

**Title: VITEK®2 SYSTEM CAN UNDERESTIMATE THE MINIMUM INHIBITORY CONCENTRATIONS TO VANCOMYCIN OBTAINED BY REFERENCE METHOD IN STAPHYLOCOCCUS AUREUS ISOLATES FROM BLOODSTREAM INFECTIONS**

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**Abstract:**

*Staphylococcus aureus* remains an important human pathogen. Approximately 40% of *S. aureus* isolates from Brazilian hospitals are resistant to methicillin/oxacillin. To ensure safe treatment options is essential to assess the accuracy of automated systems that determine susceptibility against antimicrobials. The aim of the study was to evaluate the accuracy of the VITEK®2 automated system in comparison to the broth microdilution method (BMD) in determining the minimum inhibitory concentration (MIC) of five antimicrobials against *S. aureus* from bloodstream infections (BSI). Consecutive *S. aureus* isolates from BSI in patients attended at an university hospital in Rio de Janeiro, between 2011-2014, were analyzed. Only one isolate by episode was included. Among 110 isolates analyzed, there was agreement between the tests in 52% (n = 57) for oxacillin, with a difference of  $\pm 2$  MIC dilutions to 5.4% (n = 6) of them. The *mecA* gene was detected in 31 isolates (MRSA), and five and three of those were characterized as oxacillin sensitive by the MDC and VITEK®2, respectively. For linezolid, there was agreement in 61% (n = 67) of cases and only 29% (n = 32) for teicoplanin. For tigecycline, only 36% (n = 40) of results were in agreement and the larger errors technical were found for 14 (13%) isolates by VITEK®2 system that included them in 2 MIC dilutions below. One hundred forty-six isolates were analyzed for vancomycin and the agreement was of 64% (n = 93). Eight (5%) isolates were included in two MIC dilutions below by VITEK®2 system and six isolates with intermediate resistance (VISA - vancomycin intermediate *S. aureus*) by the BMD method were classified as sensitive by the automated system. Despite the automated system do not evaluate daptomycin, it was analyzed in relation to 169 isolates by the BMD. The MIC<sub>50</sub> and MIC<sub>90</sub> were 1µg/ml and 2µg/ml, respectively. The results indicate the importance to use a gold standard method for assessing susceptibility to vancomycin. Also, an analysis of daptomycin susceptibility is required, once it is not evaluated by the automated system. Moreover, isolates with reduced susceptibility to this drug were found in the present study. Although the automated system is faster, it may underestimate vancomycin and tigecycline MIC values, and overestimate the values for other antibiotics. The MIC results found in this study may have great influence on the choice of therapy to be adopted for treatment of BSI by *S. aureus*.

**Key-words:** Broth microdilution test; *Staphylococcus aureus*; VITEK®2 system

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