

RM-01 Clinical value of ciliary assessment in bronchiectasis—a cross sectional study

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Introduction: Although ciliary abnormalities have been studied for several decades, probably owing to technical requirements, a large scale prospective study on the clinical significance of abnormalities of ciliary beat (other than frank immotility and dyskinesia) and ultrastructure has not been conducted.

Methods: We have evaluated the prevalence and clinical significance of ciliary beat frequency and ultrastructural defects on the nasal respiratory mucosa obtained from 152 stable patients with idiopathic bronchiectasis (100F, 57.7±15.2 yrs) and 127 control non-smoking subjects (58F, 56.0±24.2 yrs). Ciliary beat assessment was performed by using a photomultiplier method established in our laboratory, and ultrastructure was assessed by using high resolution transmission electron microscopy.

Results: Bronchiectasis patients had significantly slower ciliary beat frequency ($p<0.05$), and more percent of patients showing central and peripheral microtubular defects (OR 14.4, 95% CI 5.6-36.8), namely extra peripheral microtubules, “9+1”, “8+2”, and compound cilia ($p<0.05$), but not microtubular disarrangement, extra matrix or ciliary tail abnormalities ($p>0.05$), than controls. Bronchiectasis patients also had more percent cilia with any ultrastructural, microtubular defects, compound cilia, and ciliary tails than controls ($p<0.05$). Ciliary beat frequency did not correlate with clinically relevant parameters ($p>0.05$). However, the percent of cilia with central, but not peripheral, microtubular defects correlated with 24h sputum volume ($r=0.40$, $p=0.001$, and $r=-0.04$, $p=0.70$ respectively) and FEV₁ ($r=-0.24$, $p=0.01$, and $r=0.00$, $p=0.99$ respectively).

Conclusions: Our results, therefore, strongly suggest a pathogenic role for central microtubular defects in the development of idiopathic bronchiectasis. It is hoped that future research into ciliary ultrastructural phenotyping could help diagnose and prognosticate, and further the understanding of the pathogenesis of this distressing and untreatable disease.

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RM-02 Inhaled steroid therapy and *Pseudomonas aeruginosa* infection and exhaled nitric oxide in bronchiectasis

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Purpose: Endogenous NO metabolism is involved in the pathogenesis of many respiratory and other systemic diseases. We have recently shown that exhaled (e)NO production is not significantly different between healthy volunteers and patients with bronchiectasis, except those with chronic *Pseudomonas aeruginosa* (PA) infection had significantly lower eNO than their counterparts and controls. While eNO is reduced by treatment with inhaled corticosteroid in asthma, the effects of such treatment on eNO in patients with bronchiectasis, who also have significant airway inflammation, is unknown.

Methods: eNO was measured by using an automatic chemiluminescence analyzer (Sievers NO Analyser280) at steady expiration on 60 stable patients with bronchiectasis, who received either fluticasone 500µg BID ($n=30$, 9F, 54.1±16.1yr) or matched placebo ($n=30$, 13F, 52.7±15.8yr). Patients with PA ($n=16$) at steady state were also assessed.

Results: There was no significant difference in eNO levels between fluticasone and placebo patients over the study period. There was no correlation between baseline eNO with age, FEV₁, FVC, 24h sputum volume or the number of bronchiectatic segments. Patients with *Pseudomonas aeruginosa* (PA) infection, but not their counterparts, displayed a correlation between 0- and 52-week eNO levels. PA infection was associated with significantly lower eNO levels among the patients.

Conclusion: Our data, derived from the first controlled study, showed that inhaled corticosteroid therapy has no significant effect on eNO production in bronchiectasis. The data of this longitudinal study also confirm our previous finding that eNO is reduced on PA-infected patients with bronchiectasis, and this phenomenon is likely to reflect a down-regulatory effect of PA infection on intrinsic airway NO production.