

Original Research Article


Isolation of Enterococci in Women and Antibigram in Tertiary Care Maternity Hospital

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	International Archives of Integrated Medicine, Vol. 4, Issue 6, June, 2017. Copy right © 2017, IAIM, All Rights Reserved. Available online at http://iaimjournal.com/	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 11-05-2017	Accepted on: 20-05-2017
Source of support: Nil		Conflict of interest: None declared.
How to cite this article: Vijayalaxmi P, Saroja Adapa. Isolation of Enterococci in Women and Antibigram in Tertiary Care Maternity Hospital. IAIM, 2017; 4(6): 55-59.		

Abstract

Background: Enterococci are gram positive bacteria under family enterococcaceae which occur in pairs or short chains.

Aim of the study: The study was conducted on women who are attending to antenatal outpatient department for routine Antenatal / Postnatal checkups and admitted patients with symptomatic bacteriuria and asymptomatic bacteriuria over a period of four years.

Materials and methods: This study was done in GMH Sultan Bazar during year January 2011 to December 2015. Socio-demographics and other independent variables were collected from each study participants by using self-structured questionnaire. Data collection was done by principal investigator under the supervision of the advisors.

Results: Out of 1544 samples of urine Enterococci was isolated in 80 samples as pure form and as mixture form along with Escherichia coli, Klebsiella and Proteus species. Age 20-30 years were most common effected.

Conclusion: Though in various studies the resistance of Enterococci to glycopeptide and vancomycin is reported 1-3% and 11-13%, in our study the Enterococci are 99.75% sensitive to vancomycin which is not routinely used and they are resistant to commonly used penicillin, Methicillin and cephalosporins.

Key words

Enterococci, Antibigram, Minimal inhibitory concentration.

Introduction

Enterococci are gram positive bacteria under family enterococcaceae which occur in pairs or short chains. Around 35 species have been identified and widely distributed in nature. They are normally found in the intestine, oral cavity, female genital tract of humans and animals [1]. Those organisms are catalase negative and facultative anaerobic organisms. Enterococci can able to proliferate in wide temperature range (5 °C-65 °C) and pH (4.5–10.0). In addition, they can grow in the presence of 6.5% NaCl. These characteristics differentiate them from streptococci. Moreover, Enterococci hydrolyze esculin in the presence of 40% bile [2].

A systematic review conducted on bacterial nosocomial infections showed that, enterococci were among 3rd to 4th leading cause of nosocomial infections worldwide. Among the isolates, multiple antimicrobial resistant enterococci were more prevalent including vancomycin resistant [3]. Enterococci, though commensals in adult feces are important nosocomial pathogens. The most common nosocomial infection caused by these organisms is urinary tract infection and third most common cause of bacteremia from hospital acquired infections [4, 5]. Incidence of enterococci isolation and high resistance to glycopeptides, vancomycin is increased. Antenatal patients are immunocompromised, so even low virulence give them an excellent opportunity to become secondary invaders. Isolation of Enterococci from urine and its sensitivity and resistance pattern to Penicillin, Aminoglycosides, Cephalosporins, Quinolones, Methicillin and Vancomycin was studied.

The incidence of resistance of enterococci to various antibiotics studied with routine antibiotics along with vancomycin.

Materials and methods

This study was done in GMH Sultan Bazar during year January 2011 to December 2015. A total of 4398 women referred to Obstetrics and Gynecology department were included for this study. Systematic random sampling was performed to select the study participants. The study populations were patients who have been requested by physicians for culture and antimicrobial susceptibility test during the study period.

Socio-demographics and other independent variables were collected from each study participants by using self-structured questionnaire. Data collection was done by principal investigator under the supervision of the advisors. The data was collected from their places of the study participant's from outpatient departments or inpatient wards.

Clinical samples were collected from each study participant aseptically. Five to 10 ml of morning mid-stream urine samples were collected and processed within 2 hours of collection, Each collected samples were transported to the bacteriology laboratory, All the process of sample management has been conducted according to a pre-established standard operating procedure. Sample collected and inoculated on Nutrient agar, Blood agar, Macconkey agar, Potassium tellurite agar, 6.5% of sodium chloride agar. Isolation and sensitivity was confirmed with Grams staining, Heat Resistance Test, Bile esculin azide agar, biochemical test. Enterococci isolation by phenotyping and its sensitivity was determined by minimum inhibitory concentration method by using Kirby Bauer's disc diffusion method. (NCCL Standard method).

Standard Antibiotics used are Penicillin 10 mcg, Gentamicin 10 mcg, Bacitracin 0.04 mcg, Ciprofloxacin 15 mcg, Nalidixic acid 15 mcg, Co-trimoxazole, Methicillin 15 mcg, Cephalexin

15 mcg, Cefazolin 15 mcg, Cefuroxime 15 mcg, Vancomycin 15 mcg.

Results

Out of 1544 samples of urine Enterococci was isolated in 80 samples as pure form and as mixture form along with Escherichia coli, Klebsiella and Proteus species. Age 20-30 years were most common effected (**Figure - 1**).

Only Enterococci was isolated in 30% of cases and mostly it is along with other organisms (**Table - 1**). Enterococci are 99.75% sensitive to vancomycin and resistant to Norfloxacin (92.5%), Penicillin (90%), Co-trimoxazole (72.5%) and Ciprofloxacin (71%) as per **Table - 2**.

Figure - 1: Prevalence of enterococci in age groups.

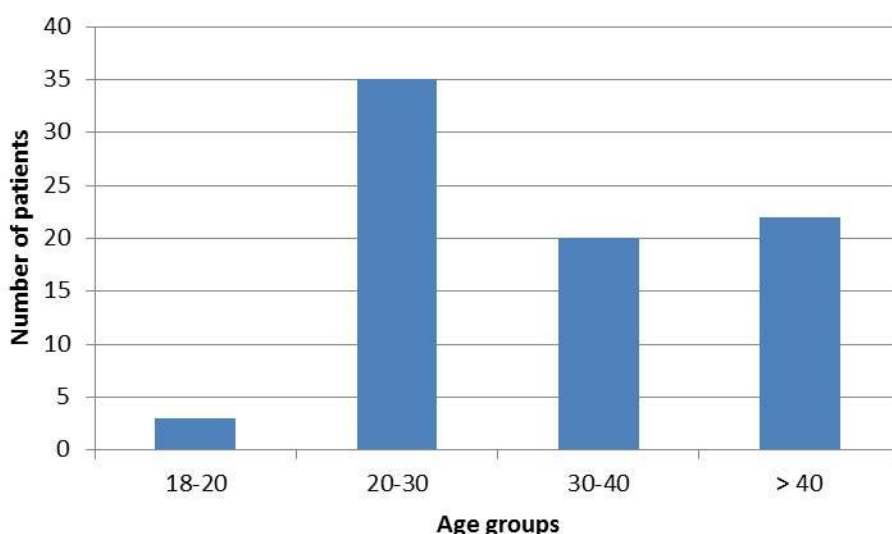


Table - 1: Bacterial Analysis in present study.

Name of the organism	Number of cases	Percentage
Only Enterococci	25	30%
Enterococci + E.Coli	20	25%
Enterococci +Klebsiella	19	23%
Enterococci +Proteus	16	22%

Table - 2: Sensitive and resistance pattern of Enterococci to various drugs.

Name of drug	Resistance	%	Sensitivity	%
Penicillin	72	90%	8	10%
Methicillin	36	45%	44	55%
Ciprofloxacin	57	71%	23	28.75%
Norfloxacin	74	92.5%	6	75%
Co-trimoxazole	58	72.5%	22	27.5%
1 st Generation Cephalosporin	26	32.5%	54	67.5%
2 nd Generation Cephalosporin	18	13%	62	16%
3 rd Generation Cephalosporin	44	55%	37	46%
Vancomycin	Nil	-	79	99.75%

Discussion

Enterococci are Gram positive cocci and occur in pairs (diplococci) or short chains. It is difficult to distinguish from streptococci on physical characteristics only. They belong to Phylum Firmisutes. They are of two types *Enterococcus faecalis*, *Enterococcus faecium* Enterococci as a part of intestinal flora are the common commensals of the gut. The emergence of enterococcal infection is leading to bacteremia, Urinary Tract Infection endocarditis, meningitis and nosocomial infections. They acquire resistance by both intrinsic and acquired mechanism. They became pathogenic since 1981 because of indiscriminate use of antibiotics which leading to resistance to various drugs.

In this study out of 4398 samples studied in 80 samples enterococci were isolated so the overall prevalence of enterococci was found to be 5.1%. This was in line with report from Nigeria 5.9% [6], Amelework Yilema is 6.2% [7]. However, it was lower than from annual summary reported to center for diseases control and prevention which was 14% [8] and also report from Saudi Arabia 31.71% [9]. The lower prevalence in the present study might be due to the variation in the study participants and the methods employed for detection of enterococci. That is, the study subjects included in the previous studies were hospitalized patients as their aim was to show hospital acquired infections.

On the other hand, the prevalence in the present study was higher than report from Kenya 0.22% [10]. This variation might be because of the Kenyan study participants included only outpatients. In addition, studies conducted in Ethiopia at deferent hospitals including Jimma, Felege Hiwot and UoGTH reported lower prevalence of enterococci which accounted for 0.59%, 0.64% and 2.13%, respectively [11-13]. The variation might be explained by the use of enterococci selective media in the current study which was not used in all the other studies. Moreover, the gradual increase in the prevalence of enterococci infections might have contributed

to the increased prevalence as evidenced by other studies [8].

In this study, vancomycin had better antimicrobial susceptibility to enterococci than the rest of antibiotics This result was similar with study conducted in Egypt with the susceptibility of vancomycin then to ampicilin, ciprofloxacin and chloramphenicol [14]. Most of the isolates were resistant to the tested antibiotics resistant to Norfloxacin (92.5%), Penicillin (90%), Co-trimoxazole (72.5%) and Ciprofloxacin (71%). The resistance patterns observed in the current study were higher than the previous study in Gondar, except for penicillin where a similar resistance pattern was recorded [15]. Sonal Saxena [16] reported resistance to drugs like Penicillin, Aminoglycosides, Cephalosporin and Vancomycin was around 0.3 to 7.5%. Inger Kühn, et al. [17] reported resistance to Vancomycin was reported less than 8% to 11%.

Patients attending health facilities for the cases of UTIs, wound infections and sepsis have to be critically examined for enterococci infection. Evidence on antimicrobial susceptibility testing of enterococci infections should be available before prescription of antibiotics and promoting rational drug use. Attention has to pay for inpatient, patients having history of any antibiotics or urinary catheterization for the suspension of enterococci infections. Finally, further study on species identification and antibiotic resistant in advanced and at large scale is demanding.

Conclusion

Though in various studies the resistance of Enterococci to glycopeptide and vancomycin is reported 1-3% and 11-13%, in our study the Enterococci are 99.75% sensitive to vancomycin which is not routinely used and they are resistant to commonly used penicillin, Methicillin and cephalosporins. This shows bacteria acquire resistance to indiscriminate use of antibiotics. So they should be used cautiously.

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