**ABSTRACT**

**Objectives:** Methicillin-resistant *Staphylococcus aureus* (MRSA) have emerged as major nosocomial pathogens during the past two decades and it is resistant not only to all β-lactams but also to a wide range of other antibiotics (Stefani et al, 2003). About 20% of individuals are persistent *S. aureus* nasal carrier, and anterior nares of the nose is the main ecological niche where the bacteria resides (Wertheim et al., 2005).

The objectives of this study were:

- To validate the new Copan ESwarb collection device (consisting of a tube with 1 ml of Amies medium and a flocked swab) and the GenXpert MRSA/SA Nasal Assay (Cepheid), a multiplex real-time PCR assay that simultaneously detects *S. aureus*, mecaA gene and staphylococcal cassette chromosome (SCCmec) in less than one hour, to optimize MRSA screening "from collection to detection" in children admitted to the "Bambino Gesù" Children Hospital screened for *S. aureus* colonization.

**RESULTS**

In this study, 1440 nasal swabs were collected from paediatric patients, admitted at the Medical Department of "Bambino Gesù" Children Hospital and screened for MRSA detection from January to June 2010. Patients hospitalized for invasive surgical procedure or admitted at Intensive Care Unit (ICU) were excluded from this study.

Sample collection was performed with the new collection and transport device ESwarb (Copan Italia SpA, Brescia-Italy), consisting of a flocked swab and a tube with 1 ml of Amies liquid transport medium, reported to have a high efficiency for recovering bacteria (Vos et al., 2010).

All specimens were tested simultaneously by traditional cultures and by the molecular Xpert MRSA assay (Fig 1). The primers and probes of the new Xpert MRSA/SA Nasal assay detect proprietary sequences for the staphylococcal protein A (spa), the gene for methicillin/staphylococcal resistance (mecaA) and the staphylococcal cassette chromosome (SCCmec). The sample processing control (SPC) verifies the adequate processing of the target bacteria and to monitor the presence of inhibitors in the PCR reaction.

For each nasal sample:

- One aliquot (10 μl) of ESwarb liquid medium was streaked onto Chapman (bioMérieux, France) and MRSA chromogenic agar (Bio-Rad, USA), and incubated at 37 °C for 18-24h. Colonies positive of *S. aureus* were subcultured onto 5% sheep blood agar and identified by using Multi-TOF Mass Spectrometry. Confirmation of identification and oxacillin/cefoxitin resistance was tested by the Vitek2 systems (bioMérieux).
- One aliquot (200 μl) ESwarb liquid medium was tested using the Xpert MRSA/SA Nasal according to the manufacturer’s instructions.

**CONCLUSION**

Rapid and accurate detection of MRSA carriers is very important because hospital-acquired infections, often due to antibiotic-resistant strains, have been associated with increased morbidity and mortality (Sheward et al., 2007).

We conducted a study to assess the clinical performance of the new Copan ESwarb device for screening MRSA detection by using simultaneously both methods and we observed:

1. The total agreement between culture and molecular assay for recovering SA; 2. The absence of interference with Real-time PCR using the liquid transport medium of Copan ESwarb; 3. The ability of the XpertMRSA/SA Nasal Assay to provide additional informations about SA variants not detectable by phenotypical methods.

This study demonstrate that the Copan ESwarb collection and transport device is compatible with the new XpertMRSA/SA Nasal Assay. The combined use of ESwarb and XpertMRSA/SA Nasal Assay allows MRSA screening “from collection to detection” can be use as a replacement for phenotypical method specially in case if a reduced TAT is mandatory.