

source of 51.6% *S aureus*, and 63.8% of CNS were isolated from blood cultures. The other strains were from specimens such as wound, catheter, pleural fluid, urine, urethral discharge, eye, and stool (Table).

Resistance rates of *S aureus* to other commonly used antibiotics were as follows: penicillin, 96.75%; cotrimoxazole, 70.2%; vancomycin, 9.2%; ciprofloxacin, 40.25%; erythromycin, 47.1%; clindamycin, 21%; and gentamicin, 61.03%. Resistance rates for CNS to these antibiotics were 97.82%, 78.3%, 4.3%, 21.73%, 27.7%, 10.6%, and 45.65%, respectively.

The ideal method for identification of MRSA is direct detection of *mecA*, but tests for the gene or its products are not yet performed routinely in most clinical microbiology laboratories. A reliable method for detection of MRSA in routine work is the oxacillin screen agar test. Oxacillin is preferred to methicillin because it is more stable. Sensitivity of oxacillin screen agar

approaches 100% for the detection of MRSA and 95% for CNS.<sup>4</sup>

In our country, the routine method for susceptibility testing is disk diffusion, but unfortunately this method is not well-standardized in many laboratories; for this reason, data obtained from various studies are not comparable. In addition, in developing countries such as Iran, standard disks and strains of organism are not available. Delayed transportation and failure of cold storage also affect the quality of antibiotics used as diagnostic reagents.<sup>5</sup> Our study was the only standard method for detection of MRSA in Iran.

As mentioned before, unfortunately the frequency of MRSA and resistance of CNS to methicillin are very high in Imam Khomeini Hospital. The rate of MRSA may be due to poor quality and misuse of antibiotics, inadequate hospital infection control, and inadequate drug-resistance surveillance.

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## MRSA Infection in Patients With Cystic Fibrosis

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Miall and colleagues from Leeds, United Kingdom, note that methicillin-resistant *Staphylococcus aureus* (MRSA) infection is increasingly found in patients with cystic fibrosis (CF). They conducted a study to determine whether MRSA infection has a deleterious effect on the clinical status of children with CF. Children with MRSA in respiratory cultures during a 7-year period were identified and compared with controls matched for age, gender, and respiratory function. Respiratory function tests, anthropometric data, Shwachman-Kulczycki score, Northern chest radiograph score, intravenous and nebulized

antibiotic therapy, and steroid therapy were compared 1 year before and 1 year after MRSA infection.

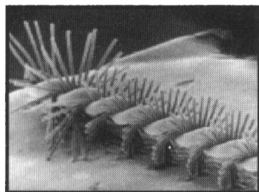
From a clinical population of 300, 10 children had positive sputum or cough swab cultures for MRSA. Prevalence rose from 0 in 1992 through 1994 to 7 in 1998. Eighteen controls were identified. Children with MRSA showed significant worsening of height standard deviation scores and required twice as many courses of intravenous antibiotics as controls after 1 year. They had significantly worse chest radiograph scores at the time of the first MRSA isolate and 1 year later, but showed no increase in the rate of decline in chest radiographic appearance. There was a trend toward lower FEV<sub>1</sub> and FEF<sub>25-75</sub> in children with MRSA.

There were no significant differences between the two groups with respect to change in weight, body mass index, or Shwachman score. There was no significant difference in prior use of steroids or nebulized antibiotics.

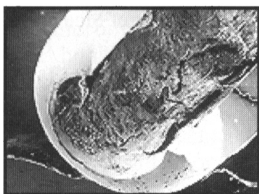
The authors concluded that MRSA infection in children with CF does not affect respiratory function significantly, but may have an adverse effect on growth. Children with MRSA require significantly more courses of intravenous antibiotics and have a worse chest radiograph appearance than controls.

FROM: Miall LS, McGinley NT, Brownlee KG, Conway SP. Methicillin-resistant *Staphylococcus aureus* (MRSA) infection in cystic fibrosis. *Arch Dis Child* 2001;84:160-162.

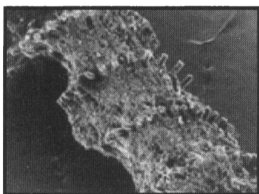
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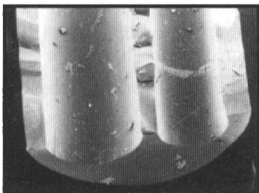
**A** Scanning electron micrograph of clean brush before use.



**B** Single-lumen catheter cut open, exposing biofilm and fibrin.



**C** Brush after going down catheter and retrieving biofilm and fibrin sample.



**D** Double-lumen catheter cut open after being brushed. Bio-load was similar to single-lumen in Photo B.

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