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**Title:** Effects of combining tiotropium and salmeterol/fluticasone propionate on airway dimensions in patients with COPD

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**Body:** Background: Triple inhalation therapy with tiotropium (Tio) and salmeterol/fluticasone propionate (SFC) is widely used in the treatment of chronic obstructive pulmonary disease (COPD). However, the effects of triple therapy on airway structural changes remain unknown. Aim: To compare the effects of Tio, salmeterol (SM), SFC, and Tio plus SFC on airway dimensions in COPD. Methods: Patients with COPD were randomized to receive 16-week treatment periods in one of four-way study: (1) Tio (18 µg once daily; n=15), (2) SM (50 µg twice daily; n=14), (3) SFC (50/250 µg twice daily; n=16), (4) Tio plus SFC (n=15). Airway dimensions were assessed by a validated CT technique, and airway wall area corrected for body surface area (WA/BSA), percentage wall area (WA%), wall thickness (T)/√BSA, and luminal area (Ai)/BSA at the right apical segmental bronchus were measured. Pulmonary function and the St. George's Respiratory Questionnaire (SGRQ) were evaluated. Results: Tio plus SFC resulted in a significant decrease in WA/BSA, WA%, and T/√BSA compared with Tio, SM, and SFC (p<0.05, respectively). SFC significantly decreased WA% and T/√BSA (p<0.05), but these changes failed to reach statistical significant difference between Tio and SM. In the Tio plus SFC group, the changes in WA% and Ai/BSA were significantly correlated with changes in FEV<sub>1</sub> (r=0.86, p<0.001, and r=0.48, p<0.05). There were more significant improvements in SGRQ scores after treatment with triple therapy than other treatments. Conclusions: The superiority of triple inhalation therapy may reflect improvements of the range of airway dimensions and pulmonary function measurements in COPD.