

Comparative pharmacokinetics of ampicillin trihydrate, gentamicin sulphate and oxytetracycline hydrochloride in Nubian goats and desert sheep

ABSTRACT

In this investigation the pharmacokinetics of three commonly used antibiotics, ampicillin trihydrate (10 mg/kg), gentamicin sulphate (3 mg/kg) and oxytetracycline hydrochloride (5 mg/kg), given intravenously, were each studied in five Nubian goats and five desert sheep. The pharmacokinetic parameters were described by a two-compartment open model. The results indicated that there were significant differences between the two species in some kinetic parameters of ampicillin and oxytetracycline but not gentamicin. Ampicillin elimination half life ($t_{1/2}$) in goats (1.20 h) was shorter than that in sheep (2.48 h), and its clearance (Cl) significantly higher in goats (2921 mL/h·kg) compared to sheep (262 mL/h·kg) ($P < 0.01$). Ampicillin volume of distribution (V_d) was found to be significantly larger in goats (5673 mL/kg) than in sheep (992 mL/kg) ($P < 0.01$). For oxytetracycline, the $t_{1/2}$ in goats (3.89 h) was significantly shorter than that in sheep (6.30 h) and the Cl value in goats (437 mL/h·kg) was significantly higher than in sheep (281 mL/h·kg). The results suggest that when treating sheep and goats, the pharmacokinetic differences between the two species must be considered in order to optimize the therapeutic doses of ampicillin and oxytetracycline.

Keyword: Nubian goats; Desert sheep; Pharmacokinetic; Antibiotics; Therapeutic doses