

Mistakes Made in the Utilization of Infectious Disease Tests: Screening for MRSA Colonization

This article is the third in a series.

Methicillin-Resistant *Staphylococcus aureus* (MRSA) is one of a group of microbial pathogens called multi-drug resistant organisms (MDRO). Although MRSA first emerged in the 1970s, this organism has recently captured the attention of the public, who perceive it as a serious new threat. Public concern for MRSA is directing hospitals to screen patients for MRSA, on admission, in an attempt to prevent the spread of this potential pathogen. Here are some things physicians should know about MRSA.

- MRSA are a sub-population of *Staphylococcus aureus*. *S. aureus* are carried by about 30% of the population at any given time. Patients with underlying illnesses or are undergoing invasive procedures are at risk of infection by the *S. aureus* they carry, but most people carry it without infection.
- About 5% of the population, including healthcare personnel, carry MRSA. Most of those people do not know they carry MRSA unless they have been cultured for some reason. People who carry it can keep it for years (persistent colonization), and if they lose it they often pick up a new strain later (intermittent colonization).
- The favorite place for *S. aureus*, including MRSA, to live on the body is the anterior nares. That area seems to have the right combination of moisture, temperature, nutrition, and adherence factors. MRSA can also colonize other warm, moist areas of the body, like the axilla, groin, and umbilicus. Nasal colonization spreads because people sneeze, rub their nose, and touch things.

LabWire is published monthly by Bronson Laboratory Services. If you have a topic you would like addressed in this publication, please call 341-8997 or send your request to Jeff Pearson, MD (pearsonj@bronsonhg.org).

- Culturing the nose will detect almost all MRSA carriers. A few people carry MRSA in places other than the nose, and the more places a patient carries it, the higher the risk of infection, but for simple screening, a nose culture is the highest yield for the money.
 - Patients can pick up MRSA in the hospital due to spread from other patients, often on the hands and equipment of healthcare personnel. Good hand hygiene prevents this. Use of antibiotics increases the likelihood of acquisition and carriage because antibiotics disrupt the patient's normal flora and allow the resistant MRSA to become established.
 - To prevent the spread of MRSA, hospitals are advised to maintain a record of MRSA-colonized patients and use contact precautions when these patients are re-admitted. Bronson uses such a system. The Infection Control department maintains the database, and the patient's MRSA status appears on the medical record face sheet.
 - It is possible to decolonize a patient who carries MRSA, but it can be difficult. You have to use topical antibiotic (usually mupirocin) in the nose, an oral antibiotic to attack the MRSA systemically, and daily application of an antiseptic (chlorhexidine) by bath or shower to knock out other sites of colonization. This procedure is a lot of trouble and may not be worth the expense for most patients.
 - It is also difficult to prove that MRSA colonization is gone because it can persist at a low level and hide out in several places. A test of cure following a decolonization protocol requires three sets of negative cultures taken a week apart at least a week after treatment from all the sites where MRSA may have been present. This process also may not be worth the expense for most patients.
- (continued)

New Test Announcement: Metapneumovirus Detection From Nasopharyngeal Swabs

The Virology Laboratory now performs testing for metapneumovirus, an important cause of acute respiratory illness affecting all ages, but especially the very young and the elderly. This test has been added to Bronson's Respiratory Viral Panel and can be ordered separately. Specimen required: Nasopharyngeal swab placed in viral transport medium.

Using this new test, metapneumovirus was identified in 6 Bronson patients diagnosed with respiratory infections in February and March 2009. Metapneumovirus was confirmed in all 6 cases by polymerase chain reaction (PCR) at a reference laboratory. PCR testing of specimens negative for metapneumovirus in our laboratory did not reveal any missed cases. This new test appears to offer excellent sensitivity and specificity for detection of metapneumovirus from nasopharyngeal swabs.

Infection with human metapneumovirus (hMPV) causes a broad spectrum of respiratory illness from mild symptoms to severe cough, bronchiolitis, and pneumonia. The clinical symptoms are similar to those seen with RSV infection and may also include high fever, myalgia, rhinorrhea, dyspnea, tachypnea, and wheezing. Hospitalization, supplemental oxygen and mechanical ventilation may be necessary in severe hMPV infections.

While bronchiolitis with or without pneumonia is the most common presentation of hMPV illness, other reported syndromes have included asthma exacerbation, otitis media, pneumonitis, flulike illness, community-acquired pneumonia and COPD exacerbation.

Reference:
<http://emedicine.medscape.com/article/237691-overview>

The Platelet Function Assay and the Aspirin/Plavix Resistance Assays Explained

The laboratory currently offers two assays that test platelet function. These are the Platelet Function Assay (PFA-100) and the Aspirin/Plavix Resistance Assay. The Platelet Function Assay offers a global assessment of platelet functional integrity by measuring the time required for the formation of a platelet plug over an aperture in the testing instrument. The results are reported as closure times in seconds. When a platelet function assay is ordered, the closure time is first measured following platelet activation with collagen and epinephrine. A normal result is reported as such without further testing. An abnormal result (ie. > 170 seconds) will prompt retesting exactly as in the first instance, but with collagen and ADP used as the platelet activators. Under these conditions, a closure time of < 122 seconds suggests impaired platelet function due to aspirin, whereas a longer closure time suggests a different etiology. Note that normal platelet plug formation requires an adequate number of circulating platelets as well as intact functional integrity, so that patients with thrombocytopenia can be expected to have an abnormal PFA result if the platelet count is sufficiently low, even if the platelets themselves function normally.

The platelet function assay is most useful as a screening test for patients in whom a platelet function disorder is a diagnostic consideration. An abnormal test selects those for whom more specific platelet function testing is appropriate, while a normal result suggests a non-platelet disorder for which additional platelet testing is probably wasteful. The assay also identifies patients recently on antiplatelet therapy who still have impaired platelet function because of persistent drug effect. Note, however, that as independent predictors of operative bleeding, the platelet function assay and other laboratory tests perform rather poorly. Other elements of the clinical history, combined with the physical examination, should be correlated to provide what will be a rough estimate of the operative bleeding risk.

The Aspirin/Plavix Resistance Assay uses a slightly different testing methodology that assesses platelet inhibition specifically due to aspirin or Plavix. In the case of Plavix, the assay yields a quantitative result that indicates the degree to which the drug is inhibiting platelet activity. The test can be used to identify Plavix nonresponders as well as those with persistently inhibited platelet activity who have recently discontinued Plavix or aspirin.

Results of the Aspirin assay are reported in two ways:

1. Positive (ie. platelet inhibition consistent with aspirin effect)
2. Negative (ie. no aspirin effect).

Results of the Plavix Resistance assay are reported in three ways:

1. Functional platelet count (ie. the number of circulating platelets not inhibited by Plavix)
2. Percent platelet inhibition (ie. the percentage of circulating platelets that are inhibited by the drug) — the range for Plavix nonresponders and patients not on the drug is < 50%.
3. Plavix Reaction Units (PRU) — Plavix responders should have a PRU < 194.

Platelet function testing is a more delicate affair than most of our other lab tests. Recall that platelets for transfusion must be constantly agitated and kept at room temperature. Similarly, blood drawn for platelet function testing must not be refrigerated or frozen, and must be tested within 4 hours of collection. For practical purposes, this means that the patient must be drawn at Bronson

Hospital, either on an inpatient floor or in the outpatient testing area.

Arrangements for draws at other locations must be coordinated with laboratory staff and for logistical reasons cannot always be accommodated.

For any questions about these tests, I can be reached at 341-8997.

— Kevin M. Herzog, MD



Kevin M. Herzog, MD

Screening for MRSA Colonization

(continued)

The Infectious Disease Society of America will release updated guidelines on MRSA in the Fall of 2009 but here are some things physicians should do or not do in the management of MRSA based on what we know now.

- Do pre-operative nasal screening of patients for *S. aureus* prior to surgical procedures for which nasal colonization is associated with surgical site infections (currently neurologic, cardiothoracic, orthopedic and cesarean sections) and suppress colonized patients with intranasal mupirocin. These cultures will also tell you if it is MRSA, but you are really interested in all *S. aureus*.
- Do MRSA nasal screening cultures and suppress MRSA as indicated if your patient is admitted to a critical care unit or will likely receive invasive procedures, increasing their risk of nosocomial infection with MRSA.
- It is probably not a good idea to screen healthy patients for MRSA colonization in the office practice setting unless you have a special reason to know this information and intend to decolonize the patient. If you look for it, you may find it, and if it is not hurting the patient or others, it might be best to leave it alone.
- It is not necessary to screen yourself or other healthcare personnel for MRSA unless you have an infection or have reason to believe that you might be the source of an outbreak. If so, please talk to the Infection Control department about that and we will help you.
- If you find that your patient is colonized or infected with MRSA, please tell them and discuss what that means. We often find patients who have carried MRSA for a long time and claim their doctor never told them about it.
- If a patient is in contact precautions for MRSA, please observe the precautions. We do not want outbreaks of



Richard A. Van Enk, PhD

MRSA spreading through the hospital. Observing simple contact precautions is not hard to do, it is not excessive or unreasonable, and it shows that you are intelligent, professional, aware of the situation and have respect for your other patients.

— Richard A. Van Enk, PhD
Director, Infection Control & Epidemiology