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High prevalence of clindamycin resistance in *Staphylococcus aureus* blood culture isolates in São Paulo, Brazil

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Abstract:

BACKGROUND: Clindamycin has become an important antimicrobial option for the treatment of *Staphylococcus aureus*. However, little is known about the current patterns of clindamycin-susceptibility in *S. aureus* invasive isolates, both in our country and in other developing countries in the world.

AIMS: The aim of this study was to determine the prevalence of constitutive and inducible clindamycin resistance in methicillin-susceptible *S. aureus* (MSSA) and methicillin-resistant *S. aureus* (MRSA) blood culture isolates in São Paulo, Brazil.

MATERIALS AND METHODS: From July 2011 to June 2012, all *S. aureus* isolates from blood cultures collected at our hospital were included in the study. Antimicrobial susceptibility testing was performed according to recommendations of the Clinical and Laboratory Standards Institute.

RESULTS: Total prevalence of clindamycin resistance was 68%, including 7.2% with inducible resistance. In MRSA resistance rate was 90.8% whereas in MSSA the rate was 32.7%.

CONCLUSIONS: Our high prevalence of clindamycin resistance highlights the importance of performing D-test in a routine base, as well of maintaining continued surveillance for the prevalence of clindamycin resistance.

Key words:

Clindamycin, methicillin resistant *Staphylococcus aureus, Staphylococcus aureus*

Introduction

Staphylococcus aureus is a major cause of community- and health-care associated infections worldwide. In the last decades, treatment of such infections has been complicated by escalating antimicrobial resistance. Penicillin- and methicillin-resistant strains have disseminated globally and more recently, community-associated methicillin- resistant *S. aureus* (CA-MRSA) as well vancomycin-intermediate, and vancomycin-resistant *S. aureus* isolates have been described and are also disseminating.[1-3]

Clindamycin has become an important antimicrobial option for the treatment of both methicillin-susceptible *S. aureus* (MSSA) and MRSA, mainly CA *S. aureus* infections.[3,4] However, little is known about the current patterns of clindamycin-susceptibility in *S. aureus* invasive isolates, both in our country and in other developing countries in the world.

Resistance to clindamycin in *S. aureus* derives from target site modification, mediated by *erm* genes, which lead to ribosomal methylation. Resistance may occur either in an inducible or constitutive form.[4]

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The aim of this study was to determine the prevalence of constitutive and inducible clindamycin resistance in MSSA, and MRSA blood culture isolates in São Paulo, Brazil.

Materials and Methods

From July 2011 to June 2012, all *S. aureus* isolates from blood cultures collected at our hospital were included in the study. Our hospital is a quaternary care general hospital in São Paulo, Brazil. Isolates were identified using traditional microbiology methods, including Gram stain, catalase, coagulase, and DNAse.

Antimicrobial susceptibility testing was performed according to recommendations of the Clinical and Laboratory Standards Institute (CLSI).[5] D-test was performed to detect inducible clindamycin resistance, also following recommendations issued by the CLSI.[5]

S. aureus isolates from blood cultures of patients that already had an isolate included in the study were excluded. Thus, only one (the first) isolate per patient was included in the study.

Results

During the study, we included 125 isolates. Seventy-six (60.8%) were MRSA and 49 (39.2%) were MSSA. Total prevalence of clindamycin resistance was 68% (85/125), including 76 (60.8%) with constitutive resistance and 9 (7.2%) with inducible resistance. Regarding the MRSA, one of the 76 isolates had inducible clindamycin resistance, and 68 had constitutive resistance. Only 7 (9.2%) MRSA were clindamycin susceptible. Of the 49 MSSA, 16 were resistant to clindamycin, including eight with inducible resistance and eight with constitutive resistance. Thirty-three (67.3%) were clindamycin susceptible.

Discussion

Although inducible clindamycin resistance was present in only nine isolates, this finding highlights the paramount importance of the routine use by D-test by clinical microbiology laboratories, since the resistance in these isolates would not be detected without this specific method. D-test is recommended routinely both by the CLSI and by the European Committee on Antimicrobial Susceptibility Testing.[5,6] However, even in developing countries, only a fraction of clinical laboratories follow such recommendations.[7]

The high prevalence of clindamycin resistance may impact empirical therapy in the era of dissemination of CA-MRSA since clindamycin is now used globally as empirical treatment for possible *S. aureus* infections where CA-MRSA is common.[4,7] Others have also reported elevated rates of clindamycin resistance in *S. aureus*.[8-10] Glycopeptides, trimethoprim-sulfamethoxazole and a number of new antimicrobial agents are being used in such cases, but their use is sometimes problematic, due to resistance or limited scientific evidence supporting it.[3] In addition, clindamycin is an important part of antimicrobial therapy for cases of toxic shock syndrome. Linezolid has recently also been showed to reduce toxic shock syndrome toxin-1 production and could be an option in these cases. However, its costs and availability are still a concern.[11]

Continued surveillance for the presence of clindamycin resistance is paramount to ensure adequate empirical antimicrobial therapy. Appropriate *in vitro* antimicrobial susceptibility tests, including D-test, are important not only as part of surveillance efforts but also to guarantee correct specific treatment for individual patients with staphylococcal infections.

Conclusions

Our high prevalence of clindamycin resistance highlights the importance of performing D-test in a routine base, as well of maintaining continued surveillance for the prevalence of clindamycin resistance.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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