

RESEARCH NOTE

CIPROFLOXACIN RESISTANCE AMONG COMMUNITY-DERIVED METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) STRAINS

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Abstract. Methicillin-resistant *Staphylococcus aureus* (MRSA) has been recognized as a nosocomial pathogen in Europe and North America for almost 3 decades. More recently it has emerged as a problem in long-term care facilities. However, It has been less frequently considered a pathogen in community-acquired infections, where it is most often seen in intravenous drug users. Consequently there has been very few studies, particularly in Bangladesh, documenting incidence of ciprofloxacin-resistance among MRSA in community patients. We tested clinical isolates from outdoor patients for ciprofloxacin resistance among MRSA strains, using *in vitro* susceptibility tests by standard disk diffusion technique. Results show significantly high incidence of ciprofloxacin resistance among MRSA isolates in these patients.

Methicillin-resistant *Staphylococcus aureus* is quite commonly isolated from out-patients in Bangladesh. In a retrospective susceptibility analysis of 132 urinary tract infection (UTI) and superficial and soft tissue infection (SSTI) samples, the overall oxacillin resistance was 25%.

All samples were collected from patients attending outdoor clinics in Dhaka city and then transferred to a central laboratory for processing and subsequent susceptibility analysis. Both disk-diffusion analysis and agar-dilution techniques were performed to confirm resistance against ciprofloxacin (≥ 21 mm, MIC ≥ 4 mg/l) and oxacillin (≥ 12 mm, MIC ≥ 4 mg/l). Different antibiotics including ciprofloxacin (5 μ g), nitrofurantoin (300 μ g), erythromycin (15 μ g), trimethoprim-sulfamethoxazole (25 μ g), oxacillin (1 μ g) and vancomycin (30 μ g) were used to assay resistance pattern in these isolates. All antibiotic disks were purchased from Oxoid, Unimed Ltd (UK) and NCCLS recommendations were followed for all assays (NCCLS, 1993a, b).

There were 50 UTI *S. aureus* isolates in this study which showed 44% oxacillin resistance. As seen from Table 1, incidence of ciprofloxacin resis-

tance is quite high in this MRSA subpopulation (40%), while only 7% in the oxacillin-sensitive *S. aureus* group. The picture is however, different in case of SSTI isolates (n=82) where MRSA incidence is 14%. Incidence of ciprofloxacin resistance is, however, extremely high in this sub-group (83%). All ciprofloxacin resistant MRSA isolates were completely sensitive to vancomycin (Table 1).

In a previous study, ciprofloxacin resistance among urinary tract *S. aureus* isolates was 29%, compared to overall resistance of ~20% among UT isolates (Iqbal *et al* 1997). This high ciprofloxacin resistance among *S. aureus* isolates, also seen in the present study, may be explained by the high cross-resistance among fluoroquinolones and methicillin. Studies carried out in other countries also report high MRSA incidence with concomitant increasing ciprofloxacin resistance in isolates collected from different body sites, even up to 80% in some MRSA populations (Jones *et al* 1994; Scheel *et al* 1996).

Unfortunately, due to lack of diagnostic facilities and ill-control over proper antibiotic prescription, empirical therapy, often injudicious, has been the norm in the rural areas and to some extent in urban areas. This has given rise to widespread antibiotic resistance, as seen in case of *in vitro* ciprofloxacin susceptibility (Iqbal *et al*, 1997). The effectiveness of fluoroquinolones against MRSA is likely to be seriously limited by the emergence of such resistance, already existent in other regions (Jones *et al*, 1994; Scheel *et al*, 1996).

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Table 1

In vitro activity of ciprofloxacin tested by NCCLS reference disk diffusion method for 132 *Staphylococcus aureus* isolates, obtained from Urinary tract infection and skin and soft tissue infection samples, based on their resistance to oxacillin.

Isolates tested (no.)	Oxacillin susceptibility (no.)	Ciprofloxacin		Ciprofloxacin resistance (%)	Vancomycin resistance ^a (%)
		Susceptible	Resistant		
Urinary tract isolates (50)	Resistant (22)	1	9	40	0
	Sensitive (28)	25	2	7	0
Skin and soft tissue isolates (82)	Resistant (12)	2	10	83	0
	Sensitive (70)	58	6	9	0

^aVancomycin susceptibility (≥ 12 mm zone diameter, MIC value ≤ 2 mg/l).

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