



Original Research Article

Prevalence of Group D Streptococci or Enterococci Isolates and their Antimicrobial Sensitivity Pattern Isolated from Various Clinical Samples In Tertiary Care Hospital, at Saharsa, North Bihar

Authors

Dr Ramanand Kumar Pappu^{1*}, Dr Maheshwar Narayan Singh²

¹Associate Professor, Department of Microbiology, Lord Buddha Koshi Medical College and Hospital, Saharsa

²Professor and HOD, Department of Microbiology, Lord Buddha Koshi Medical College and Hospital, Saharsa

*Corresponding Author

Dr Ramanand Kumar Pappu

Associate Professor, Department of Microbiology, Lord Buddha Koshi Medical College and Hospital, Saharsa

Abstract

Objective: *The aim of Present study was undertaken to evaluate the prevalence of Group D Streptococci or Enterococci isolates, isolated from the various clinical samples and to find out their Antimicrobial sensitivity Pattern.*

Materials and Methods: *A total of 2915 clinical samples or specimens (Urine, pus, wound swabs, blood cultures, discharges from fistula, peritoneal aspiration fluid, CSF and sputum) from both OPD and IPD of our hospital were received in our department. All samples were processed according to CLSI guidelines. Antimicrobial susceptibility test was done by Kirby Bauer's disc diffusion method. Antimicrobial drugs used are Amoxy-clav, Gentamicin, Azithromycin, Ciprofloxacin, Moxifloxacin, Cefepime + Tazobactam, vancomycin, Linezolid and Teicoplanin.*

Results: *Out of 2915 clinical samples, a total of 80 isolates (6.62%) of Enterococci were obtained. The highest incidence was from isolates of urine (4.30%), Pus (1.32%), wound swab (0.57%) and the least incidence was from fistula (0.08%), Blood culture (0.08%) and Peritoneal aspiration fluid (0.08%). Majority of Enterococci, 88% of the isolates were Enterococcus faecalis. Antimicrobial sensitivity pattern of the isolates showed 97% sensitivity to vancomycin and 100% sensitivity to the Linezolid and Teicoplanin.*

Conclusion: *Enterococci have emerged as a common cause of Hospital and Hospital acquired infection and incidence to the resistance of antibiotics is increasing. So Irrational and indiscriminate use of antibiotic can be avoided and antibiotic can be used after drug sensitivity testing.*

Keywords: *Enterococci, Infection, Antibiotics.*

Introduction

Group D Streptococci are part of the normal gastrointestinal flora. Apart from their long established propensity to cause urinary tract infections and endocarditis, Enterococci have traditionally been regarded as low-grade pathogens. Recently however enterococci have

emerged as a common cause of serious nosocomial infection and have been reported as the third commonest cause of hospital acquired infections in the United States. Serious Enterococcal infections are refractory to treatment and the mortality rate is high. Furthermore the incidence of resistance to the limited number of

antibiotics useful in treating enterococcal infections appears to be increasing. The ability of enterococci to colonize the gastrointestinal tract, plus the many intrinsic and acquired resistant traits which usually seem to have low virulence is given an excellent opportunity to become secondary invaders. Since nosocomial isolates of enterococci have displayed resistance to essentially every useful antimicrobial agent, it will likely become increasingly difficult to successfully treat and control enterococcal infections.

Materials and Methods

The present study was carried out in the Department of Microbiology, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, during the period of **June 2014 to December 2015**. A total of 2915 clinical samples or specimens (Urine, pus, wound swabs, blood cultures, discharges from fistula, peritoneal aspiration fluid, CSF and sputum) from both OPD and IPD of our hospital were received in our department. All the Swabs were transported in Amie's transport medium. All samples were processed according to CLSI guidelines. Gram's stain was performed with the pus and wounds samples and was inoculated on Blood and Mac Conkey's agar respectively. As for urine samples a standard loopful of urine was inoculated on nutrient, blood and Mac Conkey's agar. Blood cultures were incubated in Brain heart infusion broth overnight and sub-cultured onto solid medium and observed for growth.

Enterococci were identified on the basis of Gram's stain, catalase test, growth on bile esculin medium and the isolates were speciated by standard CLSI guidelines. Antimicrobial susceptibility test was done by Kirby Bauer's disc diffusion method, Antimicrobial drugs used are Amoxy-clav, Gentamicin, Azithromycin, Ciprofloxacin, Moxifloxacin, Cefepime + Tazobactam, vancomycin, Linezolid and Teicoplanin. All the media and Antimicrobial discs were supplied by Hai media, Mumbai.

Results

Out of 2915 clinical sample 80 isolates of Group D Streptococci or Enterococci were obtained. The overall incidence of group D streptococcal infections was found to be 6.62%. All the isolates showed 100% positivity on Gram's stain and catalase negativity which differentiated them from Staphylococci.

On Mac Conkey's agar all isolates produced tiny minute lactose fermenting colonies. Bile Esculin agar used for confirmation of Group D Streptococci also showed 100% positivity.

78 isolates showed growth in 6.5% NaCl and 60°C while all the 80 isolates showed growth in pH 9.6 broth. All the 80 isolates exhibited positivity for arginine hydrolysis test while only 71 were positive for resistance to tellurite and sorbitol fermentation.

Antimicrobial susceptibility by Kirby Bauer's disc diffusion method showed sensitivity to Amoxy-clav (72%), Gentamicin (62%), Azithromycin (78%), Ciprofloxacin (82%), Moxifloxacin (90%), Cefepime + Tazobactam (91%), vancomycin (97%) and 100% Sensitivity to Linezolid and Teicoplanin.

Discussion

The incidence of enterococcal infections among the 80 isolates obtained from various clinical samples studied indicated highest incidence in isolates of urine pus and followed by wound swabs, blood cultures and Sputum. The least incidence was noted in peritoneal aspiration fluid, Discharge from Fistula and CSF. Despite the difficulty in causing pure enterococcal infections, it is clear that enterococci can cause and contribute to abdominal and pelvic abscesses and sepsis. For example, enterococci have been reported as a cause of spontaneous peritonitis in cirrhotics and nephrotics and can cause peritonitis in patients on chronic ambulatory peritoneal dialysis. Enterococcal abscesses and bacteremia also occur with intrabdominal and biliary infections. Other sources include burn wounds, peripartum mothers and infants, bone and

intravascular catheters. Mortality of enterococcal bacteremia has generally been high, most

probably because of the underlying complicating factors.

Table shows various Types of clinical samples, Bacterial Isolates and Enterococci isolated from different clinical samples.

Clinical Sample received			Bacterial Isolates Enterococci, Kl. Pneumoniae, S. Aureus, Ps. Aeruginosa, Proteus spp, citrobactor spp, Candida albicans		Total No. of Enterococci Isolated from clinical samples from growth.	percentage
Sample Type	Total no. of sample	Percentage	Total No. of Isolates	percentage		
Urine	1168	40.06	592	50.68	52	4.30
Pus	1021	35.02	503	49.26	16	1.32
Wound Swab	312	10.7	82	26.82	7	0.57
Blood cultures	248	8.5	14	5.64	1	0.08
Peritoneal Aspiration fluid	42	1.44	5	11.9	1	0.08
Discharge from Fistula	26	0.89	3	11.5	1	0.08
CSF	18	0.61	0	0	0	0
Sputum	80	2.74	9	11.25	2	0.18
Total	2915	100%	1208	1208/2915=41.44%	80	80/1208=6.62%

Urinary tract infections are commonly caused by enterococci particularly among hospitalized patients. In persons who have been instrumented, received antibiotics, have structural abnormalities, and or recurrent urinary tract infections, the rate of urinary colonization and infection by enterococci rises.

In two studies which reviewed all blood cultures positive for enterococci 2 of 114 (1.7%) and 2 of 79 (2.5%) patients were thought to have endocarditis. Enterococci cause an estimated 5 to 15% of bacterial endocarditis. As with other enterococcal infections most isolates are *Enterococcus faecalis*. Enterococcal endocarditis occasionally occurs in children and rarely in infants. The disease may present as an acute or sub-acute illness. Common risk factors for enterococcal endocarditis included genitourinary and biliary portals. In Mandell's study, 50% of the men had preceding genitourinary instrumentation or UTI and 30% of the women had preceding abortion or instrumentation. Underlying heart disease is often present but is not a pre-requisite for the development for this disease.

Of the 80 isolates 51% were isolates of Enterococci only. The rest were combination with

other bacteria. In intra-abdominal or pelvic wound infections, wound cultures are frequently polymicrobial and the role of enterococci in this setting remains controversial.

As reported in earlier studies in this study also the majority of isolates were *Enterococcus faecalis* (88%). Enterococci are being recovered from wound infections at an increasing rate which likely results from increased antibiotic usage and emerging resistance among these organisms. In vitro studies have shown that the newer quinolones possess bactericidal activity against enterococci.

Of the presently available quinolones, ciprofloxacin, moxifloxacin the most active against enterococci. In this study also maximum sensitivity to quinolones was observed (>80%). 100% Sensitivity to Linezolid and Teicoplanin was much higher compared to the sensitivity of other antibiotics and the difference is statistically significant but this drug should be kept as a reserve drug and should not be used indiscriminately as otherwise resistance to this drug may also occur posing a threat to treatment.

In our study 3 isolates were resistant to Vancomycin by the disc diffusion method. Among

these one were from diabetic ulcer of the foot (pus), one was a baby with septicaemia (urine) and one each from patients with peritonitis and renal failure (pus) and all these patients had a prolonged hospital stay.

Since the initial reports of individual vancomycin resistant isolates, several reports have been published regarding either localised outbreaks of VRE or increased isolation of endemic vancomycin resistant strains. In general localised outbreaks have occurred in the ICU settings. Studies on the risk factors associated with the acquisition of enterococci expressing resistance to vancomycin have identified multiple antibiotics and prolonged hospital stays as independent factors.

Several reports have documented a sharp rise in the importance of enterococcus as a paediatric nosocomial pathogen. Dobson and Baker reported an increase in the incidence of neonatal enterococcal septicaemia with resistance to antibiotic therapy. Resistance to Vancomycin among species of Streptococci has been reported but the same need to be confirmed by finding the MIC.

Conclusion

Therefore, there is no other way than to stop all the malpractice, constantly conduct microbiological surveillance, follow infection control measures, Awareness to people against drug resistance, early discharge to infected patients, preventing colonization and other aseptic techniques. Antibiotic policy should be formulated in hospitals and depending on the antibiogram patterns, antibiotics should be used with caution as otherwise resistance to commonly used antibiotics may develop and pose serious threat in case of life threatening infections.

References

1. Guiney M, Urwin G. Frequency and antimicrobial susceptibility of clinical isolates of enterococci. *Eur J Clin Microbiol Infect Dis* 1993; 12:362-6.
2. Facklam R. Recognition of Group D Streptococcal species of human origin by Biochemical and physiological tests. *Appl Microbiol* 1972; 23(6):1131-9.
3. Gorensek MJ, Lebel MH, Nelson JD. Peritonitis in children with nephrotic syndrome. *Paediatrics* 1988; 81:849-56.
4. Maki DJ, Agger WA. Enterococcal bacteremia: clinical features, the risk of endocarditis and management. *Medicine (Baltimore)* 1988; 67:248-69.
5. Murray BE. The life & times of the enterococcus. *Clin Microbiol Rev* 1990; 3:46-65.
6. Wells LD, von Graevenitz A. Clinical significance of enterococci in blood cultures from adult patients. *Infection* 1980; 4:147-51.
7. Ruoff KL, DeLaMaza L, Murtagh MJ, Spargo MD, Ferraro MJ. Species identities of enterococci isolated from clinical specimens. *J Clin Microbiol* 1990; 28:435-7.
8. Schaberg DR, Culver DH, Gaynes RP. Major trends in the microbial etiology of nosocomial infection. *Am J Med* 1991; 91:795-52S.
9. Johnson AP, Uttely AHC, Woodford N, George RC. Resistance to vancomycin and teicoplanin: an emerging clinical problem 1990. *Clin Microbiol Rev* 1990; 3:280-91.
10. Dobson SRM, Baker CJ. Enterococcal sepsis in neonates: features by age onset and occurrence by focal infection. *Paediatrics* 1990; 85:165.
11. Schlaes DM, Marino J, Jacobs MR. Infection caused by vancomycin resistant *Streptococcus sanguis*. II. *Antimicrob Agents Chemother* 1984; 25:527-8.