Quicker, Simpler Tests Sought for MRSA Screening

Identifying colonized patients prior to or during hospitalization helps contain resistant bacteria.

BY BETSY BATES
Los Angeles Bureau

R esearchers at the Mayo Clinic and others are striving to develop rapid-detection tests for Staphylococcus aureus, both to better tailor appropriate antibiotic prescribing and to halt the galloping spread of methicillin-resistant strains of the bacteria.

“There are many companies now developing rapid tests,” Betsy McQuaughy, Ph.D., said in an interview. “Among the contenders are Innovative Biosensors Inc. in College Park, Md., which is using light-based technology developed at the Massachusetts Institute of Technology, and Quidel Corp., a cellular-based company about to introduce another genetic-based rapid test; and JM, which has ‘waded deep into this territory,’ said Dr. McQuaughy, director of the New York City-based nonprofit Committee to Reduce Infection Deaths.

Progress has been keenest in identifying colonized patients prior to or during hospitalization to help spread the resistant bacteria.

At the University of Maryland Medical Center in Baltimore, for example, patients considered at risk for methicillin-resistant S. aureus (MRSA) can be screened in 2 hours with a polymerase chain reaction (PCR) DNA test developed by Becton, Dickinson & Co., rather than waiting 24-48 hours to get results by culturing for the bacteria.

All intensive care unit patients are being screened at admission, on a weekly basis, and on discharge so that infected patients can be identified and treated with appropriate isolation and contact precautions, said Richard Venezia, Ph.D., professor of pathology and director of clinical microbiology at the university.

Just who are they? It’s not a generation of tests that are going to be using ‘within-the-tube’ closed systems,” based on either DNA or immunology, that represent a major technological advance in the way risky bacteria are identified, Dr. Venezia said.

The tests do not require complex interpretation nor the level of training or sophisticated precautions against cross-contamination that were necessary with previous PCR procedures developed in research laboratories.

The new tests are currently confined to hospital or community laboratories, but Dr. Venezia said that they will almost certainly be available for bedside or community office practices within 5 years. At the Mayo Clinic in Rochester, Minn., two swab-based PCR tests are being developed, one to signal the presence of S. aureus and another to identify MRSA. Dr. Mark Pittelkow, professor of dermatology, said in an interview.

S. aureus is rapidly overcoming streptococci as the bacteria of concern, Dr. Pittelkow said.

The Mayo tests, to be marketed by Roche Pharmaceuticals, use a specially designed swab that does not wick samples in the same way as the Becton test. “If this is the first of a generation of tests that are going to be using ‘within-the-tube’ closed systems,” he said.

Pittellkow also said that rapid tests are going to become even more necessary for hospitals, because the Centers for Medicare and Medicaid Services has proposed that Medicare diagnosis-related group reimbursements for nosocomial infections be stopped.

The advent of such restrictions on payments for hospital-acquired illnesses might lead some institutions to universally test patients on admission and throughout their stays. Treatment of an MRSA infection can run as much as $36,000, said Barbara Kalavik, director of worldwide public relations for Becton, Dickinson & Co. “We’re seeing the tests are still a matter of contention.

When a physician orders a test to pinpoint the best antibiotic to treat a patient, the cost can be charged to the patient or insurance. Who will bear the cost of screening hospital patients is less clear, Ms. Kalavik said.

Most hospitals absorb the cost of these procedures, she said, but “starting Jan. 1, 2007, new CPT codes have been instituted that allow for hospitals to be reimbursed approximately $49 for screening outpatients” for MRSA.

Pneumonia Caused by MRSA Can Have Rapid, Deadly Course

BY KATE JOHNSON
Montreal Bureau

■ A alert for severe cases of community-acquired pneumonia that might be caused by methicillin-resistant Staphylococcus aureus, the Centers for Disease Control and Prevention advised.

Although uncommon, community-acquired pneumonia (CAP) can be caused by methicillin-resistant S. aureus (MRSA). Such cases often affect young, otherwise healthy individuals and can be rapidly fatal. MRSA should be suspected in patients with severe pneumonia, especially during the influenza season, and in those with cavitary infiltrates. The index of suspicion for MRSA CAP should be particularly increased in those who have a history of MRSA skin infection or who have had close contact with MRSA-infected individuals, the CDC said (MMWR 2007;56;325-9).

During December 2006 to January 2007, 10 cases of severe MRSA CAP were reported to the CDC from Louisiana and Georgia. Patients ranged from 4 months to 48 years; eight were younger than 30 years. Five were female and five male. Six of the 10 patients died, including one who died in intensive care. MRSA was isolated in 14 cases.

One patient had a history of chronic hepatitis C and hypertension, and two were current smokers.

Four had documentation of recent MRSA skin and soft-tissue infection or were living with someone who did. In all 10 cases, influenza-like illness had been diagnosed prior or concurrent with CAP. Six patients had laboratory-confirmed influenza. Of six for whom vaccination status was available, none had received influenza vaccine for the 2006-2007 season.

Radiologic information, available for all 10 patients, showed unilobar infiltrates in 3 and multilobar infiltrates in 7. In three patients, MRSA was isolated from sputum only.

Notably particular was the short period between any respiratory symptom onset and either death or recovery of MRSA from the patient: Respiratory symptoms began a median of 3 days (range 2-6 days) before collection of specimens that grew MRSA. Of the six patients who died, the median period from onset to death was 3.5 days (range 2-25 days). All six died within 4 days of symptom onset.

These short durations suggest that the influenza virus and the MRSA infection probably occurred simultaneously. Concomitantly, the CDC noted.

—Miriam E. Tucker

Severity of CA-MRSA Pneumonia Linked to Panton-Valentine Toxin

BY KATE JOHNSON
Montreal Bureau

MONTRÉAL — The high mortality in community-acquired pneumonia caused by methicillin-resistant Staphylococcus aureus may be largely due to Panton-Valentine leukocidin toxin, said Dr. Ian Gould, consultant microbiologist at the University of Aberdeen (Scotland).

“Thus, efforts to control the infection should probably focus on the toxin as well as the bacteria,” Dr. Gould said at an international conference on community-acquired pneumonia.

“Even if the antibiotics can kill the bug, the toxin’s still there and that’s what’s doing the damage, he said in an interview at the meeting.

Panton-Valentine leukocidin (PVL) toxin is produced mostly by community-acquired, as opposed to hospital-acquired, strains of methicillin-resistant S. aureus (MRSA). And the prevalence is increasing, Dr. Gould said.

“Clearly, there have been big changes in the epidemiology of community-acquired MRSA, and now there are quite a few epidemiologic strains that produce PVL,” he said. In fact, according to a recent report from the Centers for Disease Control and Prevention, the frequency of reported community-acquired MRSA infections are PVL-producing strains (MMWR 2007;56:325-9; see story at left.) Yet although most of these infections involve children, Dr. Gould said, “we are seeing PVL-producing strains in elderly patients, too.”

According to Dr. Gould, high-dose clindamycin or linezolid are good options not only for their antibacterial effect but also because of their potential ability to lower PVL production. IV immunoglobulin is also well recognized as an adjunct, he said. In addition, gentamicin is indicated for patients who are bacteremic.

“We haven’t seen the end of the story by any means,” said Dr. Gould. “This is a rapidly developing organism.” Dr. Gould said. “I have to say things are going to get worse here before they get better.”