

Basic Research Overview

High-Frequency Chest Compression: Mechanism of Action/Physiological Effects

This pioneering study to assess HFCC mechanisms of action and showed that HFCC greatly enhanced tracheal mucus clearance rates (TMCR). In the range of 11 to 15 Hz, TMCR reached a peak value of 340% greater than that of spontaneously breathing control subjects, suggesting significant potential for clinical benefit.

Title	King M, Phillips D, Gross D, Vartian V, Chang HK, Zidulka A. Enhanced tracheal mucus clearance with high frequency chest wall compression. <i>Am Rev Respir Dis</i> 1983; 128:511-515.
Objective	<ul style="list-style-type: none"> • To measure the effects of HFCC applied at different frequencies on TMCR in dogs • To examine variation in TMCR within the trachea • To measure the effect of HFCC-induced TMCR by altering the baseline clearance rate by increasing depth of anaesthesia
Method	<ul style="list-style-type: none"> • HFCC was administered to 9 anesthetized dogs by oscillating the pressure in a thoracic cuff such that it produced oscillatory tidal volumes of 25 to 100 cc at frequencies of 3 to 17 Hz • The tracheal mucus clearance rate (TMCR) was determined by direct observation of the rate of displacement of a charcoal particle spot by means of a fiberoptic bronchoscope
Results	<ul style="list-style-type: none"> • Baseline TMCR during spontaneous breathing averaged 8.2 +/-5.6 mm/min • TMCR during 2 min of HFCC was increased at 5, 8, 11, 13, 15, and 17 Hz • Clearance enhancement was most pronounced in the range of 11 to 15 Hz, reaching a peak value of 340% of control at 13 Hz • Increased TMCR with HFCC was attributed to: <ul style="list-style-type: none"> ○ HFCC-induced alterations in mucus crosslink density and viscosity ○ HFCC- induced cephalad bias of air-flow interactions

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