

Respiratory monitoring using electrical impedance tomography (EIT) with and without an endotracheal tube during recovery from anesthesia in mesocephalic and brachycephalic dogs

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This study aimed to compare lung ventilation before and after extubation in spontaneously breathing brachycephalic and mesocephalic dogs during anesthesia recovery using electrical impedance tomography (EIT).

A total of 20 client-owned dogs were enrolled into two groups: brachycephalic (French Bulldogs [n = 7], Pugs [n = 3]) and mesocephalic (n = 10). Dexmedetomidine 1 µg kg hour⁻¹ CRI was administered to all dogs 15 minutes before and throughout the recovery period. After EIT belt placement, dogs were positioned sternally with the head elevated. Extubation was performed when swallowing was observed. Inspiration time (t_i), tidal variation (TIV) as surrogate for tidal volume, respiratory rate (f_R), and minute ventilation (VE_{EIT}) were retrospectively calculated at three timepoints: T_{pre} (1 minute pre-extubation), T_{post} (1 minute post-extubation), and T3 (3 minutes post-extubation). Data were analysed using a mixed model for repeated measures ANOVA, with $p < 0.05$ considered significant.

The t_i significantly increased in brachycephalic dogs from T_{pre} (0.9 ± 0.3 s) to T_{post} (2.3 ± 1.3 s), compared to mesocephalic dogs (T_{pre} and T_{post} : 1.4 ± 0.5 s and 1.5 ± 0.8 s, respectively; $p = 0.026$). Brachycephalic dogs showed a decrease in VE_{EIT} from pre- (8.6 ± 5.5 AU) to post-extubation (4.9 ± 3.5 AU) ($p = 0.008$), while mesocephalic dogs showed an increase in VE_{EIT} from T_{pre} (6.1 ± 2.5 AU) to T_{post} (8.1 ± 5.2 AU). No significant differences were observed in TIV and f_R between the groups. No significant differences were found in any variable between groups at T3.

Brachycephalic dogs demonstrated significant changes in respiratory variables in the immediate post-extubation period, suggesting a greater susceptibility to hypoventilation compared to mesocephalic dogs.