EXHALED EICOSANOIDS AND BIOMARKERS OF OXIDATIVE STRESS IN COPD EXACERBATION

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Eicosanoids and oxidants play an important role in inflammation, but their role in chronic obstructive pulmonary disease (COPD) is uncertain. In this study we hypothesized that levels of exhaled leukotrienes, prostaglandins and biomarkers of oxidative stress are increased in infectious exacerbations of COPD and that they decrease after antibiotic therapy. Cysteinyl-leukotrienes (LTs), leukotriene B4 (LTB4), prostaglandin E4, hydrogen peroxide (H2O2) an d 8-isoprostane were measured in exhaled breath condensate (EBC) in 16 COPD patients with infectious exacerbations (mean age 64 +/-12 yr, 13 male) on day 1, on antibiotic therapy (days 2-4), 2-4 days post-therapy and at a follow-up visit when stable (21-28 days post-therapy). There was a significant fall in concentration of cys-LTs, LTB4 and 8-isoprostane at visit 3 compared to day 1 (cys-LTs: 196.5 +/-38.4 vs. 50.1 +/-8.2 pg/ml, $p<0.002$; LTB4: 153.6 +/-25.5 vs. 71.9 +/-11.3 pg/ml, $p<0.05$:8-isoprostane:121.4 +/-14.6 vs. 56.1+/-5.2pg/ml, $p<0.03$, respectively). Exhaled H2O2 was higher on day 1 compared to that at visits 2 and 3 (0.74 +/-0.05 vs. 0.52 +/-0.03 and 0.35+/-0.03 mM, $p< 0.01$ and $p<0.01$, respectively). Exhaled PGE2 levels did not change during exacerbations of COPD. Exhaled eicosanoids and H2O2 in EBC measured at follow-up visit (stable COPD) were significantly higher compared to those from healthy subjects. We conclude that eicosanoids and oxidants are increased infectious exacerbations of COPD. They are also elevated in the airways of stable COPD patients compared to healthy subjects.