MRSA Trends: Skin Infections Rising in Children

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STOWE, VT. — Community-acquired methicillin-resistant *Staphylococcus aureus* infection incidence in children is increasing each year; and while sensitivities vary by region, the problem is not limited to areas of the United States previously characterized as disease "hot spots," said Dr. Howard B. Pride at a dermatology meeting sponsored by the University of Vermont.

A review of the recent literature on this topic provides insight into these and other clinically important trends, reported Dr. Pride, a pediatric dermatologist at Geisinger Medical Center, Danville, Pa. For example, multiple studies have shown that MRSA is emerging in children without established risk factors for infection, and many children with MRSA are not receiving antibiotics that have been shown to be effective against the pathogen. "Surprisingly, this doesn't seem to impact recovery, as outcomes, at least initially, appear to be similar between those children who do and do not get antibiotics that offer appropriate coverage," Dr. Pride said.

With respect to the increased incidence of community-acquired MRSA (CA-MRSA), the results of a 14-year study conducted at Driscoll Children's Hospital in Corpus Christi, Tex., demonstrated an exponential increase in community-acquired MRSA at that institution—"something that has been mirrored in many communities nationwide," Dr. Pride said. Investigators determined that of 1,002 MRSA cases at Driscoll between 1990 and 2003, 928 (93%) were community acquired.

From 1990 through 1999, the number of CA-MRSA cases ranged from 0 to 9 per year; in 2000 there were 36 cases, and in 2003 there were 459 cases. Of particular importance, according to Dr. Pride, was the authors' observation that "categorizing children with CA-MRSA infections into those with and without risk factors is losing any clinical relevance," because the observed antibiotic "susceptibility patterns and the spectrums of disease are becoming increasingly similar" (Arch. Pediatr. Adolesc. Med. 2005;159:980-5).

In an effort to assess the national burden and clinical effect of the increase in MRSA infections among patients without risk factors, a Centers for Disease Control and Prevention study evaluated population-based surveillance of two cities (Baltimore and Atlanta), as well as laboratory-based sentinel surveillance of 12 hospitals in Minnesota.

At one institution, the number of cases of CA-MRSA in children went from 36 in 2000 to 459 in 2003, a trend echoed in communities nationwide.

From the data, investigators identified 12,553 patients diagnosed with MRSA between 2001 and 2002. Of those, 1,647 infections were not associated with established risk factors and thus were classified as community-acquired MRSA disease. About 77% of these cases involved skin or soft-tissue infections, and 23% required hospitalization. The infection was fatal in one case.

The investigators found that the annual incidence of CA-MRSA varied according to site, with the most cases per 100,000 patients occurring in Atlanta. They also determined that the disease incidence was significantly higher among children younger than 2 years old and, in Atlanta, blacks were at greater risk for infection than were whites. In approximately 73% of the patients, the infecting strain of MRSA was resistant to prescribed antibiotics, yet in patients with skin or soft-tissue infections, treatment with inappropriate antimicrobials (usually β-lactam antibiotics) did not appear to correlate with differences in outcome (N. Engl. J. Med. 2005;352:1436-44).

Other studies seem to confirm the observation that CA-MRSA outcome may not be dependent on antibiotic coverage, Dr. Pride reported. Investigators from Brown University, Providence, R.I., reviewed the charts of 1,063 children with *S. aureus* cultures between 1997 and 2001. Of these children, 57 had confirmed MRSA infections and of those, 23 had CA-MRSA infections, predominantly in the skin and soft tissue. "Many of these children never received an antibiotic effective against MRSA, yet they still recovered," Dr. Pride said (Pediatrics 2004;113:e347-52).

Similarly, in Dallas, among 69 children

Continued on following page

Continued from previous page

whose culture-proven CA-MRSA skin and soft-tissue abscesses were drained, there was no difference in outcome on the basis of whether they received an antibiotic (Pediatr. Infect. Dis. J. 2004;23:123-7).

Although treatment with "ineffective" antibiotics may not give a worse outcome, there are some new data that give us "an inkling that appropriate antibiotic coverage is important," Dr. Pride said. An evaluation of a CA-MRSA outbreak in 13 high school football players on a western Pennsylvania football team showed that individuals whose initial skin infections were not treated with an antibiotic guided by bacterial sensitivities were 33 times more likely to develop a recurrent infection, compared with those who received appropriate antibiotic coverage. "Although the infections treated with only β-lactam antibiotics did not have a different outcome per se, they were at a high risk for recurrence," Dr. Pride noted (Pediatr. Infect. Dis. J. 2005;24:841-3).

Finally, another news maker in the infectious disease realm has been the reports of increasing clindamycin resistance, Dr. Pride said. In one study comparing *S. aureus* cultures from pediatric patients at 57 military hospitals and clinics, clindamycin resistance increased from 0.48% from 2001 to 2002, to 4% from 2003 to 2004. While most CA-MRSA are still susceptible to clindamycin, the possibility of inducible clindamycin resistance should lead to cautious use of the agent and to the consideration of treatment alternatives, Dr. Pride concluded (Pediatr. Infect. Dis. J. 2005;24:622-6).

Dr. Pride reported no conflicts of interest with respect to the medication agents discussed in his presentation. ■

Hep B Vaccine, Immunoglobulin Protect Neonates

Hepatitis B vaccines, hepatitis B immunoglobulin, and a combination of the two all prevent the infection from developing in newborns of mothers who are positive for hepatitis B surface antigen, reported Chuanfang Lee, a clinical pharmacist at Copenhagen University Hospital, and associates.

The researchers conducted a meta-analysis of 26 randomized trials that evaluated vaccine or immunoglobulin effectiveness and included newborns. The average duration of follow-up was 19 months, with a range of 6-60 months.

Compared with placebo or no intervention, hepatitis B vaccination significantly decreased the risk of transmission of the infection from mother to newborn. There was no difference between plasma-derived and recombinant vaccines. "However, more infants who received recombinant vaccine achieved antibody levels to hepatitis surface antigen," the investigators said (BMJ 2006 Jan. 27 [E-pub doi:10.1136/bmj.38719.435833.7C]).

There was no difference in effectiveness between high-dose and low-dose vaccine, or among different vaccination schedules. "Furthermore, our subgroup analyses did not show a strong association between timing of injection (within 12, 24, or 48 hours [of birth]) and magnitude of effects," they said.

However, because the number of infants in these trials was small, larger trials are needed to confirm that all doses, schedules, and forms of vaccine are equivalent, the investigators cautioned.

Hepatitis B immunoglobulin also lowered the risk of infection, compared with placebo or no intervention. The vaccine plus immunoglobulin combination was superior to vaccine alone. Few of the trials reported adverse events, so a metaanalysis of adverse events could not be carried out.

—Mary Ann Moon