

12 Best Papers

[O121] VANCOMYCIN DISPLAYS TIME DEPENDENT ERADICATION OF MATURE STAPHYLOCOCCUS AUREUS BIOFILMS

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Aim: Determine the time concentration profile required to achieve vancomycin-mediated eradication of *Staphylococcus aureus* biofilm. This is critical for the identification of performance targets for local antibiotic delivery, yet has not been described.

Method: Mature *S. aureus* UAMS-1 biofilms were grown on titanium-aluminum-niobium discs in Mueller Hinton broth (MHB). After 7 days, the discs were incubated in MHB containing vancomycin at 100, 200, 500, 1'000 and 2'000 mg/L. Both static and shaking conditions were tested. Samples were retrieved at intervals for up to 28 days for quantification of residual biofilm by sonication and serial dilution plating. One additional disc was processed per time point for scanning electron microscopy.

Results: Progressive and significant reduction of viable bacteria was observed over time at all vancomycin concentrations in both static and shaking conditions. After 28 days under static conditions, the *S. aureus* biofilm was completely eradicated at 200 mg/L vancomycin and higher concentrations. Biofilm could however not be eradicated under shaking conditions at any concentration. Logistic regression documents time of exposure at ≥ 200 mg/L as being the essential determinant of eradication.

Conclusions: The clinical relevance of the present study is that it is not impossible to eradicate mature *S. aureus* biofilm from metal implants by vancomycin alone, fostering efforts to optimize local delivery. The required time concentration profile cannot be achieved yet by systemic administration or any of the local delivery vehicles available. Even longer exposure as 28 days might be required as wound fluid flow might influence unfavourably biofilm resistance to vancomycin