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Cardiovascular Benefits of Switching From Tobacco to Electronic Cigarettes



We welcome the paper by George et al. (1) on the early cardiovascular effects of switching from tobacco cigarettes (TCs) to vaping electronic cigarettes (ECs) in long-term smokers (1). However, the report raises additional issues that need to be borne in mind and addressed.

First, the investigators surprisingly found no difference between the 2 EC arms (with and without nicotine) in terms of flow-mediated dilation or other vascular endpoints. Yet, it is well-established that nicotine per se exerts pharmacological effects that could contribute to acute and chronic cardiovascular events, and other studies on modified risk products (MRPs), smokeless tobacco, or nicotine replacement therapy clearly show that the risks of nicotine without tobacco combustion are low but still of concern especially in people with cardiovascular disease (2). Second, they also found no significant difference for other secondary outcomes, including pulse-wave velocity, heart rate, biomarkers of inflammation, and platelet reactivity, which is at odds with several scholarly reports (2-4). The investigators stated in the Methods section that "all dropouts were replaced to achieve 36 completed subjects in each group." Because this approach may generate a bias, a sensitivity analysis including all initially included subjects is strongly warranted to properly clarify the actual effect of nicotine on vascular function. Another possible explanation for the lack of effect of nicotine may be related to the choice of an EC that may not be necessarily comparable to other ECs with high nicotine content (e.g., JUUL, JUUL Labs, San Francisco, California) or other MRPs (e.g., IQOS, Altria, Enrico County, Virginia), as well as to the lack of analysis and comparison of EC puffing style and frequency among different arms.

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<https://doi.org/10.1016/j.jacc.2020.01.045>

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Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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REPLY: Cardiovascular Benefits of Switching From Tobacco to Electronic Cigarettes



Dr. Biondi-Zoccai and colleagues query a secondary finding in our study (1) regarding the lack of difference between the 2 electronic cigarette (EC) arms. However, they also admit in their letter that the risks of nicotine without tobacco combustion are low. Although nicotine may exert pharmacological effects, we tested the acute impact of switching away from tobacco cigarettes in the design of VESUVIUS (Vascular Effects of Smoking Usual Cigarettes versus Electronic Cigarettes). We state clearly that avoidance of tobacco toxicants may have produced the majority of the benefit seen, as both EC arms demonstrated significant benefit over tobacco cigarettes. Clearly, further investigation is required to understand the impact of nicotine on longer-term vascular function. It should also be noted that larger randomized clinical trials on nicotine replacement therapy have not shown these to be associated with increased cardiovascular risk (2).

In relation to the lack of difference seen in other biomarkers, Dr. Biondi-Zoccai and colleagues quote