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Long-term effects of inhaled corticosteroids on sputum bacterial and viral loads in COPD

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Abstract

Inhaled corticosteroid-containing medications reduce the frequency of COPD exacerbations (mainly infectious in origin) while paradoxically increasing the risk of other respiratory infections. Theaim was to determine the effects of inhaled corticosteroids on airway microbial load in COPD patients and evaluate the influence of the underlying inflammatory profile on airway colonisation and microbiome. This is a proof-of-concept prospective, randomised, open-label, blinded endpoint study. Sixty patients with stable moderate COPD were randomised to receive one inhalation twice daily of either a combination of salmeterol 50 μg plus fluticasone propionate 500 μg or salmeterol 50 μg for 12 months. The primary outcome was the change of sputum bacterial loads over the course of treatment. Compared with salmeterol, 1-year treatment with salmeterol plus fluticasone was associated with a significant increase in sputum bacterial load ($p=0.005$), modification of sputum microbial composition and increased airway load of potentially pathogenic bacteria. The increased bacterial load was observed only in inhaled corticosteroid-treated patients with lower baseline sputum or blood eosinophil ($\leqslant 2\%$) levels but not in patients with higher baseline eosinophils. Long-term inhaled corticosteroid treatment affects bacterial load in stable COPD. Lower eosinophil counts are associated with increased airway bacterial load.