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RESPIRATORY MEDICINE: NEW ADVANCES IN INTER-SPECIES AEROSOL DELIVERY

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Respiratory conditions are common in many domestic species however, are particularly detrimental to performance animals such as the horse. Respiratory disease is one of the major causes of lost training days for horses in Australia and overseas (Rossdale, Hopes *et al.* 1985; Bailey 1998) and continues to be a significant contributor to wastage. To date, treatment modalities for respiratory disease have been commonly based on speculative diagnosis, with survey results suggesting that antibiotics are over-prescribed by Australian veterinarians when treating coughing horses (Christley 1999). It has been ascertained that benefit may be gained by the use of aerosolized pharmaceuticals in the cases of horses with Inflammatory Airway Disease (IAD) and Recurrent Airway Obstruction (RAO). The recent advances of tailored systems for aerosol drug administration in horses facilitate the use of bronchodilators and anti-inflammatory drugs (usually corticosteroids) to be administered topically and target specifically, minimising undesirable side effects commonly encountered when drugs, particularly corticosteroids are administered systemically via oral or intravenous (IV) routes.

To ascertain the efficacy of pulmonary distribution using the lightweight AeroHippus® Equine Aerosol Chamber (EAC), a radiolabeling study was conducted at The Cummings School of Veterinary Medicine. Horses (n=6) were administered beclomethasone dipropionate (BDP) via metred dose inhaler (MDI) using the AeroHippus® as the delivery device. All horses were un-sedated while administered with 10 actuations (80µg/actuation) of the radiolabeled (^{99}mTc sodium pertechnate) beclomethasone. The AeroHippus® device was placed against the nostril as recommended for each actuation with a 15-30 second delay between actuations. Once 10 actuations were administered, horses were sedated with detomidine (2mg IV) for gamma scintigraphy.

Lung deposition computed using two different methods of attenuation correction were similar with no significant difference ($P>0.05$), with average lung deposition being 20.7% (method 1) vs. 15.8% (method 2), for a mean lung deposition of 18.2%. This compares to other administration devices such as the Aeromask® (6% deposition) and Equinehaler® (8.2% deposition), making the AeroHippus® the most efficient device available. Favourably, the Flow-Vu® indicator enables counting of the number of breaths the horse has taken through the chamber and also ensures a satisfactory seal, both of which aid the correct and optimal delivery of drug to the lungs.

It has also been considered that certain factors may have contributed to underestimation of lung deposition. Namely, the attenuation correction factor derived from ultrasound measurements of chest wall thickness may have been underestimated due to compression of soft tissues from the probe, which has implications to the calculation of attenuation correction factors. Furthermore, deposition may have been increased if experimental horses received prior acclimation or exposure to the device and the radioaerosol canister was sonicated, as this would improve mixing of the drug with pertechnate and deposition, which may increase deposition measurements.

Additionally, the AeroDawg® and AeroKat® are available for the treatment of feline asthma and chronic bronchitis in canines.

Bailey, C. J. (1998). *Identification and Characterisation of Causes of Wastage in the Australian Thoroughbred Racing Industry*. Thesis. Veterinary Science. University of Sydney.

Christley, R. M. (1999). *Studies of the Epidemiology of Lower Respiratory Tract Disease in Thoroughbred Racehorses in Sydney, Australia* Thesis. Veterinary Science. University of Sydney.

Rossdale, P. D., R. Hopes, et al. (1985). *"Epidemiological Study of Wastage Among Racehorses 1982 and 1983."* Veterinary Record **116**: 66-69.