Original article:

Comparison of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis

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ABSTRACT

Introduction: Infective endocarditis (IE) is the infection of lining of the heart or the valves, often affecting the muscles of the heart. It is a life threatening infection with high morbidity and mortality, in case if not aggressively treated with antibiotics or surgery (1).

Aim: To compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditisTo compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis in terms of Microbiological eradication and in terms of adverse event

Results: However in ouer study the effects of of vancomycin and Teicoplanin were found to be similar however Treatment with teicoplanin offer advantages over treatment with vancomycin-provided that similar clinical efficacy can be shown . studies with larger sample size are required to come to a conclusion.

Conclusion: Treatment with teicoplanin offer advantages over treatment with vancomycin-provided that similar clinical efficacy can be shown . studies with larger sample size are required to come to a conclusion

INTRODUCTION:

Infective endocarditis (IE) is the infection of lining of the heart or the valves, often affecting the muscles of the heart. It is a life threatening infection with high morbidity and mortality, in case if not aggressively treated with antibiotics or surgery (1). Despite the availability of improved diagnostic and therapeutic facilities, it remains a serious cardiac problem (2). The reported incidence of IE is between 1.7 and 6.2 per 100,000 cases per year, and it has been on the increase and been changing in recent years (3). Overall mortality remains increased, ranging from 21–50%, over the past three decades with an operative mortality of 5–30%, despite recent advances in diagnosis, medical and surgical management of patients with IE (4). The epidemiology, clinical and microbiologic spectrum of IE is different in Indian population, compared to the west and usually depends on the type of endocarditis (native valve or prosthetic) (5). In most developed countries, NVE accounts for 84.5% of cases and PVE accounts for 7–25% of cases of IE (5). The changing spectrum of IE was described through several data available from the developed countries (4). Chronic rheumatic heart disease was found to be the leading cause of chronic valvular disease, comprised of 46% of all cases. Common organisms causing IE include streptococci, staphylococci,

enterococci and fastidious Gram-negative coccobacilli. Other rare causes are mycobacteria, rickettsia, chlamydia and fungi (1). Staphylococcus aureus remained the most common cause of bacterial endocarditis in India (6–8).

Glycopeptide antibiotics, such as teicoplanin and vancomycin, are active against staphylococci (including methicillin resistant strains), streptococci, enterococci and Clostridium spp. Vancomycin and teicoplanin are both widely used in the treatment of infections caused by Gram-positive organisms. Vancomycin can, however, provoke a number of side-effects, and serum concentrations should be monitored during treatment. Teicoplanin has a longer half-life than vancomycin, it can be given as an intravenous bolus or by intramuscular injection, and nephrotoxicity and ototoxicity are relatively uncommon. Treatment with teicoplanin might, therefore, offer advantages over treatment with vancomycin-provided that similar clinical efficacy can be shown (9).

AIM & OBJECTIVES

Aim: To compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis

Objectives:

1. To compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis in terms of Microbiological eradication
2. To compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis in terms of adverse events.

MATERIAL AND METHODS:

Study design: Descriptive longitudinal

Study population: Patients diagnosed with infective endocarditis visiting NAME OF THE STUDY SITE

Study period:2 years

Sample size:50

Ethical clearance: The study will be initiated after approval of Institutional Ethical committee.

Selection criteria: Patients diagnosed with infective endocarditisvisiting NAME OF THE STUDY SITE, will be subjected to the following inclusion and exclusion criteria.

Inclusion criteria:

1. Patients diagnosed with infective endocarditis visiting NAME OF THE STUDY SITE.
2. Patients receiving treatment with Teicoplanin orVancomycin for treatment of Infective endocarditis.
3. Patients of age 18 years or above of either gender.
4. Patients willing to give written informed consent to participate in the study.

Exclusion criteria:

1. Patients having gram negative or mixed infections.
2. Patients allergic to Teicoplanin orVancomycin.
3. Patients who have already received dose of antibiotic.

   Patients who will satisfy the above inclusion and exclusion criteria will be included in the study. Written informed consent will be taken in all patients.

RESULTS

Statistic: - 100 patients were included in the study, of which 34 were females and 66 were males.

Table 1. Gender wise distribution of patients		Frequency	Percent
Gender	Female	34	34.0
	Male	66	66.0
	Total	100	100.0

Figure 1. Distribution of patients with respect to drug received
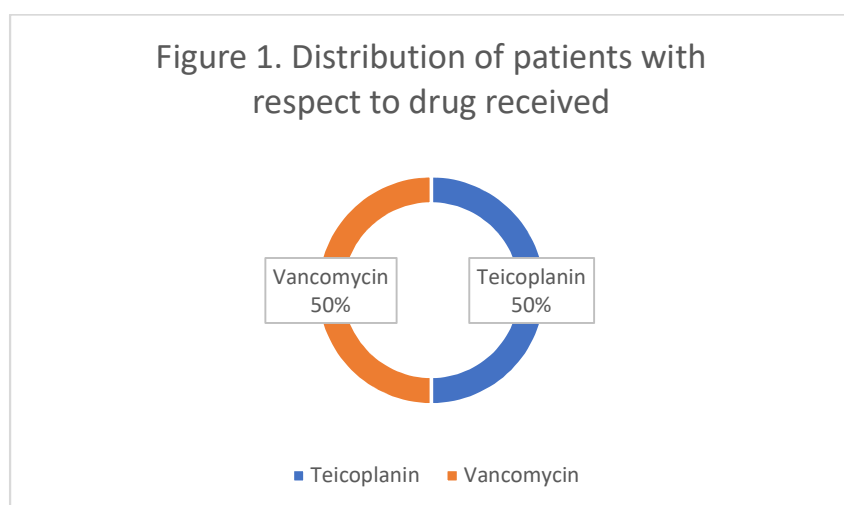
50 each were treated with Teicoplanin and Vancomycin, respectively.Most of the patients were diagnosed of fever under investigation, while 22 and 18 patients were diagnosed of enteric fever and gangrene, respectively.

Table 4. Distribution of patients with respect to organism found		Frequency	Percent
Organism	Coagulase Negative Staphylococci	11	11.0
	E Coli	12	12.0
	Enterobacter	17	17.0
	Enterococcus Faecalis	9	9.0
	Enterococcus Faecium	7	7.0
	Klebsiella	11	11.0
	Klebsiella Pneumoniae	15	15.0
	Pseudomonas	11	11.0
	Staphylococcus aureus	7	7.0
	Total	100	100.0

Enterobacter (17) followed by Klebsiella (15) and E coli (12) were the most common organisms found.

Table 6 LFT, RFT and serum electrolyte profile of patients		
	Mean	Std. Deviation
Age	43.8	15.0
Total bilirubin (mg/dL)	1.0	1.1
Albumin (g/dL)	4.0	0.4
Total Protein (g/dL)	7.0	1.5
ALT (IU/L)	33.0	21.0
AST (IU/L)	27.9	11.5
ALP (IU/L)	179.7	107.9
S. Urea (mg/dL)	43.4	12.1
S. Creatinine (mg/dL)	1.5	0.3
S. Uric acid (mg/dL)	5.6	0.9
Serum Sodium (mEq/L)	134.6	3.6
Serum Potassium (mEq/L)	4.0	0.8
Serum Calcium (mEq/L)	8.8	1.3
Serum Chloride (mEq/L)	95.6	8.9

Table 7 Age and Gender wise distribution of patients				
	Gender	N	Mean	Std. Deviation
Age	Male	66	46.4	14.7
	Female	34	38.7	14.3

Independent sample t test, P= 0.014 The mean age of Males was statistically higher than as compared to that of females.

| Table 10 Distribution of patients with respect to Diagnosis and Treatment given				
		Drug		Total
		Teicoplanin	Vancomycin	
Diagnosis	Enteric fever	11	11	22
	Fever	30	30	60
	Gangrene	9	9	18
Total		50	50	100

With respect to diagnosis, both treatments were equally distributed among the patients of enteric fever, fever under diagnosis and gangrene.

Table 11 Distribution of patients with respect to Odema before treatment and Treatment given				
		Drug		Total
		Teicoplanin	Vancomycin	
Odema	++	29	29	58
	+++	21	21	42
Total		50	50	100

Table 12 Distribution of patients with respect to Odema after treatment and Treatment given				
		Drug		Total
		Teicoplanin	Vancomycin	
Odema	+	22	22	44
	++	28	28	56
Total		50	50	100

Table 19 Distribution of patients with respect to occurrenceLeucopenia and Treatment given				
		Drug		Total
		Teicoplanin	Vancomycin	
Leupenia	No	49	48	97
	Yes	1	2	3
Total		50	50	100

Leucopenia was observed in 2 patients receiving Vancomycin and 1 patient receiving Teicoplanin.

igure 20 Distribution of patients with respect to Occurrence of rash and Treatment given
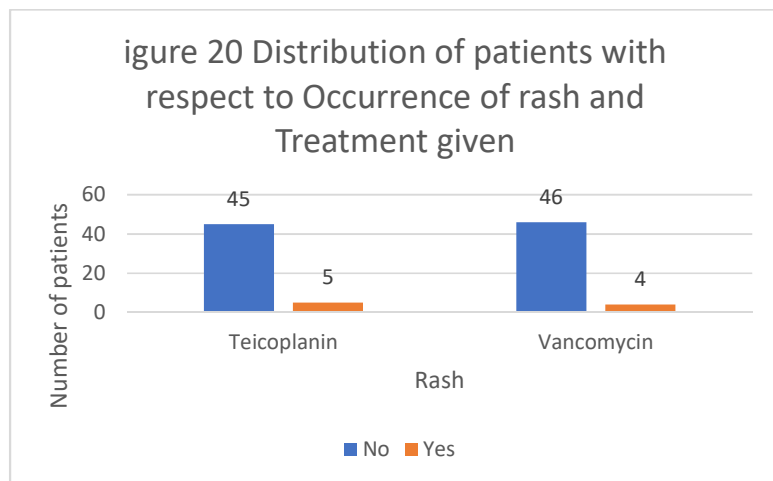
Table 23 difference in WBC, ESR and CRP before and after treatment of patients with respect to drug administered.

Parameter	Drug administered	Mean	SD	P value
WBC count	Teicoplanin	10704	3991.4	P<0.001
	Vancomycin	7612	4464.8	
ESR	Teicoplanin	12.9	9.3	P>0.05
	Vancomycin	14.9	8.7	
CRP	Teicoplanin	54.6	16.3	P>0.05
	Vancomycin	48.0	16.3	

Discussion:-

Infective endocarditis (IE) is the infection of lining of the heart or the valves, often affecting the muscles of the heart. It is a life threatening infection with high morbidity and mortality, in case if not aggressively treated with antibiotics or surgery (1). Glycopeptide antibiotics, such as teicoplanin and vancomycin, are active against staphylococci (including methicillin resistant strains), streptococci, enterococci and Clostridium spp. Vancomycin and teicoplanin are both widely used in the treatment of infections caused by Gram-positive organisms. Vancomycin can, however, provoke a number of side-effects, and serum concentrations should be monitored during treatment. Teicoplanin has a longer half-life than vancomycin, it can be given as an intravenous bolus or by intramuscular injection, and nephrotoxicity and ototoxicity are relatively uncommon. Treatment with teicoplanin might, therefore, offer advantages over treatment with vancomycin-provided that similar clinical efficacy can be shown (9). Considering all this facts The following study was done to compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis in terms of Microbiological eradication and to compare effect of Teicoplanin vs Vancomycin in patients of with MRSA of infective endocarditis in terms of adverse events.(table No.1) 100 patients were included in the study, of which 34 were females and 66 were males.(Fig No.2) 50 each were treated with Teicoplanin and Vancomycin, respectively.(Fig No.3) Most of the patients were diagnosed of fever under investigation, while 22 and 18 patients were diagnosed of enteric fever and gangrene, respectively.(Fig No.4) Enterobacter (17) followed by Klebsiella (15) and E coli (12) were the most common organisms found.(Fig No.5) Of the 100 patients, 16 experienced adverse events. Rash (9) followed by Diarrhea (4) and Leucopenia (3) was seen in the patients.(Table No.6) The mean age of the patients was 43.8 ± 15.0 years. (Fig No.6a) The mean Total bilirubin, Albumin and Total Protein of the patients was 1.0 ± 1.1 mg/dL, 4.0 ± 0.4 g/dL and 7.0 ± 1.5 g/dL, respectively.(Fig No.6b) The mean ALT, AST and ALP of the patients was 33 ± 21, 27.9 ± 11.5 and 179.7 ± 107.9 IU/L, respectively.(Fig No.6c) The mean S. Urea and S. Creatinine ()of the patients was 43.4 ± 12.1 mg/dL and 1.5 ± 0.3mg/dL, respectively.(Fig No.6d) The mean Serum Potassium and Serum Calcium of the patients was 4 ± 0.8 mg/dLand8.8 ± 1.3mEq/L, respectively.(Fig No.6e) The mean Serum Sodiumand Serum Chloride of the patients was 134.6 ±   3.6and 95.6 ± 8.9mEq/L, respectively.(Table No.7) Independent sample t test, P= 0.014.(Fig No.7) The mean age of Males was statistically higher than as compared to that of females.(Fig No.8d) The pulse rate, Systolic & Diastolic BP,WBC count, ESR and CRP after treatment were significantly lower as compared to the

respective values before treatment.(Table No.9) Chi-squared Test for Independence , P < 0.0001.(Fig No.9) Vancomycin was significantly prescribed in higher number among males as compared to females.(Fig No.10) here our study is in accordance with the study done by Wood MJ. etal with the studyWith respect to diagnosis, both treatments were equally distributed among the patients of enteric fever, fever under diagnosis and gangrene.(Table No.17) Chi-squared Test for Independence, The P value is 0.4610.(Fig No.17) There was no statistical difference between the number of patients found Blood culture report positive with respect to treatment given.(Table No.18) Chi-squared Test for Independence, P = 0.9425. here our study is in accordance with the study done by Wood MJ. etal (Fig No.18) There was no statistical difference among the number of patients with respect to treatment received and type of organism found.(Fig No.19) Leucopenia was observed in 2 patients receiving Vancomycin and 1 patient receiving Teicoplanin.(Fig No.20) Rash was observed in 4 patients receiving Vancomycin and 5 patient receiving Teicoplanin.(Fig No.21) Diarrhea was observed in 2 patients each receiving Vancomycin and Teicoplanin.(Table No.22) Unpaired T test.There was no statistically significant difference found among the patients receiving Teicoplanin and Vancomycin with respect to LFT, RFT and serum electrolytes levels.(Fig No.23a) The drop in WBC count after treatment with Teicoplanin (10704.0 ± 3991.4) was significantly higher as compared to that with Vancomycin (7612 ± 4464.8).(Fig No.23c) There was not statistically significant difference between the change in CRP and ESR levels among the patients receiving Teicoplanin and Vancomycin.here our study is in accordance with the study done by ghosh etal however in ouer study the effects of of vancomycin and Teicoplanin were found to be similar however Treatment with teicoplanin offer advantages over treatment with vancomycin-provided that similar clinical efficacy can be shown . studies with larger sample size are required to come to a conclusion

Conclusion

Treatment with teicoplanin offer advantages over treatment with vancomycin-provided that similar clinical efficacy can be shown . studies with larger sample size are required to come to a conclusion

REFERENCES:

1. Kucukates E, Gultekin N, Bagdatli Y. Cases of active infective endocarditis in a university hospital during a 10-year period. J Pak Med Assoc 2013;63:1163–1167.

2. Khan NU, Farman MT, Sial JA, Achakzai AS, Saghir T, Ishaq M. Changing trends of infective endocarditis. J Pak Med Assoc 2010;60:24–27.

3. Beynon RP, Bahl VK, Prendergast BD. Infective endocarditis. BMJ 2006; 333:334–339.

4. Senthilkumar S, Menon T, Subramanian G. Epidemiology of infective endocarditis in Chennai, South India. Indian J Med Sci 2010;64:187–191.

5. Nunes MC, Gelape CL, Ferrari TC. Profile of infective endocarditis at a tertiary care center in Brazil during a seven-year period: prognostic factors and in-hospital outcome. Int J Infect Dis 2010;14:e394–398.

6. Wallace SM, Walton BI, Kharbanda RK, Hardy R, Wilson AP, Swanton RH. Mortality from infective endocarditis: clinical predictors of outcome. Heart 2002;88:53–60.

7. Ghosh S, Sahoo R, Nath RK, Duggal N, Gadpayle AK. A study of clinical, microbiological, and Echocardiographic profile of patients of infective endocarditis. Int Sch Res Notices 2014;2014:340601.

8. Gupta A, Gupta A, Kaul U, Varma A. Infective endocarditis in an Indian setup: Are we entering the 'modern' era? Indian J Crit Care Med 2013;17:140–147.

9. Wood MJ. The comparative efficacy and safety of teicoplanin and vancomycin. Journal of Antimicrobial Chemotherapy. 1996 Feb 1;37(2):209-22.