



---

# 36th BRITISH EQUINE VETERINARY ASSOCIATION CONGRESS

---

HARROGATE  
17th to 20th September 1997

*Handbook Produced and Printed by*

**Boehringer  
Ingelheim**



**Vetmedica**

Fragments of SP and CGRP-like immunoreactive fibres were also present in large nerve fibre bundles and ganglionic clusters, but not in the ganglion cells themselves. The density of nerve fibres immunoreactive for D $\beta$ H was very low and restricted to blood vessels and mucus glands. Furthermore, there was marked variation in the density of nerve fibres at the different sites, with the greatest density, particularly for VIP, over the arytenoid cartilage. Immunoreactive nerve fibres were less plentiful on the epiglottis, and the density of all types of nerve fibres was low on the cricoid cartilage.

Title (26) : ALVEOLAR CLEARANCE IN COPD HORSES

Author(s) : Votion D, Duvivier D H, Vandenput S, Art T, Lekeux P

Institution(s) : Laboratory for Functional Investigation, Faculty of Veterinary Medicine, University of Liege, Bât B42, Sart Tilman, B-4000 Liege, Belgium

Abstract : The principle of alveolar clearance study is based on the assumption that hydrophilic compounds deposited within the lungs passively diffuses through the alveolar-capillary barrier at the site of cell junctions. As alveolar cell junctions are tighter than the ones of the capillary endothelium, the epithelium is the main barrier to solutes diffusion. If a disease induces alteration of these junctions, the solute permeation will be faster, resulting in an accelerated clearance. The permeability of the alveolar epithelium to a hydrophilic  $\gamma$ -emitting tracer ( $^{99m}\text{Tc}$ -DTPA) was measured in six horses suffering from chronic obstructive pulmonary disease (COPD) and the results were compared with those of six healthy control horses. The clearance from lung to blood of the aerosolised label was calculated as the time to half-clearance ( $T_{1/2}$ ) over the caudal part of the left lung.

Before the experiments, each subject were submitted to pulmonary function tests (PFT) *i.e.*, arterial blood gas analysis and mechanics of breathing. In control horses, PFT confirmed that the horses were healthy and  $^{99m}\text{Tc}$ -DTPA mean  $T_{1/2}$  was equal to  $42.35 \pm 7.21$  min. An acute attack of COPD, induced significant changes in PFT and accelerated values of  $^{99m}\text{Tc}$ -DTPA clearance ( $T_{1/2} = 20.34 \pm 3.58$  min). After six weeks in pasture, the clinical remission of the disease was obtained with restoration of normal half-time clearance values ( $T_{1/2} = 43.41 \pm 14.79$  min) and normal PFT. On the other hand, six weeks in barn with grass silage, induced intermediate half-time clearance values ( $T_{1/2} = 28.50 \pm 3.21$  min) despite normal PFT. Measure of alveolar permeability seems therefore to be a very sensitive indicator of alveolar-capillary barrier damage since modified values of clearance may be found without the presence of clinical symptoms.

Title (27) : EVALUATION OF THE IOS AS A NON-INVASIVE METHOD FOR PULMONARY FUNCTION TESTING IN HORSES

Author(s) : Van Erck-Westergren E, Art T, Lekeux P

Institution(s) : Laboratory for Functional Investigation, Faculty of Veterinary Medicine, University of Liege, Bât B42, Sart Tilman, B-4000 Liege, Belgium

Abstract : A new alternative in pulmonary function testing in horses is impulse oscillometry or IOS. In contrast to current reference techniques (CRT) which requires the introduction of a balloon-tipped esophageal catheter for pressure measurements, the IOS is totally non-invasive, demands no active cooperation or sedation and could be used in the field. The IOS is based on the forced oscillation principle and measures resistance (Rrs) and reactance (Xrs) of the respiratory system in a range of frequencies from 5 to 35 Hz. The aim of this study was to compare the IOS technique to the CRT in their ability to detect functional changes in horses with either upper or lower airway obstruction. Respiratory mechanical parameters were recorded using IOS and CRT in random order in five horses before and after a transient induced left laryngeal hemiplegia (LLH). In a second protocol, the same parameters were evaluated in six COPD-affected horses during an acute crisis and after clinical remission. The IOS was well tolerated by all horses and yielded repeatable results (CV=7%). All the spectral resistance values were significantly modified ( $P < 0.05$ ) after LLH whereas CRT parameters showed no variations. Both techniques detected significant differences of RL, Cdyn, Rrs at 5Hz and Xrs in horses during crisis compared to remission. The behavior of Rrs and Xrs with frequency was modified according to the level of obstruction, enabling to differentiate between upper or lower airway dysfunction. To conclude, the IOS was more sensitive than CRT in detecting an upper airway obstruction and in differentiating peripheral from upper airway mechanical dysfunctions. The IOS seems to be a reliable, comfortable, quick and easy-to-use method for the evaluation of respiratory mechanical parameters in horses.

Title (28) : TREATMENT OF COPD HORSES BY DRY POWDER INHALATION OF IPRATROPIUM BROMIDE

Author(s) : Duvivier D H, Votion D, Vandenput S, Art T, Lekeux P

Institution(s) : Laboratory for Functional Investigation, Faculty of Veterinary Medicine, University of Liege, Bât B42, Sart Tilman, B-4000 Liege, Belgium

Abstract : Adaptation of the dry powder inhalation (DPI) to horses has led to the development of an airtight face mask that may be connected to the DPI device. This device contains the drug in gelatine capsules that are manually pierced. Since ipratropium bromide (ipratropium) is commercially available from human medicine as dry powder, the airway response to DPI of ipratropium was determined in 6 horses suffering from COPD. When their maximal change in pleural pressure ( $\max\Delta P_{pl}$ ) was greater than 1.96 kPa, pulmonary function tests were recorded before DPI, and 60 minutes post-inhalation. Either placebo (6 capsules/horse) or ipratropium (600, 1200 and 2400  $\mu\text{g}$ /horse) was administered in randomised order.

Table 1: total pulmonary resistance ( $R_L$ ), dynamic compliance (Cdyn) and  $\max\Delta P_{pl}$  60 min after DPI of placebo and ipratropium at 3 dosages. Values are expressed as percentage change from baseline values (mean  $\pm$  SD).