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Detection of Inducible Clindamycin Resistance in Methicillin Resistant Staphylococcus Aureus

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Introduction

Methicillin-resistant strains of *S aureus* are resistant to all β-lactam antibiotics and frequently to many other antibiotic classes.

CA-MRSA (Community acquired) has a greater spectrum of antimicrobial susceptibility including to sulfa drugs, tetra cyclines, and clindamycin. CA-MRSA are more easily treated, though more virulent than HA-MRSA. About 75 percent of CA-MRSA infections are localized to skin and soft tissue.

β -lactam resistance is due to an alteration of the penicillin-binding protein PBP 2a, which is encoded by the chromosomal gene *mec A*. Once introduced into a microbial population, *mec A* may be transferred horizontally and recombined among methicillin-susceptible *S aureus* (MSSA) cells. This has led to the global spread of MRSA in association with increasing geographic mobility of infected patients and carriers of the organism.

Objectives

To determine the prevalence of MRSA among clinical isolates from patients with extensive impetigo at the Dermatology outpatient department.

To determine their susceptibility pattern to various antibiotics, especially inducible Macrolide Lincosamide Streptogramin B (iMLS$_B$) resistance.

Materials and Methods

A total of 50 pus samples received from patients with extensive impetigo in the department of Microbiology, Thoothukudi Govt Medical College was included in the study.

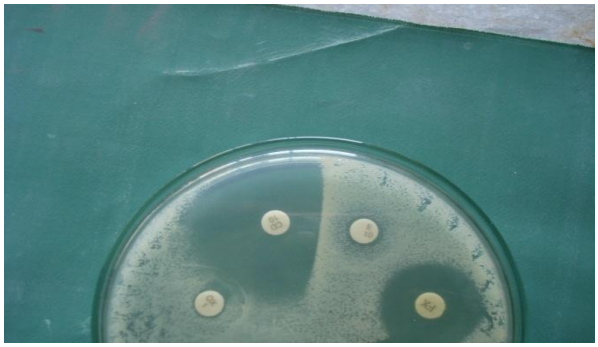
Methods

Pus samples received from patients with extensive impetigo received at the department of microbiology was screened for Methicillin Resistant Staphylococcus aureus using Mannitol Salt Agar with 2µg oxacillin disc.

The isolates were confirmed by standard protocol (Catalase test, Urease, Voges Proskear test, Slide & Tube coagulase test, Furazolidone & Bacitracin disc).

The antibiotic susceptibility was determined by Kirby Bauer disc diffusion method using Muller Hinton Agar Penicillin(10 U), Cephalexin (30µg), Amoxyclav (30µg), Erythromycin (15µg), Clindamycin (2µg), Vancomycin (30µg), Cotrimoxazole (25µg), Amikacin (30µg), Chloramphenicol (25µg), Tetracycline (30µg).

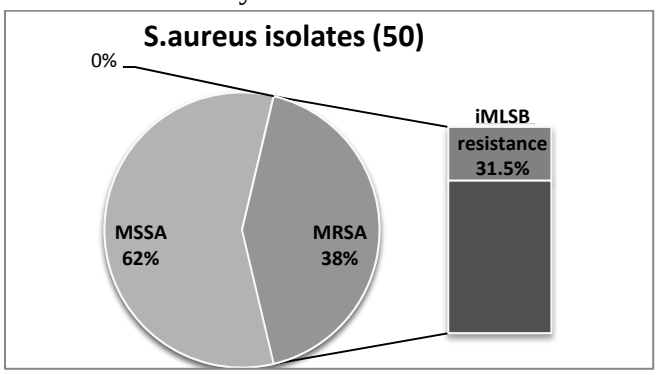
Methicillin resistance was confirmed using Oxacillin disc (1µg) and Cefoxitin disc (30 µg).
Inducible Macrolide Lincosamide Streptogramin ($iMLS_B$) resistance was identified by the D zone test (placing 15µg Erythromcin disc & 2µg Clindamycin disc at a distance of 15 cm on an agar plate that has been inoculated with a staphylococcal isolate and incubated overnight).
D zone test



A flattening of the zone of inhibition around the Clindamycin disk proximal to the Erythromycin disk (producing a zone of inhibition shaped like the letter D) is considered a positive result and indicates that the Erythromycin has induced Clindamycin resistance (a positive "D-zone test"). For Erythromycin-resistant isolates, induction tests can help laboratories determine whether results for Clindamycin should be reported as susceptible (when the induction test is negative) or as resistant (when the induction test is positive).

Results

Of the 50 isolates, 19 were Methicillin Resistant Staphylococci. Among the Methicillin resistant isolates 6 were positive for D test. The prevalence of MRSA was found to be 38% and Erythromycin inducible Clindamycin resistance was 12%.



Implications

MLS antibiotics are commonly used in treatment of staphylococcal infections.
Clindamycin is a frequent choice for some staphylococcal infections, particularly skin and soft-tissue infections, and as an alternative in the penicillin-allergic patient. It has excellent tissue penetration (except for the central nervous system) and accumulates in abscesses, and no renal dosing adjustments are needed. Good oral absorption makes it an important option in outpatient therapy or as follow-up after intravenous therapy.
Though Clindamycin is a useful drug in the treatment of skin and soft tissue infections caused by Staphylococcal species, the detection of a considerable rate of iMLSB resistance among Erythromycin resistant / Clindamycin sensitive strains suggests that, the true percentage of Clindamycin resistance may be underestimated if testing for inducible resistance is not performed.

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