Abstract: P940

Effects of IQOS smoking on vascular function, coronary flow reserve, myocardial deformation and myocardial work index during one month of use

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Background: IQOS smoking (heat-no burn smoke product) is proposed to reduce harm compared to conventional smoking. We examined its effects on vascular function, myocardial deformation and ventricular arterial coupling.

Methods: Thirty-seven current smokers (mean age 48±5 years, >20 cigarettes/day) without cardiovascular disease and 20 healthy subjects with similar age sex and risk factors participated in the study. All subjects were instructed to smoke only IQOS for one month. Measurements were performed at baseline and 1 month after smoking IQOS. we measured a) the aortic PWV (PWV) and central aortic systole blood pressure (SBPc) by Complior; b) the exhaled CO level (parts per million-ppm) as a smoking status marker; and c) brachial systolic (SBP)and diastolic (DBP) blood pressure and heart rate (HR) a) flow mediated dilation (FMD) of the brachial artery b) coronary flow reserve (CFR) after adenosine infusion by Doppler echocardiography and c) global longitudinal strain (GLS) peak twisting and untwisting velocity and myocardial work index derived by pressure – myocardial strain loops by speckle tracking imaging PWV to GLS ratio was also used as a marker of ventricular arterial coupling

Results: At baseline exhaled CO, PWV, SBPc, FMD, PWV/GLS ratio, myocardial work index and peak untwisting velocity were higher and CFR was lower in smokers compared to controls (14.9±7 vs. 4.2±1 ppm, p<0.001, 8.7±1.4 vs 10.0±1.6 m/s, p<0.05; 118±16 vs 110±7 mmHg p<0.001, 6.9±2 vs 9.5±2% p<0.001, −0.61±0.21 vs. −0.45±0.11 m/sec%, p<0.001, 1926±284 vs 1826±300 mmHg% p=0.04, −122±36 vs −95±25 deg/sec, p=0.02, 2.5±0.9 vs. 3.1±0.8 p=0.001 respectively). In the chronic phase we observed a significant improvement of FMD, CFR, GLS, PWV/GLS, myocardial work index and peak untwisting velocity compared to baseline (12±2% vs. 6.9±2%, p=0.03; 3.2±0.6 vs. 2.5±0.9 p=0.001; −19.3±2.2% vs. −21.1±2.8%, p=0.001; −0.61±0.21 vs. −0.47±0.12 m/sec% p=0.03; 1926±284 vs 1830±343 mmHg% p=0.03, −122±36 vs −105±25 deg/sec, p=0.03, respectively) in parallel with reduction of the exhaled CO (14.9±7 vs. 6±4.9 ppm, p<0.001). HR remained unchanged throughout the study and there was a borderline reduction of central aortic systolic blood pressure (118±16 vs. 114±19 mmHg, p=0.048).

Conclusions: Replacement of conventional cigarettes with IQOS results in improved LV longitudinal myocardial deformation, LV untwisting and reduced LV myocardial work index possibly linked to the concomitant improvement of aortic elasticity, endothelial and coronary microcirculatory function and ventricular-arterial coupling within 1 month.