

Anti-inflammatory effects of targeted lung denervation in patients with COPD

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Background: Acetylcholine is the primary parasympathetic neurotransmitter in the airways, and induces bronchoconstriction. Recent evidence from animal models reveals that acetylcholine also promotes airway inflammation; however this has never been shown in patients with COPD.

Aim: To investigate the effect of targeted lung denervation (TLD) on inflammation in patients with COPD. TLD is a novel bronchoscopic therapy for COPD, in which airway nerves are ablated by locally applying radiofrequency energy.

Methods: Seven subjects with moderate to severe COPD were recruited as part of a safety and feasibility study for TLD (NCT01483534). Patients were withheld LAMA 7 days prior to TLD. Before TLD of the first lung, bronchial wash and brush were collected from the planned site of intervention. This procedure was repeated after 30 days.

Results: The percentage of neutrophils in the bronchial wash at day 30 compared to day 0 was decreased in 5 out of 7 patients; CXCL8 concentration decreased in 4 out of 7 patients and CCL4 (MIP-1 β) levels decreased in 6 out of 7 patients ($p=0.047$). Gene expression of CXCL8 in the brush decreased in 6 out of 7 patients ($p=0.031$) and expression of IL-6 decreased in 5 out of 7 patients. Furthermore, TGF- β gene expression decreased in 6 out of 7 patients ($p=0.047$), and MUC5AC gene expression decreased in 5 out of 7 patients.

Conclusion: These preliminary findings suggest that TLD attenuates airway inflammation. To our knowledge, this is the first study reporting a direct effect of acetylcholine on inflammation in patients with COPD. A large-scale randomized controlled study into the effectiveness of TLD is needed to confirm these interesting findings.