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Local and systemic levels of tobramycin delivered from calcium sulfate bone graft substitute pellets

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We asked if tobramycin-loaded calcium sulfate pellets could be used to maintain high local site antibiotic concentrations for an extended period with minimal systemic levels and without adverse effects on vital organs. Calcium sulfate pellets loaded with 10% tobramycin were implanted in contained medullary defects in the proximal humeri of canines. The number of pellets implanted was calculated to yield an equivalent human maximum prescribed dose, and 1.8-fold this dose. These doses converted to approximately 20 mg/kg, and 36 mg/kg, respectively, for the canine. Local and systemic tobramycin levels, pellet resorption, bone response, clinical pathology parameters, and histopathologic responses of potential target organs were analyzed to determine if there was any adverse response for a 28-day period. Serum tobramycin was elevated for less than one day while local levels remained elevated for at least 14 days, and in some animals, 28 days. Tobramycin delivered locally from calcium sulfate pellets had no apparent adverse effect on clinical pathology parameters or on any of the organs that were analyzed. In addition, bone formation and pellet resorption followed patterns typically seen with calcium sulfate materials.