

Prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) in community-acquired primary pyoderma

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ABSTRACT

Background: Although prevalence of MRSA strains is reported to be increasing, there are no studies of their prevalence in community-acquired primary pyoderma in western India. **Aims:** This study aimed at determining the prevalence of MRSA infection in community-acquired primary pyoderma. **Methods:** Open, prospective survey carried out in a tertiary care hospital in Mumbai. **Materials and Methods:** Eighty-six patients with primary pyoderma, visiting the dermatology outpatient, were studied clinically and microbiologically. Sensitivity testing was done for vancomycin, sisomycin, gentamicin, framycetin, erythromycin, methicillin, cefazolin, cefuroxime, penicillin G and ciprofloxacin. Phage typing was done for MRSA positive strains. **Results:** The culture positivity rate was 83.7%. *Staphylococcus aureus* was isolated in all cases except two. Barring one, all strains of *Staphylococcus* were sensitive to methicillin. **Conclusions:** Methicillin resistance is uncommon in community-acquired primary pyoderma in Mumbai. Treatment with antibacterials active against MRSA is probably unwarranted for community-acquired primary pyoderma.

Key Words: Community-acquired primary pyoderma, Methicillin-resistant *Staphylococcus aureus*

Staphylococcus aureus and *Streptococcus pyogenes* are the common causative agents of cutaneous bacterial infections.^[1] Methicillin-resistant *Staphylococcus aureus* (MRSA), once considered primarily as a nosocomial pathogen, is being increasingly reported from India as a colonizer in healthy individuals without risk factors and even in community-acquired infections, including pyoderma.^[2,3] The implications of these reports for the current prescription practices for cutaneous bacterial infections are obvious. It is therefore essential to determine the susceptibility pattern of clinical isolates of *S. aureus* in different communities across our diverse country. The present study was undertaken to determine the prevalence of MRSA in community-acquired primary pyoderma

in outpatients visiting an urban tertiary care hospital.

METHODS

This open prospective survey was carried out in a tertiary care hospital in Mumbai. Eighty-six consecutive patients with primary pyoderma visiting the dermatology outpatient between February and July 2004 were included. Patients with cellulitis, erysipelas, secondary pyoderma or those receiving local or systemic antibiotic therapy and those with a history of hospitalization within the last year were excluded.

Sterile swabs were used for aseptically collecting the

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exudate or pus from the lesions. They were then processed as per the standard protocol for the isolation of aerobic bacteria.^[4] The specimens were inoculated on 5% sheep blood agar; MacConkey's agar; and mannitol salt agar, which was used as a selective medium for *S. aureus*. *S. aureus* was identified based on Gram's stain morphology, colony characteristics and positive catalase and coagulase tests. Antimicrobial susceptibility test was performed by the Kirby Bauer Disc Diffusion method as per National Committee for Clinical Laboratory Standards (NCCLS) guidelines.^[5] The antimicrobials tested included penicillin G [10 units], erythromycin [15 mg], vancomycin [30 mg], sisomycin [10 mg], gentamicin [10 mg], framycetin [100 mg], ciprofloxacin [5 mg], cefazolin [30 mg] and cefuroxime [30 mg]. *S. aureus* ATCC 25923 was used as a control. Methicillin resistance was detected by using 1 mg oxacillin discs.

RESULTS

Eighty-six patients (54 males and 32 females) with community-acquired primary pyoderma were enrolled. Their ages ranged from 5 to 80 years (mean age = 36.1 years, median age = 38.5 years). Folliculitis [Table 1] was the predominant primary pyoderma (58.8%), followed by furunculosis (33.3%).

Of the 86 swabs cultured aerobically, growth was obtained in 72, with a culture positivity rate of 83.7%. Only one organism was isolated from any sample. *S. aureus* was the predominant pathogen, being isolated from 70 patients (81.4%). The remaining two isolates were *S. pyogenes*. All the strains of *S. aureus* [Table 2] were sensitive to vancomycin and sisomycin. The sensitivity to other antibiotics varied. Only one of the seventy strains of *S. aureus* was methicillin resistant.

Table 1: Distribution of primary pyoderma

Type of lesion	Number of patients	Percentage
Folliculitis	53	58.9
Furuncle	30	33.3
Impetigo	3	3.3
Ecthyma	3	3.3
Periporitis	1	1.1
Total	90	-

Table 2: Antibiotic susceptibility pattern of *S. aureus*

Antibiotic tested	Number of sensitive strains (n = 70)	Percentage of resistant strains
Vancomycin	70	0
Sisomicin	70	0
Methicillin	69	1.4
Gentamicin	69	1.4
Cefazolin	69	1.4
Cefuroxime	65	7.2
Ciprofloxacin	58	17.2
Framycetin	45	35.7
Erythromycin	40	42.9
Penicillin G	9	87.2

DISCUSSION

The present study was undertaken to determine the prevalence of MRSA in community-acquired primary pyoderma.

Folliculitis and furunculosis were the commonest primary pyoderma, seen in 58.8% and 33.3% of cases respectively. These have also been reported to be the most frequent primary pyoderma in some other studies,^[6,7] while in one study in children, impetigo was the commonest lesion.^[8] The majority of our patients were adults, which could account for the high frequency of folliculitis and furunculosis.

All samples in our study yielded monomicrobial flora, with *S. aureus* isolated from 81.4% of patients and *Streptococcus pyogenes* from 2.3%. Cultures were negative in 16.3% of the patients. Baslas *et al.* also reported negative cultures in 14.9% of patients.^[7] *S. aureus* is the predominant pathogen reported in other studies as well,^[3,6-10] including cases of secondary pyoderma. However, since Gram negative bacilli also account for secondary pyoderma, *S. aureus* is relatively less frequently associated with secondary pyoderma than with primary pyoderma.^[7,10] Other studies have reported polymicrobial flora ranging from 5-16%;^[8,9] this is not surprising since only patients with primary bacterial infections were selected for our study. In another study, *Streptococcus pyogenes* accounted for 26.98% of the total isolates.^[11]

Many reports from India and Asia have highlighted the prevalence of MRSA in the community as well as in community-acquired pyoderma.^[2,3,10,12] In a series

on community-acquired pyodermas from Mangalore, Nagaraju *et al.* reported that 11.8% of strains of 202 *S. aureus* strains were methicillin resistant.^[3] According to the National Staphylococcal Phage Typing Centre, New Delhi, there is an increase in the occurrence of methicillin-resistant strains of *S. aureus* from 9.83% in 1992 to 45.44% in 1998.^[13] MRSA strains were more common in southern India (30.94%) than in the west (20.33%) or north (18.88%). Thus, it is likely that the prevalence of methicillin resistance in community-acquired *S. aureus* strains also varies in different regions. In our study, only one of the seventy strains of *S. aureus* (1.4%) was methicillin resistant. This low prevalence was probably because our study included only community-acquired primary pyodermas as against the earlier retrospective study where samples from hospitalized and OPD patients were received from all types of infections.

In our series, the sensitivity of *S. aureus* strains to other antibiotics varied. All the strains were sensitive to vancomycin and sisomicin. They showed minimal resistance to first generation cephalosporins and gentamicin (1.4%). Resistance was greatest to penicillin (87.2%), followed by that to erythromycin (42.9%) and framycetin (35.7%), an antimicrobial used for topical application. Resistance to ciprofloxacin was 17.2%. In other studies too, an increasing resistance to erythromycin is being observed.^[3,13,14]

The emergence of antibiotic resistant strains poses a significant problem both in community as well as hospital practice in deciding empiric therapy. It is therefore important to monitor the changing trends in bacterial infections and their antimicrobial susceptibility patterns. Studies like the present one help in establishing the etiological agents and deciding empiric therapy from time to time. The increasing resistance observed to framycetin and erythromycin limits their use as first choice antimicrobial agents. In patients with primary pyodermas, cephalosporins and penicillinase resistant penicillins (e.g., methicillin, cloxacillin) can be considered as preferred first line systemic therapeutic agents. Similarly, the first choices of topical therapy for primary pyodermas are probably gentamicin and sisomicin rather than framycetin.

However, we have not been able to check the sensitivity of these isolates to some other popular topical antibacterials like sodium fusidate, mupirocin and nadifloxacin as our study was focused on the frequency of MRSA strains. In spite of this drawback, our findings indicate that it may probably be unnecessary to use antibacterials useful for MRSA strains on a routine basis for the empirical treatment of community-acquired primary pyodermas. However, these findings need to be confirmed by a larger study.

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