

Local concentrations of gentamicin obtained by microdialysis after a controlled application of a GentaColl sponge in a porcine model

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Background: Local treatment with gentamicin may be an important tool in the prevention and treatment of surgical site infections in high- risk procedures and patients.

Purpose / Aim of Study: The aim of this study was to evaluate the pharmacokinetic profile of gentamicin in bone and surrounding tissue, released from a controlled application of a GentaColl sponge in a porcine model.

Materials and Methods: In 8 female pigs, a GentaColl sponge of 10x10 cm (1.3 mg gentamicin/cm²) was placed in a cancellous bone cavity in the proximal tibia. Microdialysis was used for sampling of gentamicin concentrations over 48 hours from the cavity with the implanted GentaColl sponge, cancellous bone parallel to the cavity over and under the epiphyseal plate, cortical bone, the intramedullary canal, subcutaneous tissue, and the joint cavity of the knee. Venous blood samples were obtained as reference.

Findings / Results: The main finding was a mean peak drug concentration (95-CI) of gentamicin in the cancellous bone cavity containing the implanted GentaColl sponge of 11,315 (9,049-13,581) µg/ml, persisting above 1000 µg/ml until approximately 40 hours after application. Moreover, the concentrations were low (< 1 µg/ml) in the surrounding tissues as well as in plasma.

Conclusions: The mean peak gentamicin concentration from the cancellous bone cavity after a controlled application of a GentaColl sponge was high and may be adequate for the prevention of biofilm formation. However, high MIC strains and uncontrolled application of the GentaColl sponge may jeopardize this conclusion.