Electronic cigarettes and cardiovascular disease: epidemiological and biological links

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 Abstract

Electronic cigarettes (e-cigarettes), as alternative nicotine delivery methods, has rapidly increased among youth and adults in recent years. However, cardiovascular safety is an important consideration regarding e-cigarettes usage. e-cigarette emissions, including nicotine, propylene glycol, flavorings, nitrosamine, and metals, might have adverse effects on cardiovascular health. A large body of epidemiological evidence has indicated that e-cigarettes are considered an independent risk factor for increased rates of cardiovascular disease occurrence and death. The incidence and mortality of various types of cardiovascular disease, such as cardiac arrhythmia, hypertension, acute coronary syndromes, and heart failure, have a modest growth in vapers (users of e-cigarettes). Although the underlying biological mechanisms have not been fully understood, studies have validated that oxidative stress, inflammation, endothelial dysfunction, atherosclerosis, hemodynamic effects, and platelet function play important roles in which e-cigarettes work in the human body. This minireview consolidates and discusses the epidemiological and biological links between e-cigarettes and various types of cardiovascular disease.

Keywords: Cardiovascular disease; Smoking; Toxicity; Vaping; e-cigarettes.

The association between combustible/electronic cigarette use and stroke based on national health and nutrition examination survey

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 Abstract

Aims: This study aims to analyze the association between combustible/electronic cigarettes and the risk of stroke.

Methods: We obtained data from the 2017-2018 National Health and Nutrition Examination Survey (NHANES). The stroke history and combustible/electronic cigarette use were acquired by questionnaires. Considering the sole or dual use of combustible cigarettes and electronic cigarettes (e-cigarettes), we divided all the individuals into four subgroups, including nonsmokers (reference group), sole combustible cigarette, sole e-cigarette, and dual use of both combustible cigarettes and e-cigarettes. We performed multivariable logistic regression to determine the association between cigarette use with the prevalence of stroke. We used odds ratios (ORs) with 95% confidence intervals (CIs) to show the effect size. Finally, we developed a prediction model to evaluate the risk of stroke for individuals with combustible or electronic cigarette use based on a random forest model.

Results: We included a total of 4022 participants in the study. The median age was 55, and 48.3% of the participants were males. When we adjusted for age, gender, education attainment, race, total-to-HDL cholesterol (< 5.9 or ≥ 5.9), diabetes, hypertension, and alcohol consumption, the groups of sole e-cigarette use, sole combustible cigarette use, and dual use of combustible and electronic cigarettes were significantly associated with the prevalence of stroke with ORs (with 95%CI) of 2.07 (1.04-3.81), 2.36 (1.52-3.59), 2.34 (1.44-3.68), respectively. In the testing set, the AUC was 0.74 (95%CI = 0.65-0.84), sensitivity was 0.68, and specificity was 0.75.

Conclusion: Sole e-cigarettes and dual use of e-cigarettes with combustible cigarettes might increase the risk of stroke.

Keywords: Clinical prediction model.; Combustible cigarette; Electronic cigarette; Smoking; Stroke.

Cardiopulmonary Consequences of Vaping in Adolescents: A Scientific Statement From the American Heart Association

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Abstract

Although the US Food and Drug Administration has not approved e-cigarettes as a cessation aid, industry has at times positioned their products in that way for adults trying to quit traditional cigarettes; however, their novelty and customizability have driven them into the hands of unintended users, particularly adolescents. Most new users of e-cigarette products have never smoked traditional cigarettes; therefore, understanding the respiratory and cardiovascular consequences of e-cigarette use has become of increasing interest to the research community. Most studies have been performed on adult e-cigarette users, but the majority of these study participants are either former traditional smokers or smokers who have used e-cigarettes to switch from traditional smoking. Therefore, the respiratory and cardiovascular consequences in this population are not attributable to e-cigarette use alone. Preclinical studies have been used to study the effects of naive e-cigarette use on various organ systems; however, almost all of these studies have used adult animals, which makes translation of health effects to adolescents problematic. Given that inhalation of any foreign substance can have effects on the respiratory and cardiovascular systems, a more holistic understanding of the pathways involved in toxicity could help to guide researchers to novel therapeutic treatment strategies. The goals of this scientific statement are to provide salient background information on the cardiopulmonary consequences of e-cigarette use (vaping) in adolescents, to guide therapeutic and preventive strategies and future research directions, and to inform public policymakers on the risks, both short and long term, of vaping.

Keywords: AHA Scientific Statements; adolescent; cardiovascular system; electronic nicotine delivery systems; lung injury; smoking; vaping.