Clearance of dexamethasone sodium phosphate following nebulisation of clinical doses in adult horses

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Introduction

Nebulisation is an effective and safe way of administering dexamethasone sodium phosphate (DSP) for the treatment of equine asthma, with the reduced risk of adverse effects that have been associated with the long-term use of systemic corticosteroids. DSP is a controlled substance in competition; clearance times have been established for intravenous and intramuscular DSP, but to the author’s knowledge there are no clearance studies for nebulized DSP. The objective of this study is to establish the time for a single dose of DSP, administered to adult horses using a Flexineb® nebuliser, to be eliminated from urine and blood.

Materials and Methods

Six Standardbred mares were used. A single dose of 0.04mg/kg DSP was diluted in 0.9% NaCl and administered as an aerosol using a Flexineb® nebuliser. Blood samples (0 (baseline), 2, 4, 6, 8, 10, 12, 24, 32, 48, 72 and 96 h) and urine samples (0 (baseline), 1, 4, 8, 24, 32, 48, 72 and 96 h) were collected for analysis using mass spectrometry at an official Forensic Racing Laboratory. This study was approved by the University of Sydney Animal Ethics Committee (2017/1221).

Results

Plasma concentrations reached $t_{\text{max}}$ at the earliest collection point (2 h) after nebulization and ranged from 0.6ng/mL to 1.8ng/mL. Dexamethsone was no longer detectable in the blood of any of the horses at 48 h. A single horse recorded a low reading at 96 h after having no detectable traces after 24hours. The $t_{\text{max}}$ in urine was reached at the earliest collection point (1 h) after nebulisation and ranged from 3.2 to 23.8 ng/ml. Dexamethasone was no longer present in urine at 72 h in 5 horses while detectable levels (0.1 ng/ml) were still present at 96 h in one horse.

Relevance to Australian clinical equine practice

A single dose of 0.04mg/kg of dexamethasone sodium phosphate administered as an aerosol through a Flexineb® mask was no longer detectable in blood at 48 h in all horses tested and was only detectable at a low concentration (0.1 ng/ml) in urine by 72 h in one horse.