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 Porto, 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, multilug-resistant S. aureus strains are of great clinical and public concern since resistances make the treatment of infections much more difficult. The mec 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 staphyloccocci from serious infections [4]. Carriers among health care workers or patients have been frequently identified as the source of outbreaks.

Results

Staphylococcus aureus Prevalence

![Figure 1: PCR detection of the presence of genes 16S rRNA, mecA, nuc](image1)

**Antimicrobial Resistance Profile of Staphylococcus aureus**

![Figure 2: Percentage of resistant, intermediate and sensible S. aureus to Penicillin (PEN), Amoxicillin (AMP), Vancomycin (VAN), Chloramphenicol (CHL), Ciprofloxacin (CIP), Gentamicin (GEN), Nitrofurantoin (NIT), Rifampin (RIF), Erythromycin (ERY), Tetracycline (TET)](image2)

**Antimicrobial Resistance Profile of MRSA**

![Figure 3: Percentage of resistant, intermediate and sensible MRSA to Penicillin (PEN), Amoxicillin (AMP), Vancomycin (VAN), Chloramphenicol (CHL), Ciprofloxacin (CIP), Gentamicin (GEN), Nitrofurantoin (NIT), Rifampin (RIF), Erythromycin (ERY), Tetracycline (TET)](image3)

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 colonization 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 MRSA 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 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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