

The Electronic Cigarette, Do We Need to Worry?

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There are few high-quality studies on the effects of electronic cigarettes (e-cigarettes) on the cardiovascular system and this is a topic of increasing debate within cardiology. The study by Moheimani and co-workers that was published in February 2017 in JAMA Cardiology adds some clarity to the debate that e-cigarettes are probably not harmless. The researchers found that e-cigarette use was related to increased sympathetic activity and oxidative stress in habitual e-cigarette users.^[1]

E-cigarettes are especially popular among young people. Vaper is a term that is used to describe a person who inhales the e-cigarette vapour or is vaping. They deliver a heated aerosol into the mouth and lungs, and the main elements are nicotine, carbonyls and particulates. Scientific data supporting whether they are safe or are causing harm to the cardiovascular system are scarce, and the results are conflicting. One study found that platelet aggregation was increased.^[2] In addition, increased heart rate and elevated diastolic blood pressure have been shown in vapers.^[3]



Abnormal heart rate variability has been shown to be associated with risk of acute myocardial infarction and sudden cardiac death, and increased oxidative stress may stimulate and lead to atherosclerosis.^[1]

The research question in this study was whether cardiac autonomic tone imbalance and increased oxidative stress and inflammation could be detected in healthy users of e-cigarettes. In a cross-sectional case-control study performed in Los Angeles, USA, 23 users and 19 nonusers (35% females, 21–45 years) of e-cigarettes were recruited. The researchers analysed components of heart rate variability, oxidative stress, and inflammation. They measured heart rate variability as both high- and low-frequency components and the ratio of the low frequency to high frequency. Oxidative stress was measured as LDL oxidizability, HDL anti-inflammatory capacity and paraoxonase-1 activity. The high-frequency component of heart rate variability was decreased, and the low-frequency component and the ratio of low to high frequency component were increased which indicated sympathetic predominance. LDL oxidizability was increased, which indicated increased oxidative stress. A shift in cardiac autonomic balance and increased oxidative stress, as shown in this study, might be associated with increased cardiovascular risk.



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The studies on e-cigarettes often have methodological problems as well as severe conflicts of interest. Moreover, rapidly changing product designs as well as lack of follow-up studies make it even more difficult to draw conclusions on the safety of e-cigarettes. These aspects in addition to possible health harm effects are covered extensively in recent reports.^[3,4] A systematic review on the effectiveness of e-cigarettes as cessation aids concluded that the evidence in support of e-cigarettes' effectiveness in quitting smoking was very low to low.^[5]

Surprisingly, e-cigarettes are still increasing in popularity among smokers and this is most likely due to very effective marketing performed by the tobacco industry. The tobacco industry has conducted and published many of the studies on e-cigarettes, and probably we should be careful in trusting results produced by this industry.^[3,4] Characteristic traits of the studies sponsored by tobacco industry are that they almost never find negative health effects and provide little discussion of study limitations.^[6] So far, there is no reason to believe that e-cigarettes are completely harmless to the cardiovascular system, and I think we do need to worry. Further work is needed, both short-term experimental and long-term effect studies, in order to confirm the possible adverse health effects of e-cigarettes on the cardiovascular system.

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