Acute effect of an e-cigarette with and without nicotine on lung function

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Background
E-cig is an electrical device that vaporizes propylene or polyethylene glycol-based liquid solution into an aerosol mist containing different concentration of nicotine. Our preliminary study showed an increase in Raw, a concomitant decrease in sGaw and an increase in slope of phase III in a limited number of subjects immediately after smoking a single e-cig containing nicotine.

Materials and methods
We extended our protocol in a larger group of never smokers and in smokers. We implemented the same protocol with a nicotine free e-cig in a group of never smokers. We studied 60 subjects before and after smoking an e-cig containing 11mg nicotine (Group A). Group A: 9 never smokers and 51 smokers (24 had no overt airways disease, 11 asthma, 16 COPD). Another group of 10 never smokers used a nicotine free e-cig (Group B). Lung function assessed pre and post e-cig use including lung volumes, airway resistance (Raw), specific airway conductance (sGaw) and the slope of phase III. The same brand of e-cig used in both groups, with 11 and 0mg of nicotine.

Results
Group A: a significant increase in Raw was shown in smokers and in never smokers (0.284 ± 0.13-0.308 ± 0.14; p = 0.033, 0.246 ± 0.07-0.292 ± 0.05; p = 0.006) with significant decrease in sGaw (1.197 ± 0.50-1.060 ± 0.42; p = 0.009, 1.313 ± 0.22-1.109 ± 0.18; p = 0.043). Increased slope in phase III was shown only in asthmatic patients (p = 0.008). Group B: increase in Raw (0.247 ±0.03-0.333 ± 0.08; p = 0.005) and a decrease in sGaw (1.213 ± 0.29-0.944 ± 0.18; p = 0.009) noted.

Conclusions
The present study supports our preliminary results showing increased Raw and a concomitant decrease in sGaw. These changes might be due to the vaporizing liquid but not to the inhaled nicotine per se.

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