Application of MALDI-TOF MS combined with PBP2' latex agglutination test for MRSA screening

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Introduction

Methicillin-resistant *Staphylococcus aureus* (MRSA) are significant pathogens that have emerged to cause nosocomial and community acquired infections. Rapid and accurate detection of MRSA is a very important step of clinical health care. Here, we report our experiences concerning the combination of MALDI-TOF MS and PBP2' latex agglutination test (Oxoid) in the MRSA screening among patients at the Albert Szent-Györgyi Clinical Center of the University of Szeged (Szeged, Hungary) in 2015.

Materials and methods

120 samples of 51 patients were involved in the study (Figure 1). All of them were screened by the standard culturing-based method to detect MRSA colonization. Susceptibility testing was performed in accordance with the EUCAST recommendations.

For MALDI-TOF MS identification, sample preparation from the sediments of *S. aureus* selective enrichment broths was optimized and the analyses were carried out directly from the selective enrichment broths after 24 h incubation. If *S. aureus* was detected by the MALDI-TOF MS analysis, PBP2' latex agglutination test was also performed from the sediment (Figure 2).

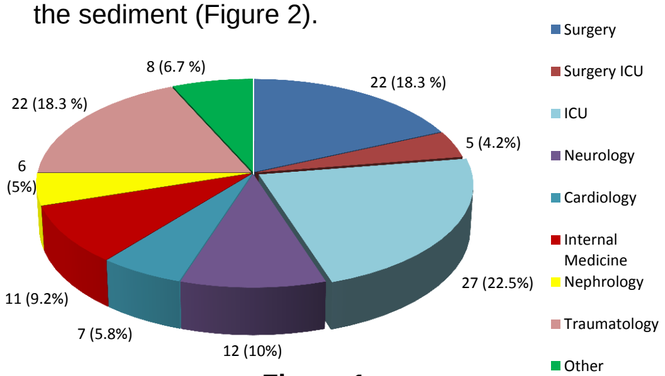

Figure 1
Distribution of the departments from where the 120 samples were originated

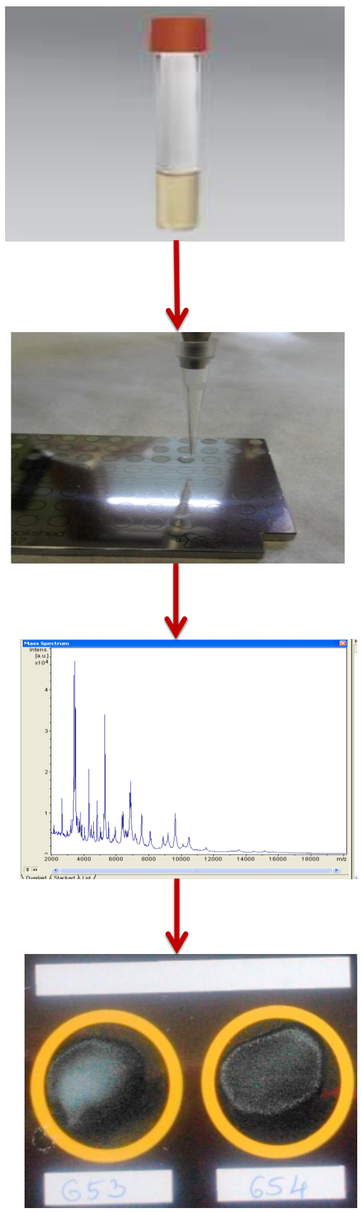

Figure 2
Workflow of the application of MALDI-TOF MS combined with PBP2' latex agglutination test for MRSA screening.

Results

Distribution of the samples was the following: 41 nasal, 37 throat, 17 axillary, 14 inguinal and 11 other samples (Figure 3).

Sediments of 18-24-h long incubated selective enrichment broths of 120 samples were examined by MALDI-TOF MS. In 23 cases, *S. aureus* was detected by MALDI-TOF MS identification. Seven samples were found to be MRSA-positive by MALDI-TOF MS combined with PBP2' latex agglutination test. Eight samples proved to be positive by conventional MRSA screening.

Both methods found 112 samples as negative (Table 1).

The positive and negative predictive values, sensitivity and specificity proved to be 100% and 99.1%, 87.5% and 100% respectively. Almost all tests (99.2%) gave the same result as the traditional MRSA screening method.

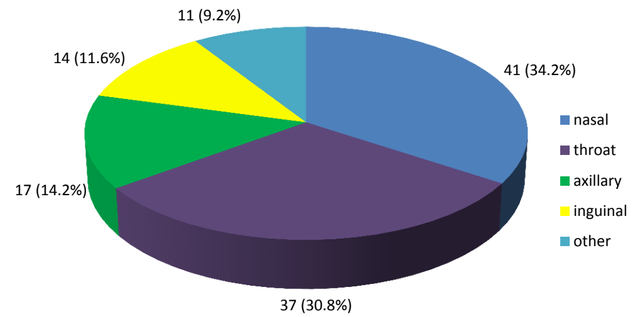

Figure 3
Distribution of the types of the examined samples

Conventional MRSA screening method (no. of cases)	MRSA screening by MALDI-TOF MS (no. of cases)
Negative (112)	Negative (113)
Positive (8)	Positive (7)

Table 1 Correlation between conventional MRSA-screening and MALDI-TOF MS in the 120 samples studied

Conclusions

Combination of MALDI-TOF MS and PBP2' latex agglutination test is an efficient alternative to shorten the duration and to improve the efficiency of the MRSA screening. Using this technique, MRSA colonisation can already be reported 18-24 hours after the sample collection.

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