Research Note

Ciprofloxacin resistance among community-derived methicillin-resistant *Staphylococus aureus* (MRSA) strains

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Methicillin-resistant *Staphylococcus aureus* is quite commonly isolated from outparients 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 of Dhaka 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 (≤ 15 mm, MIC ≥ 4 mg/L) and oxacillin (≤ 12 mm, MIC ≥ 4 mg/L). Different antibiotics including ciprofloxacin (5 μg), nitrofurantoin (300 μg), erythromycin (15 μg), trimethoprim-sulfamethoxazole (25 μg), oxacillin (1 μg) and vancomycin (30 μg) 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 & 1993b).

There were 50 UTI *S. aureus* isolates in this study, which showed 44% oxacillin resistance. The incidence of ciprofloxacin resistance is quite high in this MRSA subpopulation (40%), but is only 7% in the oxacillin-sensitive *S. aureus* group (Table 1). The picture is different in SSTI isolates (n=82), where MRSA incidence is 14%. The incidence of ciprofloxacin resistance is however, extremely high in this sub-group (83%). All ciprofloxacin-resistant MRSA isolates were completely sensitive to vancomycin.

In a previous study, ciprofloxacin resistance among urinary tract *S. aureus* isolates was 29%, compared to overall resistance of about 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 inadequate control over proper antibiotic prescription, empirical therapy, often injudicious, has been the norm in rural and to some extent in urban areas. This has given rise to widespread antibiotic resistance, as seen in the 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.*, 1996).

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Table 1. *In vitro* activity of ciprofloxacin tested by NCCLS reference disk diffusion method for 132 *Staphylococcus aureus* isolates 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 (%)[1]
		Susceptible	Resistant		
Urinary tract isolates (50)	resistant (22)	12	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

[1]Vancomycin susceptibility (≥ 12 mm zone diameter, MIC value ≤ 2 mg/L)

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