Comparison of 3 different continuous positive airway pressure interfaces in healthy Beagles under light anaesthesia

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Comparison of 3 different continuous positive airway pressure interfaces in healthy Beagles under light anaesthesia

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The aim of this study was to compare the efficacy of 3 interfaces to deliver continuous positive airway pressure (CPAP) in dogs: self-made mask (M), helmet (H), and conical facemask (FM). Ten Beagles were kept under light anaesthesia with medetomidine 3 μg kg⁻¹ hour⁻¹ and propofol 7 mg kg⁻¹ hour⁻¹ IV in dorsal recumbency (FiO₂ 0.21). Each interface was tested in each dog in random order. Measurements were taken at T₀ (no interface), T₁ (interface without CPAP) and T₂ (after 15 minutes of CPAP 7 cmH₂O using commercially available device). End-expiratory lung impedance changes (EELIC) using electrical impedance tomography (T₀-T₂), PaO₂ and PaCO₂ (T₁-T₂), inspired fraction of CO₂ (FiCO₂) (T₁), and leak (T₂) were measured. Mixed-effects linear regression models were used for statistical analysis (p ≤ 0.05). The EELIC increased by 7% (p < 0.001) between T₀ and T₂ without significant differences between interfaces. No significant difference was found for PaO₂ between devices at T₂. PaCO₂ was higher with FM compared to H (4 mmHg; p = 0.03) and M (4 mmHg; p = 0.03). The leak was significantly higher with M and H than with FM (p < 0.001). At T₁ FiCO₂ was higher with H than M (6.6%; p < 0.001), higher with FM than M (10.1%; p < 0.001) and lower with H than with FM (-3.5%; p = 0.001). All three devices performed clinically equal regarding gas exchange. FM showed the smallest leak during CPAP, but the highest amount of rebreathing without CPAP.
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