PHARMACOKINETICS OF A SINGLE DOSE OF METRONIDAZOLE IN CAPTIVE ASIAN ELEPHANTS (Elephas maximus)

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Abstract

Metronidazole is a nitroimidazole drug with bacteriocidal activity against a broad range of anaerobic bacteria.1,3 It is a recognized treatment for elephants exhibiting signs of colonic impaction, diarrhea, colic, protozoal disease, or anaerobic bacterial infection.1 The purpose of this study was to evaluate the pharmacokinetics of rectally administered metronidazole (15 mg/kg) in adult female Asian elephants (Elephas maximus, n = 6). Serum samples were collected from each animal at the following times: 0, 0.25, 0.5, 0.75, 1, 1.5, 2, 4, 6, 8, 12, 16, 24, 36, 48, 60, 72, 84 and 96 hr post rectal administration of metronidazole. Serum concentrations of metronidazole and its primary metabolite hydroxymetronidazole were measured via ultra performance liquid chromatography. Data were analyzed via a noncompartmental pharmacokinetic approach. Results indicated that serum levels of metronidazole were quantifiable at 0.25 hr and absent by the 96-hr time point in all elephants. The serum peak concentration (mean ± SD 13.15 ± 2.59 µg/ml) and mean area under the curve from time 0 to infinity (mean ± SD was 108.79 ± 24.77 hr * µg/ml) were higher than that reported in horses after rectal administration of metronidazole at similar doses.2,4 Concurrently, the time of maximum serum concentration (mean ± SD 1.2 ± 0.45 hr) and terminal elimination half life (harmonic mean ± pseudo-SD 7.85 ± 0.93 hr) were longer when compared to equine reports.2,4 Rectal administration of metronidazole was well tolerated and rapidly absorbed in Asian elephants. Dosing recommendations will depend on the mean inhibitory concentration of metronidazole for each pathogen.

1Metronidazole, Watson Pharma, Parsippany, NJ 07054 USA.

Key words: Asian elephant, Elephas maximus, Metronidazole, pharmacokinetic, rectal

ACKNOWLEDGMENTS

The authors thank Sherri Divband, National Zoological Park, and the animal care staff at the Ringling Brothers Center for Elephant Conservation for their diligent work on this project and their unrelenting care for the elephants in this study.

LITERATURE CITED

