ORIGINAL STUDY

The Prevalence and Characteristics of Community Acquired-Methicillin Resistant *Staphylococcus Aureus* (CA-MRSA) in Abha, KSA

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Abstract:

We carried out a study on the prevalence of CA-MRSA in Abha and found a rate of 16% in an environment where nosocomial MRSA rate is 46%. We believe that the rate of CA-MRSA could be much lower if the patients had been interviewed with a view to eliminate obvious risk factors.

Introduction:

Methicillin-resistant *Staphylococcus aureus* (MRSA), was first recognized in the 1960s and most cases of MRSA infections are acquired nosocomially (hospital-acquired or HA-MRSA[1].

Such HA-MRSA, are usually resistant to Penicillins, Cephalosporins, and the beta-lactam antibiotics. In addition, they are also resistant to multiple antibiotics, but sensitive to Vancomycin and Rifampicin. Recently, however, there have been increasing reports of community-acquired Methicillin-resistant *Staphylococcus aureus* (CA-MRSA), with distinct epidemiological markers[2]. The question then arises as to whether the CA-MRSA represents the spread of hospital MRSA into the community. Presently, there are no clear-cut answers to this question.

In a recent study of HA-MRSA prevalence in two of our hospitals in Abha[3] we got a rate of 46%. With such high rate of nosocomial MRSA, we decided to find out what the situation is in our community. This article discusses our findings.

Materials and Methods:

We carried out this study in the Microbiology Laboratory of Abha General Hospital.

Significant growth of *Staphylococcus aureus* from clinical specimens submitted to the laboratory from the outpatient Department from January 1 to June 30, 2004, form the basis of this report. The patients were neither seen nor interviewed. The isolation and identification of *Staphylococcus aureus* were performed according to standard Microbiological procedures.

E-Test Minimum Inhibitory Concentration (MIC) was performed using the E-test strips from AB BIODISK, Solna, Sweden according to the manufacturers' guidelines.

Results:

Table 1 shows the clinical specimens from which the *Staphylococcus aureus* isolates were made. Although some of these cases could be due to colonization, we left such decisions to the managing Physicians.

Table 2 shows the E-test MICs for Oxacillin and Vancomycin. Out of the 62 isolates, ten (16%), were MRSA, while 52 (84%), were MSSA. 70% of the MRSA had borderline resistance to Oxacillin (MIC 3-4 µg/ml) and 30% were highly resistant to Oxacillin (MIC > 256 µg/ml).

All the MRSA and MSSA were however sensitive to Vancomycin (MIC < 4 µg/ml).

Table 3 shows the antibiogram to common antibiotics. The MRSA were sensitive to all except Tetracycline and Ciprofloxacin. The MSSA also show good sensitivity to most of the antibiotics. Both the MRSA and MSSA were fully sensitive to Vancomycin and Chloramphenicol. The MRSA were fully sensitive to the amino glycosides and fully resistant to the Cephalosporins. The MSSA, on the other hand, shows varying degrees of sensitivity to both the amino glycosides and the Cephalosporins.

Table 4 shows the risk factors so far identified for HA-MRSA and suggested for CA-MRSA.

Discussion:

There is an increasing prevalence of infections with community-acquired Methicillin-resistant *Staphylococcus aureus* (CA-MRSA), worldwide, including Saudi Arabia[4,5,6]. MRSA was not acquired outside hospital until the 1980s, when intravenous drug users from Detroit were reported with MRSA bacteraemia[6].

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Table 1: Types of Clinical Specimens

S/No.	Specimen	No.	%
1	High vaginal swab	22	35.5
2	Skin & soft tissue infections	16	25.8
3	Urinary tract infections	11	17.7
4	Ear secretions	7	11.3
5	Respiratory specimens	2	3.2
6	Others	4	6.5
	Total	**62**	**100.0**

Table 2: Oxacillin and Vancomycin ES-Test MIC

	Oxacillin MIC (μg/ml)				Vancomycin MIC (μg/ml)				
	< 1	1-2	3-4	> 256	0.75	1	1.5	2	3
MRSA n = 10 (%)	0 (0)	0 (0)	7 (70)	3 (30)	1 (10)	0 (0)	1 (10)	6 (60)	2 (20)
MSSA n = 52 (%)	50 (96)	0 (4.0)	7 (0)	3 (0)	1 (1.9)	0 (1.9)	1 (23.0)	6 (55.8)	2 (17.3)

MRSA = Methicillin Resistant Staphylococcus Aureus
MRSA = Methicillin Sensitive Staphylococcus Aureus

Table 3: Percent Sensitivity of CA-MRSA and CA-MSSA

	C	VA	CD	TS	E	OT	CIP	AK	GM	TN	NET	CTX	CAZ	CRO
MRSA n = 10 (%)	100	100	100	100	100	0	0	100	100	100	100	0	0	0
MSSA n = 52 (%)	100	100	90	90	73	52	100	96	100	92	100	85	60	81

AK = Amikacin; GM = Gentamicin; TN = Tobramycin; NET = Netilmicin; CTX = Cefotaxime; CAZ = Ceftazidime; CRO = Ceftriaxone; C = Chloramphenicol; VA = Vancomycin; CD = Clindamycin; TS = Trimethoprim/Sulphamethoxazole; E = Erythromycin; OT = Oxytetracycline; CIP = Ciprofloxacin

Table 4: Practical Points

A. Identified Risk Factors for HA-MRSA

1. Invasive devices
2. Surgical procedures
3. Long stay in hospital > 2weeks
4. Old age
5. Male gender
6. Recent hospitalization
7. Antibiotic exposure
8. Care in an ICU
9. Injection drug user close proximity to a hospitalized patient who is colonized or infected with MRSA
10. Treatment with Ciprofloxacin
11. Renal dialysis

B. Suggested Risk Factors for CA-MRSA

1. Younger age group
2. Skin lesions
3. Contact with recently discharged patient from the hospital
4. Obtaining clinical specimen in the hospital vicinity

There has always been concern that MRSA would become prevalent in the community. Recent reports indicate that this is fast becoming true[2,5,7]. It has been speculated that if a person from the community manages to acquire the organism, he or she usually has been in close contact with someone who has been in a hospital or a resident of a long-term-care facility or an injection drug user[2]. However, it has been unclear whether CA-MRSA isolates represent the spread of hospital MRSA isolates into the community. Current evidence tends to suggest otherwise because there are differences in antibiogram, genetic and demographic features between CA-MRSA and HA-MRSA[2,7-12]. We did not interview our patients with a view to identifying any associated risk factors; if we did, we probably would have a lower prevalence of CA-MRSA.

It is gratifying that none of our CA-MRSA was resistant to Vancomycin and seventy-percent of them showed low-level resistance to Oxacillin (MIC 3-4 μg/ml) ***(Table 2)***.

Unlike the nosocomial MRSA which are resistant to all Penicillins and Cephalosporins and multiply resistant to Tetracycline, Chloramphenicol, Erythromycin and Amino glycosides, but sensitive to Vancomycin and Rifampicin, the CA-MRSA are usually non-multi-resistant MRSA[7,8]. Our results agree with this observation ***(Table 3)***.

We observed that our CA-MRSA were resistant to Tetracycline and Ciprofloxacin, unlike the CA-MRSA isolates recently reported from Minnesota[9]. Since our isolates are few, we cannot draw any conclusions at this stage. Curiously, the Minnesota study reported the presence of distinct clonal group of CA-MRSA from HA-MRSA. Could this be a universal

feature of all CA-MRSA? In addition, could it be responsible for the differences in the antibiogram between the two groups of MRSA? We await the reports of a similar study from other parts of the world to shed light on these grey areas. Also speculative at this point are the risk factors for CA-MRSA ***(Table 4)***. Until we know such risk factors, current infection control practices should apply to all cases of CA-MRSA, or else, their impact could be substantial if they become more frequent and widespread.

Acknowledgement:

We are grateful to Mr. Faisal Yousef Mustafa of Microbiology Laboratory, Abha General Hospital, for technical assistance.

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