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MEETING ABSTRACT

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Pharmacokinetics of levofloxacin after single intravenous and subcutaneous administration in domestic goats (*Capra hircus*): a pilot study

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Background: Fluoroquinolones are widely used for the treatment of bacterial infections in humans and veterinary medicine. However, development of bacterial resistance to fluoroquinolones has been reported [1]. This may lead to the loss of effectiveness in the treatment of bacterial infections with the drugs of this group. Levofloxacin, a third-generation fluoroquinolone approved for human medicine only, shows excellent antibacterial activity against a variety of microorganisms. Several pharmacokinetic studies showed that it could be used in veterinary species such as bovine, poultry and small ruminants.

Objectives: To study the pharmacokinetic profiles of levofloxacin after single intravenous and subcutaneous administration in goats.

Methods: Seven female, clinically healthy domestic goats (body mass 52–64 kg) received 500 mg per animal of levofloxacin via intravenous (4 goats) and subcutaneous (3 goats) administration. Blood samples were collected at 5, 15, 30, 45 minutes and 1, 1.5, 2, 4, 6, 8, 10, 24, 34 and 48 hours after the administration. Serum levofloxacin concentrations were analyzed using the HPLC system, according to an existing chromatographic method [2]. Enrofloxacin was used as an internal standard. Pharmacokinetics was fit according to bicompartimental analysis by WinNonlin 5.3 software.

Results: No adverse effects were observed during the experiment. Levofloxacin was detectable up to 24 hours after both subcutaneous and intravenous administrations. Mean plasma clearance (i.v. group) was 440.5 ± 99.3 ml/h/kg, elimination half-life 1.65 ± 0.26 h, and volume of distribution at steady state 905.5 ± 91.2 ml/kg. After s.c. administration, levofloxacin showed elimination half-life of 16.2 ± 10.0 h, maximum plasma concentration of $3,247.7 \pm 727.0$ ng/ml and time at the maximum drug concentration of 2.19 ± 0.16 h. This suggests the presence of a flip-flop phenomenon. Subcutaneous bioavailability was $93.4 \pm 6.0\%$.

Conclusions: This is the first study that compares the intravenous and subcutaneous routes of administration of levofloxacin in domestic goats. The pharmacokinetic trend of levofloxacin appeared to be somewhat similar to that reported for other small ruminants [3]. Second phase of this crossover study will contribute more data.

Keywords: levofloxacin – goat – pharmacokinetics – flip-flop kinetics

References

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