Comparison of the ESwab (Copan) to the traditional swab for screening patients for Methicillin-Resistant Staphylococcus aureus (MRSA) colonization by culture and by GeneOhmTM MRSA assay (Becton & Dickinson).

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Discussion & Conclusion

Our study, performed in high risk patients admitted in the cardiac surgical ward of a roman teaching hospital, confirmed the efficacy of the molecular methods in the rapid and sensible detection of MRSA.

Particularly efficient has been the combination of a new collection system such as Copan ESwab (which demonstrates to be extremely efficient in the recovering of microorganisms from body sites also when compared to traditional swab) and BD GeneOhmTM MRSA assay.

The ESwab collection system, allowing the recovering of a great number of colonies, had allowed us to confirm antimicrobial susceptibility of the isolates other than MRSA (e.g. clinical relevant MSSA that the BD GeneOhmTM MRSA assay at the time of our study did not identify) in a short time.

PCR facilitates the early detection of MRSA and could contribute to preventing spread of such pathogens; therefore its introduction in the ordinary work flow of the laboratory is advisable if we consider the use of the imminent new version of the assay which will be able to identify also the MSSA.

Objectives

Aim of the present study, it is to determine the prevalence of MRSA as well as MSSA from cardiac surgical ward unit by evaluating the performance of GeneOhm™ MRSA assay in comparison to traditional culture, and to evaluate the performance of the ESwab in comparison to the traditional swab for screening of patients colonized by MRSA.

Materials & Methods

171 patients (95 female and 116 male, with a median age of 71) were enrolled in the study. Two Nasal swabs were collected from patients when admitted to the cardiac surgical ward, one using the conventional swab (Stuart transystem; Copan), the other using ESwab (flushed swab and Amox liquid). The traditional swab was processed for culture only, while the ESwab was used in the BD GeneOhmTM MRSA assay as well as for the culture. An internal control (IC), a Positive Control (PC) and a Negative Control (NC) were included in each run to detect specimens inhibitory and to monitor PCR contaminations and assay reagents integrity. The whole procedure took about 76 to 85 min, depending on the number of specimens processed. The decisional algorithm for BD GeneOhm™ MRSA assay is embedded in the Smart Cycler® software: Positive (specimens for which MRSA DNA was detected and the IC results were positive). Negative (specimens for which MRSA DNA was not detected and the IC results was passed). Unresolved (specimens for which the results of the IC amplification failed because of an inhibitory effect of mucine on polymerase, so that we modified the procedure by performing the ‘quick speed’ step twice and also by prolonging the heating the sample at 95°C from 2 min to 5 min. The supernatant from extracted specimens appeared more clear.

Results

In a six months period (from May to November 2007) nasal swabs from 171 in-patients were collected. 35 patients (20.46%) had MSSA, 3 (1.75%) had MRSA, while the remaining were negative. All the MRSA/MSSA isolates, but the microbial count (expressed in CFU/ml) from ESwab was from 1 to 2 logs greater than that obtained using the traditional swab.

References


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Background

Staphylococcus aureus is an important cause of healthcare- and community-associated infections. Diseases caused by this pathogen range from mild skin and soft-tissue infections to potentially fatal systemic illnesses such as endocarditis and toxic-shock syndrome. By the 1990s, resistance to methicillin (MRSA) had spread throughout the world, compromising the use of all semi-synthetic penicillins for therapy of staphylococcal infections. MRSA is increasing worldwide and is often the cause of nosocomial infections. To control the spread of this pathogen CDC and NIS suggest screening hospital in-patients by culturing nasal and/or perianal swabs. The use of chromogenic media and molecular methods, like MRSA-ID Gen Ohm system, has significantly reduced the detection time of MRSA allowing early identification of positive-patients and prompt implementation of precaution measures.

NOTE: When the initial sets of the nasal swabs were processed, we registered a smaller number of unresolved specimen. As some of these specimens appeared to be partially resolved we thought to fade a possible inhibitory effect of mucine-component on polymerase, so that we modified the procedure by performing the ‘quick speed’ step twice and also by prolonging the heating the sample at 95°C from 2 min to 5 min. The supernatant from extracted specimens appeared more clear.