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SUSCEPTIBILITY TO BIOFILM FORMATION BY CLINICAL ISOLATES FROM PATIENTS WITH URINARY TRACT INFECTION: DEVELOPMENT OF A MULTIFACTORIAL PREDICTIVE MODEL

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Implantable medical devices help enhancing therapeutic results, saving human lives and improving life quality of patients. However, these devices can be readily colonized by bacteria and fungi, since the presence of a foreign body will reduce the number of microorganisms necessary to produce an infection (Guggenbichler et al., 2011).

Accordingly, the aim of this study was to evaluate a group of biofilm producing bacteria isolated from patients with urinary tract infections, identifying the main factors contributing to biofilm formation. It was also intended to evaluate the association of these factors with biofilm formation, in order to understand their contribution as predictors for biofilm onset, allowing an earlier and more effective selection of the required antibiotic treatment. Biofilm detection was done by the tube adherence method. The investigation of the biofilm production was performed measuring its adherence to borosilicate test tubes following a previous methodology (Christensen et al., 1985) with minor changes. Among the 156 isolates, 58 (37.2%) were biofilm producers. The patient's genre (p=0.022), together with bacterial species (p <0.001), were the factors with highest influence for biofilm production. In fact, some of the isolated bacteria were biofilm producer in all cases. The assayed factors (age, gender, hospital unit, bacteria and catheterization) were used to build a predictive model in order to anticipate biofilm occurrence immediately after bacterial identification. In this way, it is possible to select a more effective antibiotic (among the susceptibility options suggested by the antibiogram) against biofilm producing bacteria, avoiding the need to change antibiotics due to acquired resistance during the treatment.

Regarding resistance profile among bacterial isolates, the β-lactamic antibiotics presented the highest cases/percentages: ampicillin (32/55.2%), cephalothin (30/ 51.7%), amoxicillin/clavulanic acid (22/37.9%), although the carbapenemic group still represent a good therapeutic option (2/3.4%). Quinolones (nucleic acid synthesis inhibitors) also showed high resistance percentages. Furthermore, biofilm production clearly increases bacterial resistance. Actually, almost half of biofilm producing bacteria showed resistance against at least three different species.

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References

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