

Asthma, respiratory allergy and cough

The pattern of tracheobronchial coughing is altered by reduced vagal afferent drive

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The effect of graded modulation of vagal afferent feedback on cough was studied on 20 spontaneously breathing cats anesthetized with sodium pentobarbital (40 mg/kg, i.p.). The average vagal temperature was 3.9 ± 0.4 °C for the right vagus and 4.4 ± 0.2 °C for the left vagus. The cervical sympathetic trunk was cooled to an average temperature of 4.4 ± 0.5 °C. In 8 animals the unilateral vagotomy was performed at the end of experiment. The number of coughs during vagal cooling was significantly decreased ($p < 0.001$). Inspiratory cough efforts were reduced by approximately 30% ($p < 0.001$) and expiratory motor drive by more than 80% ($p < 0.001$). Temporal analysis showed prolonged inspiratory and expiratory phases, the total cycle duration, its active portion, and the interval between maxima of the diaphragm and the abdominal activity during cough ($p < 0.001$). Similar, but mostly non statistically significant changes were observed after unilateral vagotomy, supposedly due to reduced contribution of vagal C fibers resulting in high variation of the data. However, very similar cough data to those during vagal cooling were found comparing high excitability coughs (early controls before vagal cooling) and low excitability coughs (late controls before vagotomy).

Our results indicate that reduced cough afferent drive markedly attenuates coughing, and alters cough temporal feature. Such changes also occur when excitability of cough response decreases naturally in time. Differences in effects of vagal cooling and vagotomy suggest significant modulatory role of intact C fibres on mechanically induced cough.

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