

Methicillin- resistance in *Staphylococcus aureus* isolated from health care personnel

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Objective

The purpose of this study was to evaluate the presence of nasal *Staphylococcus aureus* on health care personnel of two hospital services of a Central Hospital in Oporto, to determine to what extent isolates are resistant to a range of antibiotics and the proportions of Methicillin - Resistant *Staphylococcus aureus* (MRSA) strains. Strains antibiotic resistance profiles analysis was done.

Introduction

Staphylococcus aureus is a common cause of infection and is one of the leading causes of nosocomial infections [1]. The primary habitat of *S. aureus* is the mucous membranes of the human nasopharynx and animal skin [2]. Among antibiotic resistant staphylococci, multidrug-resistant *S. aureus* strains are of great clinical and public concern since resistances make the treatment of infections much more difficult. The *mecA* gene is harbored on the staphylococcal chromosomal cassette *mec* (*SCCmec*), a genetic element that integrates site specifically into the *S. aureus* chromosome [3]. Tests for *mecA* or for the protein expressed by *mecA*, the penicillin-binding protein 2a (PBP2a) are the most accurate methods for prediction of resistance to oxacillin and could be used to confirm results for isolates of staphylococci from serious infections [4]. Carriers among health care workers or patients have been frequently identified as the source of outbreaks.

Results

Staphylococcus aureus Prevalence

41.7%

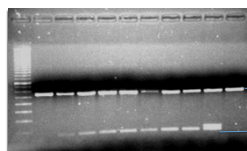


Figure 1: PCR detection of the presence of genes 16S rRNA; *mecA*; *nuc*

Antimicrobial Resistance Profile of MRSAs

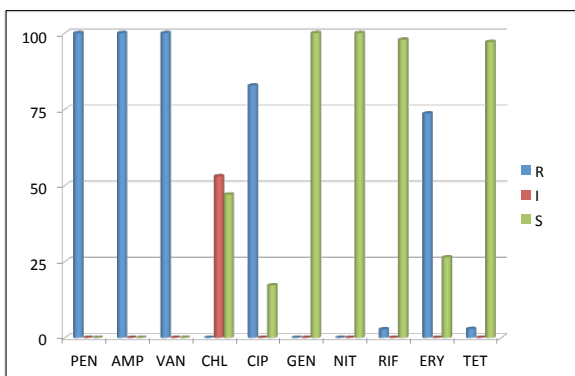
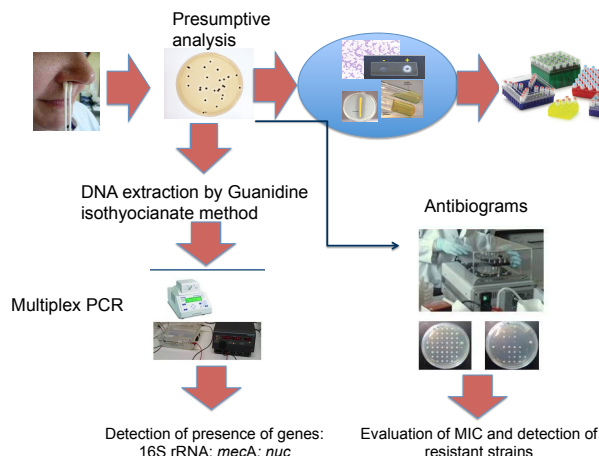


Figure 3: Percentage of resistant, intermediate and sensitive MRSA to Penicillin (PEN), Ampicillin (AMP), Vancomycin (VAN), Chloramphenicol (CHL), Ciprofloxacin (CIP), Gentamicin (GEN), Nitrofurantoin (NIT), Rifampin (RIF), Erythromycin (ERY), Tetracycline (TET)

Methods



Antimicrobial Resistance Profile of *Staphylococcus aureus*

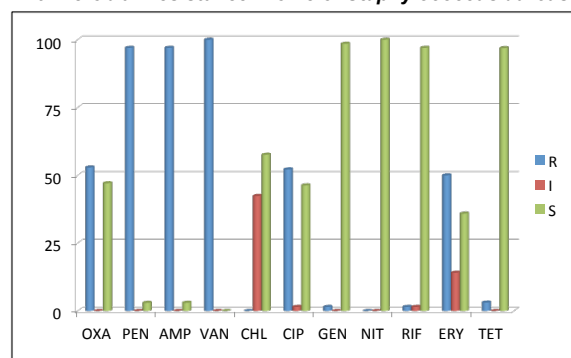


Figure 2: Percentage of resistant, intermediate and sensitive *S. aureus* to Penicillin (PEN), Ampicillin (AMP), Vancomycin (VAN), Chloramphenicol (CHL), Ciprofloxacin (CIP), Gentamicin (GEN), Nitrofurantoin (NIT), Rifampin (RIF), Erythromycin (ERY), Tetracycline (TET)

MRSA

52.9% of the isolates were resistant to oxacillin and therefore classified as MRSA. According to the detection of *mecA* gene in this study, 38.6% of the isolates had *mecA* gene. These isolates should have acquired resistance by *mecA* gene. The other isolates (14.3%) could have acquired resistance to oxacillin by other mechanisms.

52.9%

Discussion

According to our study, 22.0% of health professionals were MRSA carriers and 41.7% carried *S. aureus* in the nasal cavity. The prevalence of *S. aureus* nasal colonisation was higher than previously reported by Kluytmans et al. (1997). According to these investigators a mean carriage rate of 26.6% on health care workers was found. All the MRSA isolates were also resistant to other beta-lactams such as penicillin and ampicillin and 67.6% of the MRSAs were resistant to two other classes of antibiotics which in case of MRSA infection among these professionals could be a problem in options of therapeutics. It was noted a high resistance to ciprofloxacin and erythromycin, 82.8% and 73.6%, respectively, among MRSA. The other antibiotics tested had insignificant levels of resistance, besides half of the isolates and intermediate resistance to chloramphenicol.

Conclusions

Carriers among health care workers or patients have been frequently identified as the source of outbreaks. To control infection, surveillance, rate of carriers of *S. aureus* or/and MRSA among health care personnel can help hospitals to avoid outbreaks, epidemic and endemic nosocomial infections. It is well known that surveillance in hospitals must be constant and efficient in order to prevent or control nosocomial infection.

References

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