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Editorial

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Phenotypic screening for detection of methicillin-resistant *Staphylococcus aureus* in clinical settings

Methicillin antibiotic was first introduced in 1959. It is not long after its introduction, methicillin-resistant. Methicillin-resistant *Staphylococcus aureus* (MRSA) has been a problem in health care facilities and later in communities [1]. Normally, *S. aureus* is present in the upper respiratory tract, skin, and GI tract [2]. With unfavorable conditions, the colonized flora can be pathogenic [2]. These conditions occur mainly in immunocompromised hosts such as cancer, connective tissue diseases, organ transplantation, chronic diseases, newborn facilities, and nursing homes [3]. However, some patients who develop MRSA infection do not have any documented risk factors.

Through horizontal gene transfer, *S. aureus* develops a resistance to methicillin and becomes MRSA. MRSA acquires multiple drug resistance to beta-lactam antibiotics including penicillin, methicillin, oxacillin, and cephems such as cephalosporins. MRSA has *mec gene* (*mecA*, or a related variant known as *mecC*), which possesses a structural component capable of encoding penicillin-binding protein 2a (PBP2a) that establishes the resistance to methicillin and other semi-synthetic penicillinase-resistant beta-lactams [4, 5]. Methicillin-sensitive *S. aureus* or MSSA does not have *mec gene*.

MRSA can cause a wide range of infections such as endocarditis, septicemia, osteomyelitis, and soft tissue infections [6]. They could start with nasal colonization at hospital admission and subsequently became widespread and could be life-threatening [7]. Therefore, it is essential that providers identify MRSA early so that prompt and timely treatment can be given to achieve desirable outcomes. Traditional methods used to process surveillance cultures take 48–72 h to yield results. However, newer techniques shorten the amount of time required to detect MRSA in surveillance cultures. There are a variety of chromogenic agars available that can detect MRSA stains within 24 h. One of these chromogenic selective agars contains cefoxitin and detects a majority of MRSA isolates within 24 h, while commercially available real-time PCR tests for *mecA* can detect MRSA within 2 h [8].

The gold standard for the detection of MRSA is PCR of the *mecA* gene and the latex agglutination test for the detection of penicillin-binding protein 2a (PBP2a) [9, 10]. However, the PCR of the *mecA* gene may not be available or maybe too costly for a large number of laboratories in developing countries to use as a routine method. The diagnosis of MRSA has to resort to the phenotypic identification method for MRSA.

The phenotypic methods commonly used for MRSA identification include oxacillin MIC (agar dilution/broth dilution) or E-strip, oxacillin disc diffusion, oxacillin agar screening plates, and the cefoxitin disc diffusion methods. Longanathan A et al. in this issue [11], report an evaluation of various phenotypic methods with genotypic screening for the detection of MRSA [5]. They suggest that in routine disc diffusion tests, oxacillin can be replaced by cefoxitin for the detection of MRSA and that if PCR is too costly, many laboratories can routinely resort to the combination of simple phenotypic methods, such as cefoxitin disc diffusion and oxacillin MIC, for the detection of MRSA.

Clinicians may have to balance the test techniques available, given the seriousness of the problems of the patients at hand as well as the resources available at their disposal. Efforts to prevent *S. aureus* transmission through the systematic decolonization of facilities can also be some effective measures [12].

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