Vancomycin and Imipenem Release from Nails Covered with Antibiotic-Loaded Acrylic Cement: A Pharmacokinetic Study

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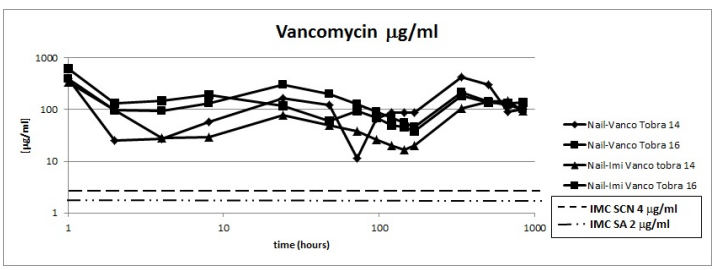
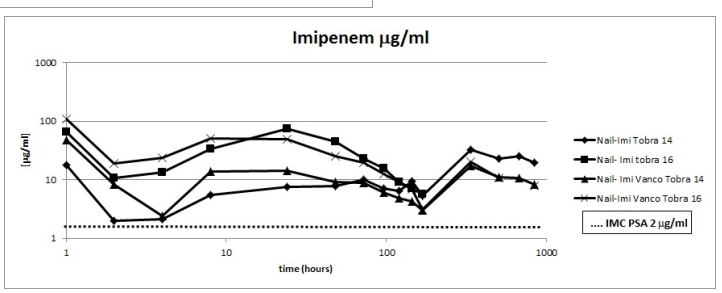
Purpose: There is a lack of information in the literature regarding pharmacokinetic properties of nails covered with antibiotic-loaded acrylic cement (ALAC). The aim of this research work was to describe the release of vancomycin and imipenem from nails covered with ALAC over a period of 6 weeks. Furthermore, we analyzed if an increase in the diameter of the nail resulted in an increase in the amount of cement applied, or if the combination of the two antibiotics in the same cement affects the amount of antibiotics released.

Methods: Two groups of three nails each were defined. Group 1 consisted of three 10-mm nails covered with cement with a final diameter of 14 mm: Nail 1, Simplex cement with tobramycin + 4 g of vancomycin per 40 g of cement; Nail 2, Simplex cement with tobramycin + 2 g of imipenem per 40 g of cement; and Nail 3, Simplex cement with tobramycin + 4 g of vancomycin + 2 g of imipenem per 40 g of cement. In Group 2 we used the same antibiotics but the three 10-mm nails were covered with cement with a final external diameter of 16 mm.

Results: In vitro concentrations of vancomycin and imipenem maintained above the MIC (minimum inhibitory concentration) for at least 6 weeks. Increasing the external diameter of the nail did not modify the concentration of antibiotics released significantly (P = 0.481). The release of the antibiotics was not significantly modified by the combination of vancomycin and imipenem in the same nail (P = 0.38).

Conclusion: it is possible to achieve in vitro concentrations of vancomycin and imipenem above the MIC for at least 6 weeks with nails covered with antibiotic-loaded acrylic cement Neither the combination of both antibiotics nor the increase in the diameter of the nail significantly modified the release of the antibiotics.





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