

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 pyodermas in Iraq.

Aims: This study aimed at determining the prevalence of MRSA infection in community-acquired primary pyodermas.

Methods: prospective survey carried out in Dermatology Department of Baghdad Teaching Hospital in Baghdad.

Materials and Methods: Eighty-six patients with primary pyoderma, visiting the dermatology outpatient, were studied clinically and microbiologically. Sensitivity testing was done for vancomycin, sisomicin, gentamicin, framycetin, erythromycin, methicillin, cefazolin, cefuroxime, penicillin G and ciprofloxacin.

Results: The culture positivity rate was 83.7%. *Staphylococcus aureus* was isolated in all cases except two. Barring one, all strains of *Staphylococcus aureus* were sensitive to methicillin.

Conclusions: Methicillin resistance is uncommon in community-acquired primary pyodermas in Baghdad. Treatment with antibacterial active against MRSA is probably unwarranted for community-acquired primary pyodermas.

Keywords: Community-acquired primary pyoderma, Methicillin resistant *Staphylococcus aureus*.

Introduction

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 as a colonizer in healthy individuals without risk factors and even in community-acquired infections including pyodermas, [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 pyodermas in outpatients visiting an care hospital.

Method

This open prospective survey was carried out in a Dermatology Department of Baghdad Teaching Hospital. Eighty-six consecutive patients with primary pyodermas visiting the Dermatology outpatient between February and

July 2008 were included. Patients with cellulites, erysipelas, secondary pyodermas 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 exudates 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 manitol salt agar, which was used as a selective medium for *Staphylococcus 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], sisomicin [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 1mg oxacillin discs.

Results

Eighty-six patients (54 males and 32 females) with community-acquired primary pyodermas 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 sisomicin. The sensitivity to other antibiotics varied. Only one of the seventy strains of *S. aureus* was methicillin resistant.

Table 1: Distribution of primary pyodermas

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 pyodermas. Folliculitis and furunculosis were the commonest primary pyodermas, seen in 58.8% and 33.3% of cases respectively. These have also been reported to be the most frequent primary pyodermas in some other studies, [6], [7] while in one study in children, impetigo was the commonest lesion, [8], [15]. 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 *Staphylococcus aureus* isolated from 81.4% of patients and *Strepto. 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], [7], [8], [9], [10] including cases of secondary pyodermas. However, since Gram negative bacilli also account for secondary pyodermas, *S. aureus* is relatively less frequently associated with secondary pyodermas than with primary pyodermas, [7], [10], [16]. Other studies have

reported polymicrobial flora ranging from 5-16%; [8], [9], [17] this is not surprising since only patients with primary bacterial infections were selected for our study. In another study, *Strepto. Pyogenes* accounted for 26.98% of the total isolates, [11], [18]. Many reports from Asia have highlighted the prevalence of MRSA in the community as well as in community-acquired pyodermas, [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], [19]. According to the reported 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], [20]. 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 OUT Patient Dermatology patients were received from all type of infection. 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, [12]. 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, cephalosporin and

penicillinase resistant penicillins (e.g., methicillin, cloxacillin) can be considered as preferred first line systemic therapeutic agents, [14]. 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, [12]. 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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الخلاصة

على الرغم من انتشار جرثومة الستافيلوكوكس اوريوس لكن لا توجد دراسات كثيرة عن مدى انتشارها في المجتمع وخاصة في العراق الأهداف: هذه الدراسة تهدف إلى تحديد مدى انتشار المرض (COMMUNITY ACQUIRED PRIMARY PYODERMAS) المـــواد والطرق: دراسة استقصائية أجريت على ستة وثمانون من المرضى المحتمل إصابتهم في مرض الابتدائي تقيح الجلد في مستشفى بغداد التعليمي (فرع الجلدية) وتمت الدراسة سريريا ومجهريا. وقد تم اختبار الحساسية الـ VANCOMYCIN, SISOMYCIN, GENTAMYCIN, FRAMYCIN ERYTHROMYCIN, METHICILLIN, CEFAZOLIN, CEFUROXIME, PENICILLIN G, CIPROFLOXACIN النتائج: كان معدل النتائج الايجابية حوالي 83.7%، المكورات العنقودية الذهبية كانت معزولة في جميع الحالات ماعدا اثنين وجميع سلالات هذه البكتريا كانت حساسة للميثاسلين. الاستنتاجات: الميثاسلين المقاوم هو غير شائع في مرضى المكتسبة الابتدائي (تقيح الجلد) في بغداد والعلاج المضاد للبكتريا نشطة ضد هذه الجرثومة.