

# Differences in regional ventilation in horses treated with and without continuous positive airway pressure – novel insights by electrical impedance tomography

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## O10-2 Differences in regional ventilation in horses treated with and without continuous positive airway pressure – novel insights by electrical impedance tomography

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The aim of this study was to evaluate the effect of continuous positive airway pressure (CPAP) on electrical impedance tomography (EIT) variables in anaesthetised horses.

Six healthy experimental horses were anaesthetised twice with isoflurane in oxygen 50% and medetomidine as continuous infusion in dorsal recumbency, receiving in random order either CPAP (8 cmH<sub>2</sub>O) or no CPAP (NPAP) for 3 hours. EIT measurements were recorded every 30 minutes and an ensemble average of 10 consecutive breaths was calculated from a 2-minute recording and used for analysis at each time point. Lung regions in which impedance changed minimally during ventilation were defined as Dependent (DSS) and Non-dependent Silent Spaces (NSS) (Swisstom 2015); Centre of Ventilation (CoV) and ventral-dorsal distribution of ventilation (Radke et al. 2012) were calculated. Venous admixture (Qs/Qt) was calculated from arterial and mixed venous blood analysis. Statistical analysis was performed using ANOVA and Pearson correlation. Data are presented as mean ± SD.

DSS were significantly lower in the CPAP group ( $7.3 \pm 0.8$ ) compared to  $12.7 \pm 0.8$  NPAP ( $p < 0.001$ ), while no difference was seen in NSS. The CoV was located more dorsally ( $52.6 \pm 0.4$  vs.  $55.6 \pm 0.4$  for CPAP vs. NPAP;  $p < 0.001$ ). The dorsal of the 4 ROIs received more ventilation

for the first two hours of anaesthesia in the CPAP group. Qs/Qt was significantly correlated with DSS when time was taken as covariate ( $p < 0.0001$ ;  $r = 0.65$ ).

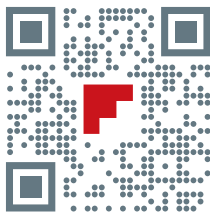
When CPAP is applied to the lungs of anaesthetised horses in dorsal recumbency the amount of DSS, most likely corresponding to anaesthesia-induced atelectasis, is reduced and ventilation is distributed towards the dependent dorsal parts of the lungs thereby improving the matching of ventilation and perfusion.

Radke OC, Schneider T, Heller AR et al. (2012) Spontaneous breathing during general anesthesia prevents the ventral redistribution of ventilation as detected by electrical impedance tomography: a randomized trial. *Anesthesiology* 116, 1227-1234.

Swisstom (2015) White paper on silent spaces. [http://www.swisstom.com/wp-content/uploads/BB2-White-Paper\\_2ST800-104\\_Rev.000.pdf](http://www.swisstom.com/wp-content/uploads/BB2-White-Paper_2ST800-104_Rev.000.pdf).

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