



Determining Inducible Clindamycin Resistance in Staphylococcus Aureus from Various Clinical Samples by D-Zone test with Special Reference with MRSA

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Abstract

Clindamycin is used in the treatment of skin and soft tissue infections caused by staphylococcus aureus and also alternative for patients who are allergic to penicillin.

Treatment of an infection caused by a strain carrying inducible erm gene using clindamycin or any non inducer macrolide can lead to clinical failure.

Thus making the need of detecting such resistance by a Disc test (D- Test).

Material & Methods: *D- test was used to detect inducible clindamycin resistance with standard erythromycin and clindamycin disc. Of the 147 S. aureus isolates, 95 were methicillin resistant staphylococcus aureus. 45.26% of these were inducible clindamycin resistant. There were 52 methicillin sensitive staphylococcus aureus isolates, only 11.53% of which were inducible clindamycin resistant.*

Conclusion: *Performing D test regularly, the diagnostic laboratory can properly guide clinician regarding judicious use of clindamycin in skin and soft tissue infection. thus Clindamycin could be a valuable weapon against staphylococcus infection.*

Introduction

Deciding the antimicrobial susceptibility of a clinical isolates is crucial for optimal antimicrobial therapy of infected patients. This is important to analyze the increase of resistance and the emergence of multidrug organisms. Clindamycin and erythromycin are only a good alternative antibiotic for treatment of MSSA and

MRSA causing systemic and local infections. However concern over the possibility of clindamycin resistance during therapy has discouraged some clinicians from prescribing it.⁶ Resistance mechanism to Clindamycin in staphylococcus aureus is mediated by a methylase encoded by erythromycin resistant methylase (erm) and macrolides streptogramins resistance

(msrA) genes³. Stains with inducible clindamycin resistance are not detected by the routine antimicrobial susceptibility tests as they appear to be erythromycin resistant and clindamycin susceptible in vitro, when they are kept adjacent to each other.⁵

Thus the aim of study was to determine inducible clindamycin resistance among staphylococcus aureus with relationship between clindamycin and methicillin resistance.

Material and Methods

The present study was conducted from Jan 2014 to Feb 2015. A total of 147 isolates of *Staphylococcus aureus* isolated from various clinical samples like pus, wound swab, aspirates, blood, blood fluids, respiratory, urine, central line, catheter tips etc were included in the study. Identification of staphylococcus aureus was done as per standard guidelines. Isolated strains were identified by using conventional methods (growth on mannitol salt agar, colony morphology, Gram stain, Catalase, Coagulase and DNase test). Antimicrobial susceptibility testing for methicillin resistance was performed according to Clinical and Laboratory standards Institute (CLSI) with Cefoxitin (30 mg) disc.² Each isolate was subjected to the disk diffusion test for detection of MRSA as recommended by CLSI. For detection of inducible clindamycin resistance, the D-test was performed on a lawn of staphylococcus aureus isolate on Muller-Hinton agar plate, standard discs of erythromycin (15 Mg) and clindamycin (2mg) were placed. Inter disc edge to edge distance between erythromycin and Clindamycin was fixed at 15mm. D-test was performed in *Staphylococcus aureus* which shows resistance to erythromycin (Zone size ≤ 13 mm) while being sensitive to Clindamycin (Zone Size ≥ 21 mm) and giving D shaped Zone of inhibition around clindamycin with flattening towards erythromycin Disc.⁴ Quality control was performed with *Staphylococcus aureus* ATCC 25923.

Results

Of the 147 *Staphylococcus aureus* isolates, most of were obtained from pus followed by blood, central line, umbilical catheter, urinary catheters, urine and respiratory samples.

D-test was performed in *Staphylococcus aureus* which shows resistance to erythromycin (Zone size ≤ 13 mm) while being sensitive to Clindamycin (Zone Size ≥ 21 mm) and giving D shaped Zone of inhibition around clindamycin with flattening towards erythromycin Disc.

Table No 1

| Clinical Samples | MRSA (NO=95) | MSSA (No=52) |
|-------------------|-----------------|-----------------|
| Pus Swab | 63 | 25 |
| Blood | 11 | 11 |
| Urine | 06 | 07 |
| Sputum | 08 | 03 |
| Endotracheal tube | 07 | 06 |

Table No 2

| Organism | Total No of isolates | iMLSB phenotype |
|----------|----------------------|-----------------|
| MRSA | 95 | 43(45.26%) |
| MSSA | 52 | 06(11.53%) |

Discussion

MRSA is problematic, due to resistance to all beta lactam antibiotics and high resistance rates for antibiotics other than beta- lactams. On the other hand, the emergence of vancomycin decreased susceptibility and resistance required alternative treatment options. Clindamycin is a good alternative for Methicillin resistant and susceptible staphylococcal infections. In vitro routine tests for clindamycin resistance due to erm genes resulting in treatment failure.

In our study, we find that out of a total of 147 *Staphylococcus aureus*. Out of the 95 MRSA stains, inducible clindamycin resistance was noted in 45.26%.(43/95).and in MSSA stains, inducible clindamycin resistance noted in 11.53%. Ciraj AM e al (2009) showed inducible resistance to be 38.46% among MRSA while it was 12.9% among MSSA.¹

Inducible resistance were found higher in MRSA as compared to MSSA same finding was reported by deotale et al.⁷

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Conclusion

Performing D test regularly, the diagnostic laboratory can properly guide clinician regarding judicious use of clindamycin in skin and soft tissue infection. thus Clindamycin could be a valuable weapon against staphylococcus infection

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