Claus Moser, Clin Microbiol 2016, 5:5(Suppl)
http://dx.doi.org/10.4172/2327-5073.C1.024

6th Clinical Microbiology Conference

Novel therapeutic strategies against chronic biofilm disease

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Biofilm infections are significant clinical challenges. They are frequent, can be related to foreign bodies or be tissue related and are recalcitrant to host responses and antibiotic treatments. Furthermore, they can be primary focus for systemic spread; they are persistent and characterized for recurrent infections, especially since timing of termination of antibiotic treatment can be exceedingly difficult. The biofilm mode of growth can also render low virulent microorganisms into virulent strains due to the induced inflammation, which generates tissue damage. Microbiologically, biofilms are defined by a self produced matrix containing extrapolysaccharides, eDNA and proteins. Therefore, biofilms can be considered as independent compartments with distinct antibiotic PK/PD parameters. Adding to this, physiological gradients are observed in biofilms with significantly different nutrition and oxygen conditions in different zones of the biofilms. Diagnostically, biofilm growing microorganisms can be challenging to demonstrate by traditional culturing due to adherent and/or extremely slowly growing microorganisms (persisters/dormant types/viable but non-culturable microorganisms). Finally, susceptibility testing is only indirectly representative for the responsiveness of the biofilm to antibiotic treatments. Therefore, the first clinical guidelines for diagnosing, prevention and treatment of biofilm infections have been published in 2015. The present abstract aims at presenting novel therapeutic regimens published since the guidelines became available last year. The focus of the presentation will be on consequences of the biofilm as a distinct compartment, hyperbaric oxygen treatment, IgY gargling and human autologous leucopatches. The presented therapeutic possibilities are involved in ongoing clinical trials or used as adjunctive treatment of other medical syndromes.

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