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Rising number of severe bone infections, health complications in children linked to MRSA, UT Southwestern researchers find

DALLAS – June 30, 2008 – The emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) as a major pathogen has led to more complications and longer hospital stays for children with acute bone infections, UT Southwestern Medical Center researchers report.

Acute osteomyelitis, a bone infection that predominantly occurs in children, is usually caused by the staph bacteria. Treatment has traditionally been straightforward because most *S. aureus* bacteria can be killed with existing antibiotics.

Recently, however, more children with osteomyelitis have been developing the more severe, antibiotic-resistant, community-associated MRSA, resulting in more complications and prolonged antibiotic therapy and hospital stays.

“This study shows the transition from the normal *S. aureus* to the methicillin-resistant one that everybody calls the superbug,” said Dr. Octavio Ramilo, professor of pediatrics at UT Southwestern and senior author of a study available online and in the July/August issue of the *Journal of Pediatric Orthopaedics*. “What’s important about this is not only that MRSA infections are harder to treat because they are more resistant to the traditional antibiotics, but they are also more aggressive and cause more severe disease manifestations. This is reflected very clearly in this study.”

Dr. Asunción Mejías, assistant professor of pediatrics and co-lead author, said MRSA isn’t a new problem among children.

“But the MRSA that we used to see was acquired in the hospital,” she said. “This is a different strain that patients acquire in the community. Now, we see kids with osteomyelitis who have bone abscesses in the legs and who get blood clots that lead to pulmonary embolisms.

“We don’t want to alarm parents, but kids who limp or have backaches and fever after an otherwise minor trauma need to be evaluated by a physician,” Dr. Mejías said.

Dr. Ramilo said osteomyelitis might be more common in children because kids tend to be more accident-prone. Most commonly, the bones get infected when bacteria reach the bone through the blood supply. It is thought that minor trauma to the bone facilitates the start of the infection.

For the study, researchers culled the medical records of 290 children admitted to Children’s Medical Center Dallas between January 1999 and December 2003 with acute osteomyelitis. The median age of those surveyed was 6 years and most children were white or Hispanic. Sixty percent were male. Symptoms such as localized pain, fever, tenderness, swelling and limping were observed in more than

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half the patients.

The researchers divided the patient population into two groups (January 1999 to June 2001 and July 2001 to December 2003) to verify whether MRSA infections were becoming more common and more severe.

They then compared patients with MRSA osteomyelitis to children with non-MRSA osteomyelitis, which included those with methicillin-sensitive *S. aureus* (MSSA) infections. They also reviewed outcomes, including duration of fever, the type and length of antibiotic therapy, and the frequency of complications, such as muscle inflammation, bone abscesses, disseminated disease and the need to drain the bone surgically.

Though the clinical characteristics of the participants didn't change significantly between the first and second study periods, children who were treated in the latter period for osteomyelitis fared far worse, possibly because MRSA infections were more common, Dr. Ramilo said.

For example, in the second study period, bone abscesses were observed in 69 percent of the patients with MRSA osteomyelitis versus 26 percent among those with MSSA infections. Children admitted with MRSA osteomyelitis during the second study period also spent an average of 42 days on antibiotics, almost two weeks longer than those diagnosed with MSSA.

Dr. Ramilo said the number of children who needed surgery was also striking. Seventy-eight percent of the patients with MRSA required surgery, compared with 49 percent of those with MSSA.

He said the findings underscore the need for multicenter studies to identify the best antibiotic regimens as well as the best surgical approaches for complications.

"For now, the key is to treat the infection as early as possible with appropriate antibiotics and if needed, surgical drainage of the bone," Dr. Ramilo said.

Other UT Southwestern researchers involved in the study were Dr. Monica Ardura, postdoctoral trainee clinician in pediatrics; Dr. Dominick Cavuoti, assistant professor of pathology; Dr. Naveed Ahmad, biostatistician in clinical research; Drs. Estrella Peromingo and Sara Guillen, international research fellows; Dr. Ali Syed, former medical student; and co-lead author Dr. Jesús Saavedra-Lozano, a former fellow in infectious diseases.

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