

ABSTRACT

The increasing incidence of resistant infections with the use of medical devices in cardiology in recent years has puzzled the scientific community. The aim of this study is to investigate the bacterial colonization of medical devices like cardiac pacemakers, defibrillators and catheter angiography in patients hospitalized in the cardiology clinic Of University Hospital of Thessaloniki AHEPA. Furthermore, the aim is to investigate the possible establishment of biofilms of these strains with qualitative and quantitative methods of Microbiology and technically Nanotechnology as Atomic Force Microscopy (AFM). Patients who participated in the study were 58 people, 32 who came to the catheterization laboratory of the Cardiology Department of University Hospital of Thessaloniki AHEPA for coronary angiography and 26 who attended the Electrophysiology laboratory to replace the pacemaker system. Of the 32 patients who came for coronary a catheter piece was received from the femoral puncture site. From the 26 patients who came to replace the pacemaker system we received for each patient, two samples such as tissue sample from the fibrous capsule that was formed around the rim of pacemaker and a coating (swab), from the area of fibrous capsule around the case. The clinical strains of bacteria isolated after culture in appropriate culture media were identified in the Microbiology Laboratory of University Hospital of Thessaloniki AHEPA using an automated system in accordance with the instructions of CLSI. Strains were also controlLed for production of extracellular mucous substance (slime) with both qualitative (tube method) and the quantitative assay slime production or microtiter plate method by Christensen et al. The 74% of coronary catheter pieces showed colonization, while 79% of pacemaker and defibrillator cultures were positive. The 33% of the strains isolated from catheters gave positive test tubes, while 50% of the strains isolated from pacemakers gave positive test tubes. Only two specimens who derived from cultured pacemaker was high slime production by microtiter plate method and 8 were moderate slime production of which 3 came from pacemaker cultures and 5 from coronary catheter pieces culture. All strains of high and moderate production of extracellular mucous substance isolated from catheters and by pacemakers and defibrillators that were studied by atomic force microscopy we obtained images that show the presence of extracellular mucous substance surrounding microorganisms.

There were however differences in the formation of extracellular matrix both between the high or low production strains and in the biofilm formation and its relation to the strain that was responsible for production. Further research may be a continuation of the control of strains with atomic force microscopy to determine if the images we receive are repeated and are always the same for specific micro-organisms in order to become atomic force microscopy an independent technique for the detection of biofilms.