VANCOMYCIN INTERMEDIATE RESISTANCE AND HETERORESISTANCE IN 
*Staphylococcus aureus* ISOLATES FROM BLOODSTREAM INFECTION IN AN 
UNIVERSITY HOSPITAL IN RIO DE JANEIRO, BRAZIL

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**Abstract:**
Approximately 40% of all *Staphylococcus aureus* isolates from bloodstream infections (BSI) are resistant to methicillin at Brazilian hospitals. In this context, vancomycin and other antimicrobial agents are important to therapy. The aim of the present study was to determine the resistance to vancomycin and other antimicrobials and characterize the type of mec cassette in *S. aureus* isolates from BSI. Consecutive *S. aureus* isolates from patients with BSI attended in a university hospital between 2011 and 2013 were analyzed. One isolate by episode was considered. The isolates were analyzed by the cefoxitin disk diffusion test. The Minimum Inhibitory Concentration (MIC) for vancomycin, teicoplanin, linezolid, daptomycin, tigecycline (all from Sigma®) and ceftaroline, the active metabolite of ceftaroline fosamil, (donated by AstraZeneca Pharmaceuticals) was determined by the broth microdilution method (BMD). Isolates with vancomycin MIC ≥2μg/ml were tested for heteroresistance (hVISA) using BHI agar supplemented with 3, 4 or 6μg/ml (BHLa3, BHLa4 or BHLa6) of vancomycin, and BHLa4 containing casein (BHL4ca) was also used. The macromethod Etest (MET) and Etest GRD was also performed. Population analysis profile (PAP) was used to confirm hVISA and VISA isolates. All cefoxitin-resistant isolates (MRSA isolates) were subjected to PCR for detection of the SCCmec type. Among 110 isolates, 31 (28%) were MRSA: 15 (48%) carried the SCCmec II and 16 (52%) the SCCmec IV. The vancomycin MIC50 and MIC90 were 1 and 2, respectively. Six isolates showed intermediate resistance to vancomycin (VISA isolates) and four of them were MRSA SCCmec types II (n=3) and IV (n=1). MRSA isolates were more likely to be resistant to daptomycin (p = 0.0003). All isolates were susceptible to teicoplanin, linezolid and tigecycline. One isolate presented intermediary resistance to ceftaroline (MIC = 2 μg/mL - SCCmec II). Among 25 isolates with vancomycin MIC≥2 mg/L, three grew on BHLa3, including one MRSA-IV. Other three isolates grew on MET, being one MRSA-II that also grew on agar BHLa4 and BHLa4ca and was confirmed as hVIASA. Among VISA isolates 5 (83%) grew on BHLa4. No isolate grew on agar BHLa6 or Etest GRD. Among two MRSA presumed to be hVISA only one, presenting the SCCmec II, was confirmed as hVISA. The results showed the presence of hVISA and VISA isolates related to BSI in our hospital harboring emerging types of SCCmec II and IV.

**Keywords:** Bloodstream infections; heteroresistance; *Staphylococcus aureus*; vancomycin; VISA.

**Agências de fomento:** CNPq, FAPERJ, CAPES