

Assessment of Cardiopulmonary Function among Electronic Cigarettes Smokers, Conventional Cigarette Smokers and Nonsmokers using Electrocardiogram and Six-minute Walk Test

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BACHGROUND AND AIM:

Tobacco smoking increases risk for cardiovascular diseases, ischemia and arrhythmogenesis. Tar and carbon monoxide from burning tobacco can affect oxygen carrying capacity, worsen ischemia and decreases aerobic capacity. The impact of electronic(e-)cigarettes on cardiac and pulmonary function is still undetermined. The aim of this study was to compare the electrocardiographic parameters in apparently healthy chronic e-cigarettes, conventional smokers compared to non-smokers. Electrocardiographic waves and intervals, as well as six-minute walk test parameters were used for this assessment.

PARTICIPANTS & METHODS:

A descriptive cross-sectional study involved a total of 105 apparently healthy volunteers (55.3% male, mean age 31.16 ± 10.65 years). Chronic e-cigarettes and conventional cigarettes smokers and non-smokers with no history of cardiovascular diseases matched to age and gender were assigned into three study groups, each of 35 participants, enrolled from January 2020 to February 2021 at Suez Canal University Hospitals. Demographic, clinical data, ECG study and submaximal aerobic capacity assessment (six-minute walk test) were obtained. Body mass index, vital signs (pulse, respiratory rate, systolic, and diastolic blood pressure) were measured. Heart rate, QRS complex, QT, QTc and TP-e intervals were manually measured. Ventricular repolarization parameters in 12-lead

electrocardiogram (Tp-e interval, Tp/QT and Tp/QTc ratios, calculated with Bazett's formula) were compared between smokers and non-smoker groups. For physical capacity assessment, the six-minute walk test (6MWT) was used as a simple, standardized, reliable and valid measure of the effect of chronic smoking on submaximal exercise capacity and parameters as dyspnoea, fatigue, and oxygen saturation (SPaO₂) were compared among the study groups.

RESULTS:

Basal demographic data were comparable among all groups. Mean systolic, diastolic blood pressure, P-wave amplitude and duration, and PR interval showed insignificant difference between all groups ($P > 0.05$). On comparing ECG parameters among e-cigarettes smokers, regular cigarette smokers and non-smoker controls; mean heart rate was 71.7, 73.4, 64.2 bpm respectively ($P, 0.001$).

CONCLUSION:

Mean heart rate, QRS complex, QTc and ventricular repolarization parameters (TP-e intervals, Tpe/QT and Tpe/QTc ratios) were increased in healthy chronic e-cigarettes and regular cigarettes smokers compared to nonsmokers. This may suggest an increased predisposition to Torsade's de Pointe mediated ventricular arrhythmias in healthy chronic smokers. Cigarette smoking is associated with risk of ventricular arrhythmogenesis and sudden cardiac death.