

METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) IN SKIN ISOLATES FROM HOSPITAL ACQUIRED INFECTIONS

AM Sajna, Maria Kuruvilla, Shalini Shenoy, Gopal Krishna Bhat

Eighty-four isolates of *Staphylococcus aureus* (*S.aureus*) obtained from nosocomial infections were screened for methicillin resistance, which was found to be about 40.47%. This indicates a rising trend in the incidence of MRSA over the previous years. Early detection of resistant strains as well as prudent use of antibiotics can help to combat the global problem of resistance.

Key words : Methicillin-resistant Staphylococcus aureus, Nosocomial infections

Introduction

Staphylococcus aureus (*S. aureus*) is a versatile microorganism, an important nosocomial and community pathogen.¹ MRSA is notorious in causing serious infections among hospitalised patients.² Subsequent to the introduction of methicillin, epidemic strains of methicillin resistant staphylococcus aureus (EMRSA) emerged,³ and outbreaks of methicillin resistance in hospitals became a major problem in therapy and infection control.^{4,5} Limiting nosocomial transmission of these organisms, once they have become well established in a hospital has proven very difficult.

This work was stimulated by the on going impact of infections due to MRSA and the difficulties in preventing and treating them. The aim of this study was to evaluate the incidence of MRSA among staphylococcal isolates from nosocomial infections.

From the Department of Dermatology and Department of Microbiology, Kasturba Medical College, Mangalore.

Address correspondence to :

Dr. Maria Kuruvilla

Dept. of Dermatology, K.M.C, Attavar, Mangalore.

Materials and Methods

Eighty-four isolates of *S.aureus* obtained from various sources (Table I) of nosocomial infections were screened for methicillin resistance. Standard definitions were used for defining nosocomial infections.⁶ Antibiotic sensitivity patterns of *S. aureus* were determined using Kirby Bauer disc diffusion method.⁷ MRSA were identified by employing 1mg oxacillin disc.⁸ Resistance to a selected number of antibacterial agents are shown in Table II. Methicillin and erythromycin showed a resistance of 40.47%. Netilmicin resistance was exhibited by 3.57% isolates.

Discussion

Staphylococcus aureus is renowned for posing a challenge to antibiotics. Methicillin resistance is phenotypically associated with the presence of altered penicillin binding protein PBP 2a, (PBP 2¹).^{9,10} Penicillin group of antibiotics do not bind to this altered receptor and hence bacteria become resistant to methicillin. PBP 2a is encoded by the chromosomal *mec A* gene.¹¹ Methicillin resistance may also be associated with

mechanisms independent of mec A, resulting in borderline methicillin resistance.¹² These mechanisms include β lactamase hyper production, acquisition of structurally

Tabel I. Sources of staphylococcus aureus

Sources	Number	Percentage
Hospital acquired pyodermas (Abscesses, furunculosis, leg ulcers etc.)	22	26.19
Canula tip infections	13	15.47
Post operative wounds	28	33.33
Decubitus ulcers	3	3.57
Trophic ulcers with underlying osteomyelitis	7	8.33
Malignancy with secondary ulceration	11	13.09
Total	84	

modified normal PBP's and the appearance of small colony variants of *S.aureus*.¹³ Most methicillin resistant strains are multidrug resistant and mec A region may harbour several resistant determinants, resulting in clustering of resistance genes in this region.

Resistant strains are not only a major obstacle in treatment, but once established, infections are also likely to ratchet up the possibility of further transmission. In 1982, an American hospital outbreak reported an incidence of 30% MRSA.¹⁴ Other studies conducted in Japan re-

Tabel II. Drug resistance patterns of s. aureus

Antibiotic	Number (%) of strains resistant
Methicillin	34 (40.47)
Penicillin	66 (78.57)
Erythromycin	34 (40.47)
Netilmicin	3 (3.57)
Roxithromycin	18 (21.42)

ported an incidence of about 41.5% by 1992.¹⁵ There are many reports of increasing resistance of *S.aureus* from our country.^{16,17}

Our study depicts a rising trend in the incidence of MRSA, which may be accounted for by the indiscriminate and injudicious use of antibiotics. Antibi-

otics like erythromycin which are a first line weapon against many infections are becoming increasingly ineffective showing a resistance as high as 40.47%. Netilmicin is one of the drugs to combat MRSA infections. It is preferred to vancomycin because of its low cost and relatively few side effects. However, this study shows an emerging resistance pattern with netilmicin which emphasises restriction on its use.

In order to reduce the problem of antibiotic resistance, it is mandatory to survey and screen all clinical isolates for resistance. Our efforts should be concentrated not only on antibiotic use, but also on other confounding factors that contribute to resistance such as infection control practices. Contact isolation and strict asepsis should be enforced. This area warrants further studies on a larger number of isolates from various parts of the country in order to develop and apply evidence based guidelines on countering resistance.

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