

Demonstration of pulmonary denervation using the Hering-Breuer reflex following Targeted lung denervation (TLD)

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Publication: European Respiratory Journal 2017; Volume 50; Supplement 61, 5206

Introduction: Targeted lung denervation (TLD) is a bronchoscopic procedure delivered using a dual cooled radio frequency ablation catheter. The catheter and denervation system was developed to relieve obstructive airways disease by disrupting pulmonary vagal parasympathetic inputs to the lung while minimizing airway wall effects. The Hering–Breuer inflation reflex (HBR) is a sensory reflex mediated by bronchial vagal sensory axons.

Aim: To determine the effect of TLD on Hering-Breuer reflex in healthy adult canine and sheep.

Methods: Following IACUC approval, 2 dogs and 2 sheep underwent circumferential ablation of both main bronchi using a lung denervation system (Nuvaira, Inc., USA). Both dogs were hounds weighing 25 and 39 Kg. Both sheep were mixed breed weighing 45 and 90Kg. The animals underwent evaluation of the HBR prior to and following TLD.

Results: All animals demonstrated a normal HBR (cessation of breathing) prior to TLD Therapy. After TLD, vagal denervation of the bronchial branches was clearly demonstrated via interruption of the HBR (continuation of breathing) in the canine model (Figure). The ovine model yielded more variable results with the HBR test due to complications with comfortably anesthetizing the sheep while maintaining spontaneous breathing.

Conclusions: TLD successfully disrupts HBR in healthy canines demonstrating a physiological response to lung denervation.

