RAPID DETECTION OF MRSA DIRECTLY FROM ESWABS USING THE BD MAX SYSTEM

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Introduction

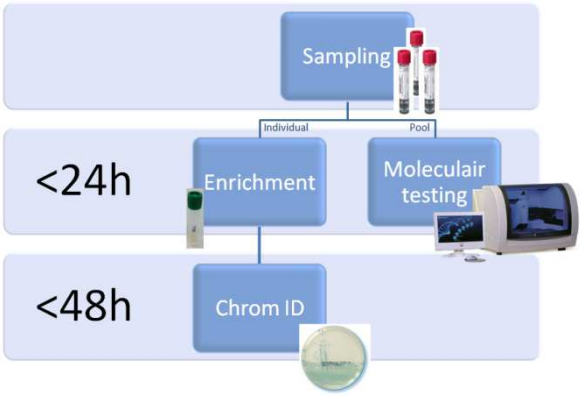
Meticillin-resistant Staphylococcus aureus (MRSA) prevalence is high in many European countries, but remains low in The Netherlands due to its 'Search and Destroy' policy. With the new Staph SR kit on the BD MAX system, MRSA results can be obtained within 2 hours and can therefore be helpful in performing isolation policy. The StaphSR assay distinguishes between MRSA and S.aureus by detection of the OrfX junction, present in MRSA, as well as the nuc gene, present in S.aureus. Furthermore, this assay detects both MecA and MecC genes. This study describes the evaluation of the BD MAX StaphSR assay for detection of MRSA directly from pooled Eswabs as a MRSA screening method, in comparison to enriched culture with subsequent incubation on a chromogenic agar from Eswab from individual patient sites.

Material and Methods

Clinical samples from different bodysites (e.g. throat, nasal and perineum collected with Eswab) were collected from patients at risk for MRSA colonisation. A pool was made by combining 100µl of Eswab medium from the different body sites. From this pool, 200µl was transferred into a BD Sample Buffer Tube for molecular testing. For culture, the Eswabs were individually transferred into a Trypticase Soy Broth (TSB) and subsequently incubated (18-24 hr., 35°C). assay.

After incubation, 10 µl of the TSB was used to inoculate a ChromID MRSA agar (bioMérieux). Suspected colonies were determined using MALDI-TOF analysis (Bruker) and susceptibility testing was performed using VITEK2 (bioMérieux). MRSA strains were confirmed by in-house MRSA PCR. For discrepancy analysis, samples were retested with the Xpert SA Nasal Complete (Cepheid). True positivity was defined as a patient who tested positive with either culture, or Staph SR assay confirmed by the Xpert SA.

Figure 1: Method for comparison StaphSR to culture



Results

Out of 200 eligible patients, 11 patients were culture positive in at least one out of three body sites. The StaphSR assay, detected 9 culture positive patients using pooled samples. With the StaphSR assay two additional (culture negative) MRSA positive patients were found. These two patients were confirmed MRSA positive by the Xpert SA and are considered as true positives. Sensitivity, specificity, positive and negative predictive values were 84.6%, 100%, 100% and 98.9% respectively when compared to our gold standard (Table 1 & 2).

Table 1: Evaluation of StaphSR qPCR assay with culture for determination of MRSA.

		Culture MRSA		
		Positive	Negative	
qPCR	Positive	9	2	PPV: 81.8%
	Negative	2	187	NPV: 98.9%
		Sens: 81.8%	Spec: 98.9%	200

Table 2: Evaluation of StaphSR qPCR assay compared to true positivity

		True result		
		Positive	Negative	
qPCR	Positive	11	0	PPV: 100%
	Negative	2	187	NPV: 98.9%
		Sens: 84.6%	Spec: 100%	200

PPV: positive predictive value; NPV: negative predictive value; Sens: sensitivity; Spec: specificity

True positivity was defined as a patient who tested positive with either culture, or StaphSR assay confirmed by the Xpert SA.

CONCLUSIONS

- The BD MAX StaphSR assay is a promising method for rapid screening MRSA directly from pooled Eswabs.
- The system provides a walk-away workflow that makes it easy to integrate into any molecular microbiological laboratory.

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