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ENTEROCOCCAL URINARY TRACT INFECTION: AN EMERGING THREAT

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ABSTRACT: INTRODUCTION: *Enterococcus faecalis* is a frequent cause of hospital acquired urinary tract infection and is being increasingly recognized as a cause of community acquired urinary tract infection. The organism is resistant to commonly used antibiotics, thereby limiting treatment options. **OBJECTIVES:** To study the epidemiology and resistogram of enterococcal urinary tract infections. **MATERIALS AND METHODS:** In this study of two years duration (August 2008 to July 2010), we included symptomatic cases of urinary tract infection which showed significant bacteriuria due to *Enterococcus faecalis* as the sole pathogen. The data concerning the age, gender, type of urinary tract infection were collected from the patients' records. Urine analysis was done following standard microbiological methods, and the antibiogram was done following standard disc-diffusion method on the Mueller-Hinton agar. **RESULTS:** Community acquired *E. faecalis* urinary tract infection (50.4%) was as common as nosocomial *E. faecalis* urinary tract infection (49.6%). Nosocomial urinary tract infections occurred most frequently in the gynecology wards. Of all *E. faecalis* urinary tract infections more than half occurred in the 21-50 year age group (52.3%) while another 13.04% of cases occurred in 1-5 year age group. There was resistance to ciprofloxacin (86.1%), amikacin (77.4%), co-trimoxazole (78.3%) and imipenem (52.2%) among the enterococcal isolates. Vancomycin resistant enterococci (3.5%) were also isolated. **CONCLUSION:** Enterococcal urinary tract infection can present as both community acquired and hospital acquired infections. The incidence of drug resistance in *E. faecalis* is high.

KEYWORDS: *Enterococcus*, Epidemiology, Resistogram, UTI.

INTRODUCTION: *Enterococcus* is a genus of lactic acid bacteria of the phylum Firmicutes.⁽¹⁾ The name "enterocoque" was first used by Thiercelin in a paper from France published in 1899.⁽²⁾ Members of the genus *Enterococcus* were classified as Group D *Streptococcus* until 1984, when genomic DNA analysis indicated a separate genus classification would be appropriate.⁽³⁾ Enterococci are facultative anaerobic organisms, i.e., they are capable of cellular respiration in both oxygen-rich and oxygen-poor environments.⁽⁴⁾ Though they are not capable of forming spores, enterococci are tolerant of a wide range of environmental conditions: extreme temperature (10-45°C), pH (4.5-10.0) and high sodium chloride concentrations.⁽⁵⁾

Enterococci typically exhibit gamma-hemolysis on sheep's blood agar.⁽⁶⁾ *Enterococcus faecalis* is a frequent cause of hospital acquired urinary tract infection and is being increasingly recognized as a cause of community acquired urinary tract infection. Undiagnosed and untreated enterococcal UTI is a well-known source of fatal enterococcal bacteraemia & endocarditis especially in nosocomial set up. From a medical standpoint, an important feature of this genus is the high level of intrinsic antibiotic resistance. Some enterococci are intrinsically resistant to β -lactam-based antibiotics

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(Penicillins, cephalosporins, carbapenems), as well as many aminoglycosides.⁽⁶⁾ In the last two decades, particularly virulent strains of *Enterococcus* that are resistant to vancomycin (vancomycin-resistant *Enterococcus*, or VRE) have emerged in nosocomial infections of hospitalized patients, especially in the US.⁽⁵⁾

OBJECTIVE: Objective of the present study was to determine the epidemiology and resistogram of enterococcal urinary tract infections.

MATERIALS & METHODS: In this study of two years duration (August 2008 to July 2010), 115 symptomatic cases of urinary tract infection were included. Data of UTI cases solely caused by *Enterococcus* were selected for analysis. The data concerning the age, gender, type of urinary tract infection were collected from the patients' records. *Enterococcus* isolation and identification were done by standard microbiological techniques according to Facklam-Collins scheme. Anti biogram was done by Kirby Bauer disc-diffusion method as per CLSI guideline.

RESULTS:

Community acquired *E. faecalis* urinary tract infection (50.4%) was as common as nosocomial *E. faecalis* urinary tract infection (49.6%).

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Graph: 2

The present data showed the nosocomial urinary tract infections occurred most frequently in the gynecology wards.

Graph: 3

Of all *E. faecalis* urinary tract infections more than half occurred in the 21-50 year age group (52.3%) while another 13.04% of cases occurred in 1-5 year age group.

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Graph: 4

The study showed female preponderance among patients presenting with UTI caused by *Enterococcus* spp (Graph: 4).

Graph: 5

Majority of the enterococcus isolates were resistant to ciprofloxacin (86.1%), amikacin (77.4%), co-trimoxazole (78.3%) and imipenem (52.2%). Vancomycin resistant enterococci (3.5%) were also isolated (Graph: 5).

DISCUSSION: Enterococci are the second most common cause of nosocomial urinary tract infection in Western hemisphere.⁽⁷⁾

Enterococcus faecalis is the most common isolate being associated with 80-90% of human Enterococcal infection, *Enterococcus faecium* ranks second and is isolated from 10-15% of infections.

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Other species are infrequently isolated from clinical specimens.⁽⁸⁾ The overall occurrence of enterococcal infection varies across continents, countries and also within hospitals. In India, the occurrence varies from 1% to 36%. In 2003, Karmakar et al carried out a study in Mumbai in which the isolation rate of enterococci from urine samples was 10.28%.⁽⁹⁾ In March 2006, Kaur et al reported an enterococcal isolation rate of 33% from urine samples in Haryana.⁽¹⁰⁾ In 2008, Agarwal et al in Lucknow showed, an isolation rate of 1.46% in diverse clinical samples.⁽¹¹⁾ In our study, community acquired *E. faecalis* urinary tract infection (50.4%) was as common as nosocomial *E. faecalis* urinary tract infection (49.6%).

Bhattacharyya et al in Kolkata showed that the isolates were resistant to commonly used antibiotics belonging to Macrolide & Fluroquinolone groups. Antimicrobial susceptibility pattern revealed the surprising fact that three *Enterococcus faecalis* and *Enterococcus gallinarum* isolates were sensitive to β -lactam antimicrobials (Benzyl penicillin and Ampicillin) and Aminoglycosides (Gentamicin and Streptomycin high level synergy) suggesting use of combination therapy of β -lactams and Aminoglycosides for treatment. Out of four isolated *Enterococcus faecium*, two were resistant to both Ampicillin and Aminoglycosides (high level synergy), whereas, the other two were resistant to β -lactam antibiotics (Benzyl penicillin and Ampicillin) but sensitive to Aminoglycosides (high level synergy). One *Enterococcus faecalis* isolate was sensitive to Benzyl penicillin and Ampicillin but resistant to Aminoglycosides (high level synergy). In these cases, above said combination therapy seemed to be ineffective. According to them, Fluoroquinolones (66.7% resistance) and Macrolides (55.6% resistance) should not be used empirically for treatment of Enterococcal infection. Out of total nine isolated Enterococci, five were multidrug resistant (55.55%). Three out of four isolated *Enterococcus faecium* (75%) and one out of four isolated *Enterococcus faecalis* (33.33%) along with the isolated *Enterococcus gallinarum* comprised this multidrug resistant group.⁽¹²⁾

In the present study, majority of the *Enterococcus* isolates were resistant to ciprofloxacin (86.1%), amikacin (77.4%), co-trimoxazole (78.3%) and imipenem (52.2%). Vancomycin resistant enterococci (3.5%) were also isolated whereas in the study of Bhattacharyya et al, no Vancomycin resistant *Enterococcus faecalis* was isolated.

Enterococcal susceptibility pattern to Nitrofurantoin is inconsistently reported by other workers.

SUMMARY & CONCLUSION: Highest incidence of *E. faecalis* UTI occurred in the 21-30 year age group, infection is commoner in females and enterococcal UTI can present as both community acquired and hospital acquired infections. Incidence of community acquired and nosocomial UTI due to *E. faecalis* is almost equal. Nosocomial UTI occurred most frequently in the gynaecology ward. The incidence of drug resistance in *E. faecalis* is high i.e, 3.5% Vancomycin resistant enterococci (VRE) were isolated. Such increasing level of resistance by different isolates of *Enterococcus* poses a threat to both community & in nosocomial set up as it tends to limit treatment options. These facts necessitate the study the epidemiology and resistogram of enterococcal urinary tract infections vividly in health care setup as well as in community.

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