

Letter to the editor

Incidence of clindamycin resistance in clinical isolates of *Staphylococcus aureus*

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Clindamycin is a lincosamide antibiotic used in staphylococcal infections. It is an attractive option for clinicians because it is available for parenteral and oral use, distributes well in tissues, and is highly bacteriostatic against *Staphylococcus aureus* [1]. However, the detection of its three resistance phenotypes (sensitive, resistant, inducible resistance) is crucial to guide antimicrobial therapy. Standard disk diffusion and broth microdilution fail to detect inducible clindamycin resistance [2]. Clinical and Laboratory Standards Institute (CLSI) recommends the double disk diffusion test (D-test) to detect the presence of inducible clindamycin resistance [3]. Also, the incidence of clindamycin resistance varies with geographic area and therefore local statistics are crucial to guide empiric therapy [4]. We undertook a retrospective study to estimate the incidence of inducible and constitutive clindamycin resistance in our hospital.

A total of 379 *S. aureus* isolates from clinical specimens such as pus, body fluids, endotracheal aspirates, and blood obtained in the period January to June 2008 at a tertiary care hospital in southern India were retrospectively included in this study. The isolates were identified as *S. aureus* by standard biochemical tests including the tube coagulase test [5]. Methicillin resistance was identified by disk diffusion using oxacillin and ceftioxin and interpreted according to CLSI 2008 guidelines. Inducible clindamycin resistance was tested per CLSI D-test guidelines by placing erythromycin (15µg) and clindamycin (2µg) discs 15 mm apart on a Muller Hinton agar plate [3]. Of the 379 *S. aureus* isolates in this study, 26% were MRSA. Overall, clindamycin

resistance was seen in 14% of the isolates of which 43% were inducible. Twenty-eight percent of the clindamycin sensitive isolates were erythromycin resistant. Forty-two percent MRSA isolates were clindamycin resistant in contrast to 5% MSSA. The results of the D-test are given in Table 1.

Disk diffusion detects constitutive clindamycin resistance but detection of inducible resistance requires the CLSI recommended D-test. In our study we found that 14% of the *S. aureus* were clindamycin resistant; 6% were inducible; and 8% were constitutive. Angel *et al.* reported 23.24% inducible clindamycin resistance with no constitutive resistance, and Gadepalli *et al.* reported inducible clindamycin resistance in 21% and constitutive resistance in 26.5% *S. aureus* isolates, whereas Deotale *et al.* found 3.6% constitutive and 14.5% inducible clindamycin resistance [6-8]. Our findings were similar to those of Gadepalli *et al.* in that we found that the constitutive phenotype was predominant in both MSSA and MRSA. Without the D-test we would have wrongly reported 23 (6%) of the isolates as clindamycin sensitive. In our study clindamycin resistance was significantly higher among MRSA isolates ($p < 0.001$), which is similar to the results of other studies [6-8]. The incidence of clindamycin resistance varies with geographic area, even in the same city [4]. Angel *et al.* conducted their study in the same part of the country as ours and yet there is a significant difference in resistance patterns. Studies such as ours are therefore necessary to guide empiric therapy. Detection of inducible clindamycin resistance should be done for accurate reporting of sensitivities.

Table 1. Findings of the disk diffusion test

Findings of the disk diffusion test				
	Erythromycin sensitive Clindamycin sensitive	Erythromycin resistant Clindamycin sensitive (D zone negative)	Erythromycin resistant Clindamycin sensitive (D zone positive)	Erythromycin resistant Clindamycin resistant
	No resistance	Only macrolide resistant	Inducible Clindamycin resistance	Constitutive Clindamycin resistance
<i>S. aureus</i> (379)	233 (62%)	92 (24%)	23 (6%)	31 (8%)
MSSA (280)	222 (79%)	45 (16%)	5 (2%)	8 (3%)
MRSA (99)	11 (11%)	47 (48%)	18 (18%)	23 (23%)

MSSA – Methicillin sensitive *Staphylococcus aureus*
 MRSA – Methicillin Resistant *Staphylococcus aureus*
S. aureus – *Staphylococcus aureus*

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