

Original Article**NITROFURANTOIN AS A EMPIRAL DRUG IN UTI CAUSED BY VANCOMYCIN RESISTANT ENTEROCOCCI (VRE) ISOLATES.****Deepak S¹, Sujatha R¹, Nashra A²**

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Objective: To study the susceptibility pattern of Nitrofurantoin against VRE isolates from Urinary Tract Infection (UTI) of patients of OPD and IPD. **Materials and Methods:** An observational study was done in the Department of Microbiology during March 2017-Aug 2017 at a tertiary care Hospital. A total of 1080 urine samples were collected and processed from the symptomatic patients of OPD & IPD, with UTI, urine culture was carried out by standard microbiological procedures, enterococcal isolates were identified and confirmed by standard phenotypic tests. Antibiotic resistance pattern was done by Kirby-Bauer Disc Diffusion Method according to CLSI guidelines 2016. **Results:** Out of 1080 urine samples significant bacteriuria was seen in 33.33%. A total of 42(3.8%) enterococcal species *Enterococcus faecalis* (40), *Enterococcus faecium*(2) were isolated. Female were 38(90.47%) and male were 4(9.53%) the incidence of UTI was more in patients in the age group of 60-80yrs. 7 of 42 isolates were observed resistant to vancomycin. Among 7 VRE, 6(85.71%) were susceptible to nitrofurantoin. All the isolates were 100% sensitive to Linezolid. **Conclusion:** UTI was common in females and in the age group of 60-80 yrs. Nitrofurantoin can be used in the treatment of UTI as an empirical drug against emerging VRE

Keywords:VRE, UTI, NITROFURANTOIN

Introduction

Urinary tract infections (UTIs) are one of the most common bacterial infections in humans both in community and hospital settings [1]. Enterococci are Gram positive cocci arranged in angulated pairs. They are the normal flora of the human gastrointestinal tract and are also important nosocomial pathogens[2] . The genus *Enterococcus* includes more than 29 species. According to recent studies 80% of clinical isolates are *Enterococcus faecalis* and is followed by *E. faecium* (10-15%). *E. durans*, *E. avium*, *E. raffinosus*, *E. gallinarum*, *E. casseliflavus*, and *E. hirae* are the rare species reported in India [3, 4]. In almost all cases there is a need to start treatment before the final microbiological results available [3]. Areaspecific monitoring studies aimed to gain knowledgeabout the type of pathogens responsible for UTIs and their resistance patterns may help the clinicians to choose the right empirical treatment [4].

Enterococci are isolated from various infections. They have an ability to cause a variety of infections like urinary tract infection (UTI), abdominal and pelvic abscesses, peritonitis, bacteraemia, sepsis, intravascular catheter infection, infection of wounds, and other rare infections [5]. The Center for Disease Control and Prevention's National Nosocomial Surveillance Survey listed enterococci as the second most common cause of nosocomial UTI [6]. There is also an emergence of acquired resistance to vancomycin, which has been increasingly reported from all parts of the world. Very limited numbers of antibiotic are available for treating enterococcal infections and currently there is no ideal antibiotic regimen with bactericidal activity for serious infections caused by vancomycin resistant enterococci (VRE) [7]. Therefore, the purpose of this study was to determine the susceptibility pattern of Nitrofurantoin against VRE isolates from Urinary Tract Infection (UTI) of patients of OPD and IPD.

Material and methods

An observational study was done in the Department of Microbiology during March 2017- Aug 2017 at a tertiary care Hospital . A total of 1080 urine samples were collected and processed from the symptomatic patients of OPD & IPD, with UTI, urine culture was carried out by standard microbiological procedures, enterococcal isolates were

identified and confirmed by standard phenotypic tests. Antibiotic resistance pattern was done by Kirby-Bauer Disc Diffusion Method according to CLSI guidelines 2016[8].

Results

Out of 1080 urine samples significant bacteriuria was seen in 33.33%. A total of 42(3.8%) enterococcal species *Enterococcus faecalis* (40), *Enterococcus faecium*(2) were isolated. Female were 38(90.47%) and male were 4(9.53%) the incidence of UTI was more in patients in the age group of 60-80yrs. 7 of 42 isolates were observed resistant to vancomycin. Among 7 VRE, 6(85.71%) were susceptible to nitrofurantoin. All the isolates were 100% sensitive to Linezolid.

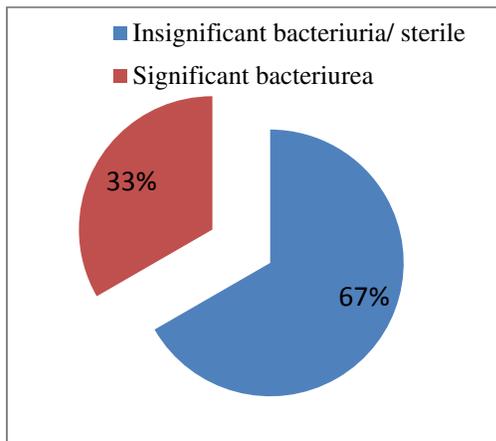


Fig 1: No. of Sample showing Significant bacteriuria

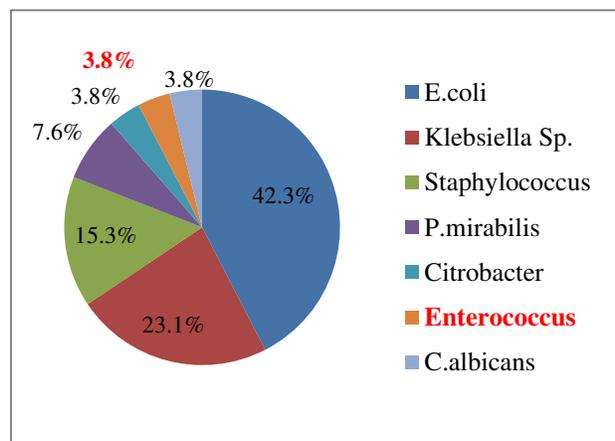


Fig 2: Distribution of Micro-organisms isolated from Urine

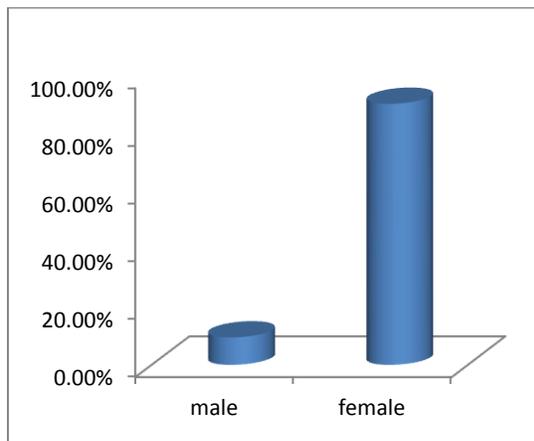


Fig 3: Gender wise distribution of Enterococcus sps

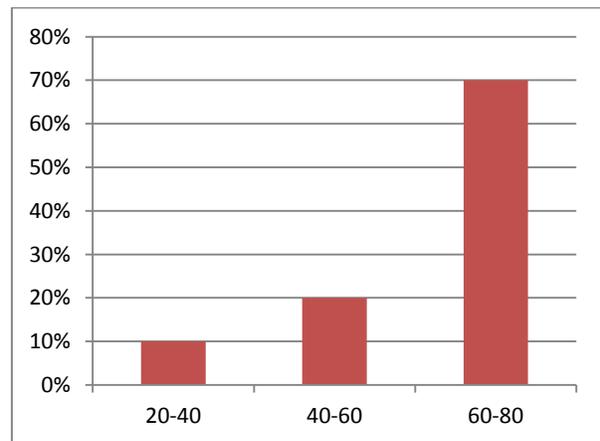


Fig 4: Age wise distribution

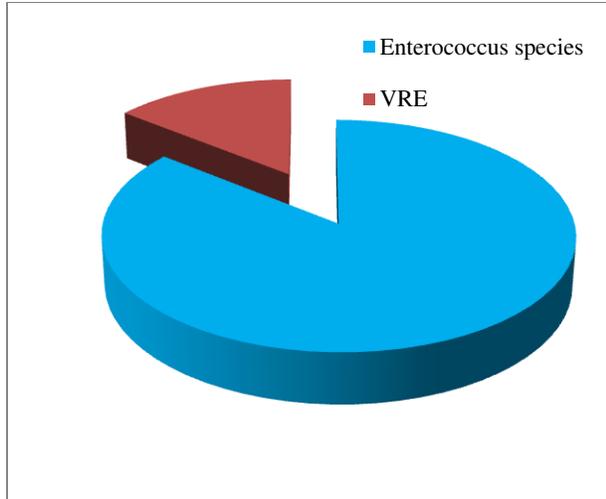


Fig 5 : Distribution of VRE and non-VRE isolates

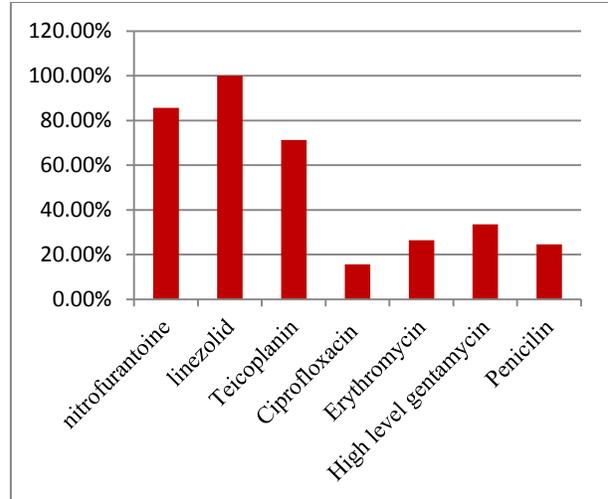


Fig 6: Antibiotic sensitivity pattern among the VRE isolates

Discussion:

Enterococci are isolated from various infections. They have an ability to cause a variety of infections like urinary tract infection (UTI), abdominal and pelvic abscesses, peritonitis, bacteraemia, sepsis, intravascular catheter infection, infection of wounds, and other rare infections [9]. The Center for Disease Control and Prevention's National Nosocomial Surveillance Survey listed enterococci as the second most common cause of nosocomial UTI [10]. There is also an emergence of acquired resistance to vancomycin, which has been increasingly reported from all parts of the world. Very limited numbers of antibiotic are available for treating enterococcal infections and currently there is no ideal antibiotic regimen with bactericidal activity for serious infections caused by vancomycin resistant enterococci (VRE) [11]. It is crucial to provide accurate and complete description of antimicrobial susceptibility pattern and current possibility for treatment of enterococcal urinary tract infections. Studies are

required to clarify epidemiology of VRE infection in these areas and this is possible by an investigation of VRE among patients. In the present study

In the present study, out of total 1080 urine samples, significant bacteriuria was seen in 33.33%, and of these 42 (3.8%) were identified as enterococci, this is similar to a study conducted by waverre et al [12].

The enterococcal infections were commonly seen in the age group of 50-59 and mean age of the patients was around 60 years [13], while in the present study mean and median is around 60-80 yrs (Fig:4). Obstructive uropathies with catheterization is more frequent in old age patients. The incidence was higher in females belonging to the sexually active age group (21 to 40 years). During intercourse and after bowel movement (cleaning), there is the possibility of entry of intestinal or vaginal enterococci (normal commensals) into a urinary tract due to proximity of urethral, vaginal and anal openings. The higher prevalence was noted in females in different studies [13]. In the present study, also the incidence of enterococcal urinary tract infection is significantly higher in females belonging to old (61 to 80 years) age group. The incidence (3.8%) rate in the present study is nearer to that of studies conducted by Parvathi S *et al.* [14] (4.48%). It is lesser than that reported by PJ Desai *et al.* [9] (28.57%) and Miskeen *et al.* [15] (7.4%). compared hospitalized and non-hospitalized patients and reported that enterococci were known to have been an increasing role in nosocomial infections.

The highest resistance was observed against ciprofloxacin, erythromycin and tetracycline [16] reported 63%, 61% and 40% isolates were resistant to erythromycin, tetracycline and ciprofloxacin respectively. Lowest resistance was observed against linezolid, and nitrofurantoin. nitrofurantoin (90%) is the drug of choice [15] for enterococcal UTI while linezolid (100%) also can be used to treat other enterococcal infections.

Vancomycin Resistant Enterococci (VRE) has been increasingly reported from all parts of the world [17]. In the present study the VRE was seen in 7/42 enterococcal isolates (1.6%) isolates which was in accordance with a study conducted by (1.4%) waverre et al [12]. Out of the 7 VRE 5 were *E. faecium*, and 2 were *E. faecalis*, and 6 (85.71%) of VRE isolates were sensitive to nitrofurantoin. All the VRE isolates were 100% sensitive to Linezolid.

Conclusion:

In this study, female were mostly affected The present study concludes that the overall incidence of enterococci among urinary tract infections is 3.8% in this region. Among the genus *Enterococcus*, *E. faecalis* is most common isolate followed by *E. faecium*. Antibacterial susceptibility pattern reveals that *E. faecium* isolates was significantly more resistant to most of the antibiotics except tetracycline than *E. faecalis*. Vancomycin resistance is less (1.6%) in our hospital. Linezolid, nitrofurantoin may be considered to treat the patients with VRE. The use of vancomycin is acceptable only for life threatening illnesses unless there is no other choice. We have focused on the emergence of vancomycin resistant enterococci, which are most often found in *E. faecium*. Empirical therapy for enterococcal infections should be guided by local patterns of drug resistance. Regular monitoring are required to establish reliable information about resistance pattern of urinary pathogens for optimal empirical therapy of patients with UTIs

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