

Efficacy of Daptomycin against Clinical Isolates of Methicillin Resistant *Staphylococcus Aureus* (MRSA) in Surgical Unit of Tertiary Care Hospital

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ABSTRACT

Aim: Efficacy of daptomycin against clinical isolates of methicillin resistant *Staphylococcus aureus* (MRSA) from surgical ward in a tertiary care hospital.

Study Design: Descriptive study.

Place Of Study: Department of microbiology, Armed Forces institute of Pathology, Rawalpindi, from November 2013 to November 2014.

Methodology: MRSA isolates from various clinical samples were included in the study. API-staph was used to confirm MRSA. Susceptibility of MRSA against daptomycin was performed by E-strip method. The results were interpreted as recommended by Clinical Laboratory Standard Institute (CLSI) guidelines.

Results: Maximum number of MRSA were isolated from pure pus i.e. 67.6%. Total of 170 isolates were included in the study. We found resistance of MRSA against daptomycin in 03 (1.8%) cases.

Conclusion: Few number of isolates resistant from daptomycin, are at present not a threat. But in future this may create treatment problems.

Key words: MRSA, Daptomycin,

INTRODUCTION

Failure of treatment in invasive infections due to MRSA is common. To compare daptomycin with standard therapy in cases of bacteremia and endocarditis caused by *S. aureus* was carried out in which success rates were less than 50% with standard therapy, and these results were same for all the agents used^{1,2}

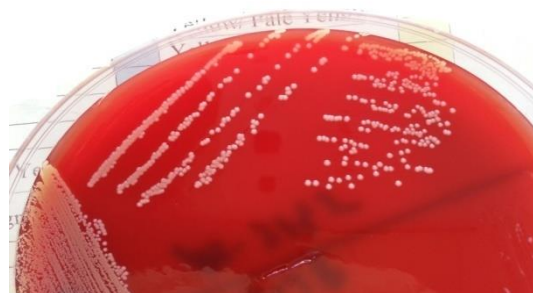
In another study, carried out in Madinah teaching Hospital with the aim of detecting resistance in 150 isolates of *S. aureus* against linezolid and vancomycin in treatment of various infection, found 46% and 13% resistance in MRSA strains against Linezolid and Vancomycin respectively^{3,4}. A study carried out with the MRSA isolates from UK, Saudi Arabia, and India, out of total 98 MRSA isolates, 27(27%) were intermediate resistant and 15(15%) were completely resistant to Vancomycin⁵.

METHODOLOGY

Different clinical samples of blood, urine, pus, pus swabs, tissue cultures, body fluids and broncho-alveolar lavage etc. from surgical wards were cultured on blood and MacConkey's agar. Staphylococcal colonies were

identified, isolates were confirmed and antimicrobial sensitivity was done by disk diffusion method as recommended by CLSI 2017.

Fig1: Colonies of *Staphylococcus* spp



After 24 hrs zone sizes were measured. Those isolates were taken, which appeared gram positive under the microscope, and were catalase and DNase positive.

RESULTS

A total of 170 isolates of MRSA were taken for this study. The detail of results is given in tables 1, 2, 3

Table 1: Efficacy of daptomycin against MDR and non-MDR cases

	MDR*	Non-MDR**	Total
Sensitive	16(9.4%)	151(88.8%)	167 (98.2%)
Resistant	1(0.6%)	2(1.2%)	3 (1.8%)
Total	17(10%)	153(90%)	170 (100%)

*Multidrug resistant ** Non multidrug resistant P value=0.16

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Table 2: Effect of type of specimen on efficacy of daptomycin

	Pus	Blood	Catheter Tip	Tissue	Total
Sensitive	115(67.6%)	26(15.3%)	19(11.2%)	07(4.1%)	167 (98.2%)
Resistant	01(0.6%)	00(0%)	02(1.2%)	00(0%)	03(1.8%)
Total	116(68.2%)	26(15.3%)	21(12.4%)	07(4.1%)	170 (100%)

Table 3: Effect of previous treatment with vancomycin on Efficacy of daptomycin

	Previously treated	Previously not treated	Total
Sensitive	13(7.7%)	154(90.6%)	167(98.3%)
Resistant	00(0%)	03(1.7%)	03(1.7%)
Total	13(7.7%)	157(92.3%)	170(100%)

DISCUSSION

In a study carried out in Lahore, the prevalence of MRSA was 14.5%. Our study shows that out of 170 isolates taken initially, 149(87.6%) isolates were MRSA and 21(12.4%) were MRSE.

In another study carried out in Iran, 53% of the isolates were found out to be MRSA. This differs widely and indicates the diversity of responses^{6,7}. In present study, the frequency of MRSA was found out to be 149 (91.25%) isolates during the confirmation through API-staph 21 (8.75%) isolates turned out to be MRSE. While Vancomycin is being used widely, daptomycin has proven itself to be effective replacement to Vancomycin. This has been also elaborated on a study carried out in 1250-bedded Hospital in America, which concludes that daptomycin is useful for MRSA treatment⁸.

CONCLUSION

Daptomycin has a good in vitro activity against MRSA strains tested in this study. It is found that the *in vitro* data that daptomycin can be considered as a new important addition in the market of weapons of antimicrobial agents.

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