

Efficiency Of Routine Methods In the Detection Of Methicillin-Resistant Coagulase-Negative Staphylococci



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Introduction

Among the multiple mechanisms of acquired drug resistance in coagulase-negative staphylococci (CoNS), methicillin resistance appears to be the most important from a clinical and epidemiological perspective. According to the Clinical and Laboratory Standard Institute (CLSI) guidelines, the detection of *mec* genes is the gold standard for identification of staphylococcal methicillin resistance. In this study, we tested the efficiency of routine methods in the detection of methicillin-resistant coagulase-negative staphylococci strains (MRCoNS).

Methods

Methicillin resistance was identified using cefoxitin (30 µg) and oxacillin (1 µg) by the disk diffusion method (DDM) on Mueller–Hinton agar (Becton Dickinson, Franklin Lakes, NJ, USA) per CLSI recommendations. Oxacillin MICs (Minimal Inhibitory Concentrations) were determined by the agar dilution method (ADM) according to CLSI recommendations [M07-A10]. To detect the *mecA* gene, *mecA* primers were designed. For *mecA*-negative CoNS strains, the *mecC* and *mecB* genes were tested by simplex PCR.

Results

The sensitivity of the disk diffusion method to oxacillin compared to the detection of the *mecA* gene was 100%, while the serial dilution method for oxacillin had a lower value (87.1%). A lower sensitivity was obtained for the disk diffusion method for cefoxitin (69.7%), while the specificity of the disk diffusion method for cefoxitin was the highest, at 95.4%. A slightly lower specificity was obtained for oxacillin by the serial dilution and disk diffusion methods, at 90.6% and 87.1%, respectively. According to CLSI guidelines, the reference for phenotypic methods was the detection of *mec* genes by PCR (Table 1).

Conclusions

Oxacillin-based methods were highly sensitive in detecting *mecA*-positive CoNS strains. Due to the heterogeneity of MRCoNS, confirmation of methicillin resistance by different methods seems crucial. This can prevent the misidentification of MRCoNS and failed antibiotic therapy.

Table 1. Screening of methicillin resistance in coagulase-negative staphylococci (CoNS) strains.

Methods	Sensitivity (%)	Specificity (%)
OXA DDM	100	87.1
FOX DDM	69.7	95.4
OXA ADM	87.1	90.6

FOX—cefoxitin; OXA—oxacillin; DDM—disk diffusion method; ADM—agar dilution method.