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Title: Aminophylline increases ventilation and abdominal muscle contractility in awake canines

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Body: Aminophylline (Amino) is still used in treatment of COPD. However, effects of Amino on ventilation and respiratory muscles are uncertain. Utilizing implants in awake canines, we examined the effects of Amino on costal diaphragm (Jagers et al. Resp Phys, 2009). Here we study the effect of Amino on abdominal muscles of expiration, by measurement of the transversus abdominis (TA). Sonomicrometry transducers and EMG electrodes were implanted in the left TA. After recovery, the animals were studied awake, breathing through a mask. Airflow, $ETCO_2$, heart rate, muscle length, and moving average EMG were recorded during room air, and CO_2 stimulation, before and after Amino. Output included breath-by-breath breathing pattern, muscle shortening, peak EMG, $PaCO_2$ and heart rate. Results are shown at room air and 3 levels of CO_2. For N= 6 dogs (mean wgt 29.8 kg) studied after 25 days, minute ventilation, tidal volume, and respiratory frequency increased significantly with Amino, during resting breathing and all levels of CO_2. Mean aminophylline was 72 umol/L (therapeutic range 55-110 umol/L). TA shortening increased significantly with Amino while TA EMG activity remained unchanged, consistent with increased contractility of the TA with Amino.

In awake, intact, canines, after Amino, TA contractility is increased, as shown by greater muscle shortening per EMG. This enhanced action of expiratory muscles occurs at therapeutic levels of Amino.