Urinary Tract Infection Caused by *Enterococcus Species*

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Abstract:
**Background:** Enterococci are most commonly transmitted due to poor personal hygiene as it is naturally present in the gastrointestinal tract, hence found in fecal matter. Improper cleaning of items containing fecal matter, or not washing hands after restroom use, can increase the risk of bacterial transmission. Since it the 2nd most common cause of hospital acquired infection and is multidrug-resistant pathogen. Hence, there is a need to understand this super bug.

**Methods:** 181 Enterococcal isolates were identified & processed according to standard protocols and speciation was based on facklam and collins conventional method, was assessed by phenotypic tests, antibacterial susceptibility pattern by minimum inhibitory concentration (Mic) for vancomycin was done by E- strip.

**Results:** Out of 648 urine samples, 181 (28%) Enterococcus spp. were isolated, in which 2 (7.1%) isolates were Vancomycin resistant E. faecium spp 2(100%), Isolated from intensive care unit.

**Conclusion:** This study indicates the 28% of UTI is caused by Enterococcus spp, among which 7.1% were Vancomycin resistant E. faecium spp, this study highlights glycopeptide resistance Enterococcus faecium spp in urine sample of ICU patients, who are already vulnerable to infection. The increased prevalence of Enterococcal urinary tract infection may be due to increasing use of catheterization and broad-spectrum antibiotics. This study stress on the importance of isolation, speciation and routine screening of all samples for drug resistance organisms in clinical samples.

**Keywords:** Minimum inhibitory concentration (Mic), E-Strip (epsilometer), ICU (intensive care unit), spp (species).

I. INTRODUCTION

*Enterococcal spp* mainly *Enterococcus faecalis* and *Enterococcus faecium* are members of the normal flora of gastrointestinal tract and are naturally resistant to commonly used cephalosporin antibiotics are opportunistic pathogens as well. They easily acquire resistance to antibiotics leading to multifiresistant strains which becomes difficult to treat, chronic, recurrent and sometimes even become fatal. *Enterococcal* infections commonly caused by *E. faecalis*, *E. faecium*. In the last few years other species of *enterococci* have been isolated from different clinical materials (*E. casseliflavus*, *E. avium*, *E. durans*, *E. gallinarum*). The aim of this study was to analyze the antibiotics susceptibility of *Enterococcus spp* isolated from urine of all urinary tract infection (UTI), hospitalized in our tertiary care centre. Glycopeptides reach high levels in the urine, and teicoplanin might be an alternative for the treatment of urinary tract infections due to *enterococci*. Enterococci have an acquired resistance to several classes of antibiotics either by mutation or by receipt of foreign genetic material through the transfer of plasmids and transposons.

Acquisition of high-level aminoglycoside resistance and vancomycin resistance has limited the therapeutic options available for clinicians. Though they are not considered to be highly virulent, their intrinsic resistance and ability to acquire resistance to several broad-spectrum antibiotics allows them to cause super infections in patients already receiving antimicrobial therapy, therefore their increasing occurrence is of concern due to high resistance to antibiotics especially in Nosocomial settings.

II. MATERIALS

It is a retrospective study. All urine samples sent from hospitalized patients in our tertiary care centre Rajarajeswari medical college & hospital where included in the study. Duration – 2months from February to March 2020

Inclusion criteria – all midstream clean catch urine samples collected from hospitalized patients were included.

Exclusion criteria – out patient urine samples, sample leak, sample transported after 2hours of collection, sample collected from urobag were rejected.

Study was conducted after taking approval from ethical committee.

III. METHODOLOGY

A total of 648 urine sample were received from hospitalized patients in our tertiary care centre. All samples were processed as per standard protocol CLSI guidelines 2020. 0.001 ml of urine was taken in sterile loop and streaked, it across a culture plate CLED and chocolate media that provides nutrients necessary for bacterial growth.

Streaked plates are covered and incubated in a 35°C incubator for a minimum of 18 hours. No Growth was reported only after 48 hours of incubation. Enterococcal isolates were identified processed according to standard protocols and speciation was based on facklam and collins conventional method, and was assessed by phenotypic tests, antibacterial susceptibility pattern by MIC for vancomycin was done by E- strip.
IV. RESULTS

Out of 648 urine samples, 394 (61%) other organism were isolated, 181 (28%) Enterococcus spp, 73(11%) no growth. 477 (74%) from wards (36%) ICU.Among 181 Enterococcus spp, 141(80%) E. faecalis, 40(20%) E. faecium The antibiotic susceptibility pattern of Enterococcal spp. showed that the isolates were highly resistance to ciprofloxacin 65.8% of which E. faecalis accounted for 60% and E. faecium 5.8% followed by high level gentamicin 36.7%, Chloramphenical 23.3%. Least resistant E. faecium was 7.1% to vancomycin and 100% sensitive for linezolid and teicoplanin and 7.1% resistant to glycopeptides. Nitrofurantoin for urine samples; nitrofurantoin is an excellent drug against Enterococcal UTI. It has been used for past many years and still shows very little resistance 8.5%. It is both bacteriostatic and bacteriocidal and resistant mutants are very rare. There are no cross resistance between nitrofurantoin and other antibiotics. It is effective against both E. faecalis and E. faecium, nitrofurantoin can be given in early pregnancy also.9,10,11

V. DISCUSSION

There is a growing awareness of the public health concerns associated with the occurrence of drug resistant strains of bacteria. The emergence of multiple antibiotic resistant bacteria has become a major challenge for treating physician. Enterococci are recognized as important human pathogen in both community and hospital acquired infections. Recent few years have witnessed increased interest not only because of their ability to cause serious infections but also because of their increasing resistance to many antimicrobial agents.7,8 The increased role of E. faecium and other strains of enterococci also has been shown. Enterococcal species have now emerged as nosocomial pathogens. Hence, it is important to know the changing patterns of the Enterococcus infections & the antimicrobial susceptibility patterns of the isolates. Also help full in epidemiological studies & for surveillance purpose. The present study highlights the prevalence of E. faecalis in our hospital. We further emphasize the need for constant monitoring of antibiotic susceptibility pattern in defined high risk areas which will be helpful in formulating local antibiotic policies. Enterococci have both an intrinsic and acquired resistance to antibiotics, making them important nosocomial pathogens. As they are difficult to treat, resistance should be monitored regularly in a wide range of clinical samples. The major factors for the emergence of multidrug-resistant Enterococci are Baseline intrinsic resistance to several antimicrobial agents, Acquired resistance via mobility of the resistance genes or plasmids, transposons, and chromosomal exchange, and The transferability of resistance.2,9

Hospital Infection Control Practices Advisory Committee (HICPAC) has made the following recommendations.

(i) Prudent use of vancomycin: Encouraging the appropriate use of oral and parenteral vancomycin is an important component of HICPAC recommendations. Other measures include formulary policies discouraging the use of third-generation cephalosporins and agents most likely to cause C. difficile colitis.

(ii) Education of hospital staff: Continuous education programmes for health care workers should include information about the epidemiology of VRE and the potential impact of this pathogen on the cost and outcome of patient care.

(iii)Effective use of the microbiology laboratory: Early detection of patients colonized or infected with VRE is an essential component of any hospital program designed to prevent nosocomial transmission of VRE.

(iv) Implementation of infection control measures: Including the use of gloves and gowns and isolation or cohorting of patients, as appropriate to specific conditions.9,17

VI. REFERENCES


