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Prospective observational study on the role of catheter colonization and multi-drug resistance associated with catheter-related bloodstream infections.

08. Healthcare-associated infections, infection prevention & control

8a. Intravascular catheter-related infections

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Background Central venous catheter (CVC)-related bloodstream infection (CRBSI) is a huge public health concern with considerable impact on mortality and health costs. The emergence of antimicrobial resistant microorganisms associated or not with CVC colonization by biofilms makes the treatment of CRBSI even more challeging.

Methods A 3-year observational study enrolling 3 tertiary hospitals located in Lisbon (Portugal) was designed to identify the major etiological agents of 58 CRBSI, their ability to colonize CVCs and their antimicrobial resistance profiles. Etiological agents of CRBSI were identified by VITEK-2. Whole-genome sequencing was used to confirm CRBSI by the most prevalent etiological agents and characterize their resistome. CVC's colonization (namely by biofilm assembly) was monitored by scanning electron microscopy.

Results Staphylococci were the most prevalent causative agent (36/58, 62.0%), with S. aureus and coagulase negative S. epidermidis accounting for 24.1% and 36.2% of CRBSIs, respectively. Fifty-nine of 72 staphylococci isolates were methicillin resistant. Comparative genomic analysis of central venous catheters/ hemoculture pairs of isolates revealed genomic matches for 35 of 36 pairs and a good correlation between antibiotic susceptibility phenotype and the presence of antimicrobials resistance genetic determinants. CVC colonization was observed mainly in the catheter lumen and presented different phenotypes ranging from isolated attached microorganims to mature biofilms. The latest phenotype, mature biofilms of S. epidermidis and S. aureus were found for 50.0% and 48.6% of the CVC, respectively. Nevertheless, no statistical significant association was established

between biofilm assembly and CRBSI highlighting the need for further studies to elucidate biofilms' role on this healthcare associated infection.

Conclusions Whole-genome sequencing proved to be a valuable tool to confirm CRBSI. Despite staphylococci biofilms identification on a considerable number of CVCs , no statistically significant association was found between CRBSI and biofilms.

Keyword 1
Catheter-related bloodstream infection
Keyword 2
Staphylococci
Keyword 3
Biofilms

Conflicts of interest

Do you have any conflicts of interest to declare?
I have no potential conflict of interest to report