were uniformly sensitive to Ampicillin, Gentamicin, Ciprofloxacin, Linezolid and Vancomycin. *Enterococcus faecium* isolates (n=2) were sensitive to Linezolid and Vancomycin and resistant to Ampicillin, Gentamicin, Ciprofloxacin (FIG 3).

DISCUSSION:

The *Enterococcus* species is considered as one of the nosocomial organism. Therefore it is important to understand the prevalence and the antimicrobial susceptibility patterns of the *Enterococcus* isolates. In our study, the maximum number of enterococcus isolates were obtained from exudates (57.8 %) followed by urine (35.9 %) this was similar to study by Sreeja S et al. In other study by Mittal S, et al, the urine isolates were maximum than exudate. Among *Enterococcus* species, the major isolate is *E. faecalis* 59 (92.2%) followed by *E. faecium* 5 (7.8%). The major isolate was *E. faecium* other non *faecalis* species of *Enterococcus* by Jain S et al.

Our study showed in exudates that 33% isolates were resistant to ampicillin and gentamicin, 60% to ciprofloxacin and from urine 30% isolates were resistant to ampicillin and gentamicin, 74% to ciprofloxacin, 57% to norfloxacin and sensitive to nitrofurantoin 100%.

Suresh et al and Puneet et al showed 54% resistance each in ampicillin and ciprofloxacin, nitrofurantoin 100% sensitive and 95% and 62% resistance in ampicillin and ciprofloxacin respectively which slightly higher than present study with nitrofurantoin 100% sensitive. High Level Gentamicin Resistance (HLGR) was 44.1%. Combination therapy with high dose ampicillin plus an aminoglycoside is recommended for serious enterococcal infection such as endocarditis. This is due to synergistic killing effect of enterococci.

Hence it is concluded that *Enterococci* being the common cause of hospital acquired infections and bacteremias with their increasing resistance to multiple drugs, the treatment has become a challenge for the physician. So it is important to know the susceptibility pattern of the organism and routine screening should be done in patients suffering from *Enterococcal* infections as it will support appropriate treatment strategies in cases of *Enterococcal* infection particularly life threatening infection and will help the clinician in treating such patients and in minimizing the speed of antibiotic resistance in the community and in the hospital.

CONCLUSION

This study illustrates the prevalence and antibiotic susceptibility pattern of enterococcus species from various clinical samples. Our study did not show *Enterococci* which were resistant to vancomycin. Isolates showing intermediate to vancomycin can be further tested by E test for the determination of minimum inhibitory concentration (MIC). Implementing strict infection control practices, antimicrobial stewardship program in medical institution can prevent the emergence and reduce the burden of VRE and multi drug resistant *Enterococcus*.

Acknowledgment : NIL

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