Central venous access devices play an important role in patients with prolonged intravenous administration requirements. In the last years, the coating of these devices with bactericidal compounds has emerged as a potential tool to prevent bacterial colonization” Mendoza et al (2017).

Abstract:

Central venous access devices play an important role in patients with prolonged intravenous administration requirements. In the last years, the coating of these devices with bactericidal compounds has emerged as a potential tool to prevent bacterial colonization. Our study describes the modification of 3D-printed reservoirs and silicone-based catheters, mimicking central venous access devices, through different approaches including their coating with the well known biocompatible and bactericidal polymer chitosan, with the anionic polysaccharide alginate; also, plasma treated surfaces were included in the study to promote polymer adhesion. The evaluation of the antimicrobial action of those surface modifications compared to that exerted by a model antibiotic (ciprofloxacin) adsorbed on the surface of the devices was carried out. Surface characterization was developed by different methodologies and the bactericidal effects of the different coatings were assayed in an in vitro model of Staphylococcus aureus infection. Our results showed a significant reduction in the reservoir roughness (≤73%) after coating though no changes were observed for coated catheters which was also confirmed by scanning electron microscopy, pointing to the importance of the
surface device topography for the successful attachment of the coating and for the subsequent development of bactericidal effects. Furthermore, the single presence of chitosan on the reservoirs was enough to fully inhibit bacterial growth exerting the same efficiency as that showed by the model antibiotic. Importantly, chitosan coating showed low cytotoxicity against human keratinocytes, human lung adenocarcinoma epithelial cells, and murine colon carcinoma cells displaying viability percentages in the range of the control samples (>95%). Chitosan-based coatings are proposed as an effective and promising solution in the prevention of microbial infections associated to medical devices.

ReTweet if useful… Chitosan-based coatings in the prevention of intravascular catheter-associated infections https://ctt.ec/IJmWO+ @ivteam #ivteam

Click To Tweet

Reference:


Thank you to our partners for supporting IVTEAM