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Letters

Electronic Cigarette Smoking Increases Aortic Stiffness and Blood Pressure in Young Smokers

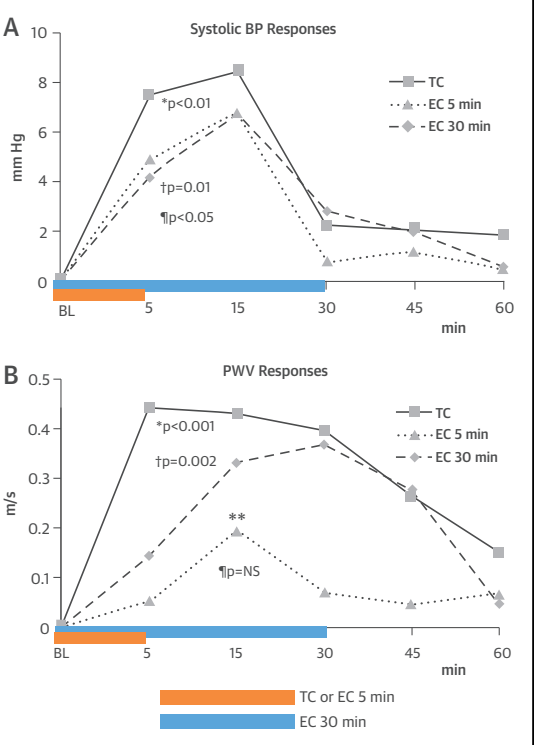
Smoking increases aortic stiffness and blood pressure (BP) (1), which are both important predictors of cardiovascular risk and all-cause mortality (2,3). Electronic cigarettes (EC) simulate tobacco cigarettes (TC) and have been advocated as a less harmful alternative (4). The effect of EC on aortic stiffness has not been defined. We investigated the acute effects of EC smoking on aortic stiffness and BP and compared them with the effects of TC smoking.

We studied 24 smokers (age: 30 ± 8 years) otherwise free of cardiovascular risk factors on 4 separate occasions (total 96 sessions): 1) TC over 5 min; 2) EC over 5 min; 3) EC for a period of 30 min; and 4) nothing (sham procedure) for 60 min. EC5min was chosen as a direct comparison with TC (nicotine delivery rate from EC is far lower and slower than with TC), and EC30min to mimic the common pattern of EC smoking (nicotine delivered obtained plasma levels comparable with those after 5 min of TC smoking) (5). Carotid-femoral pulse-wave velocity (PWV) was used to assess aortic stiffness. Our Institutional Research Ethics Committee approved the study protocol, and all subjects provided written informed consent. The results at various time points were compared with the baseline measurements within each arm, and between the 4 arms using paired and unpaired *t*-tests, respectively. The composite effect of TC or EC versus sham over time was investigated with an analysis of variance for repeated measures. Regarding PWV, the composite effect of smoking sessions versus sham over time was investigated by using mean BP as covariate.

There were no differences in all baseline measurements between the sessions. Heart rate increased in both the TC and EC 30-min sessions (by 4.0 beats/min after 5 min, $p < 0.05$, and by 3.1 beats/min after 30 min, respectively), whereas the effect of EC5min smoking on heart rate was minimal ($p = 0.57$). Both TC and EC increased systolic BP (Figure 1A) and the differences in changes of BP responses between the 2 smoking forms were not significant. Diastolic BP exhibited similar patterns of changes.

PWV increased immediately (by 0.44 m/s) after the end of TC smoking and remained increased throughout the whole period (Figure 1B). EC5min smoking induced a significant PWV increase after 15 min (by 0.19 m/s). EC30 min smoking provoked a

FIGURE 1 Systolic BP and PWV Responses



Systolic BP **(A)** and PWV **(B)** responses. Each line represents response defined as net TC/EC smoking effect minus sham procedure effect at each time point. BL = baseline; NS = non-significant. The p values refer to the composite effect of TC/EC at 5 and 30 min versus sham during the whole study duration. The composite effect of TC/EC versus sham was determined by using mean pressure as covariate. *TC versus sham, ¶EC at 5 min versus sham, †EC at 30 min versus sham, **$p < 0.001$, PWV change between EC 5 min session and sham session after 15 min smoking using the Student *t* test for paired measures.

more potent and prolonged PWV increase (peak immediately after the end of smoking, by 0.36 m/s).

Compared with TC, EC5min smoking resulted in a less potent PWV increase throughout the study ($F = 4.425$, $p = 0.005$). On the other hand, EC30min resulted in a PWV increase similar to that of TC smoking throughout the study period ($F = 0.268$, $p = 0.615$). EC30min smoking resulted in a more potent effect on PWV compared with EC5min smoking ($F = 3.167$, $p = 0.030$).

To the best of our knowledge, this is the first study dealing with various patterns of EC smoking on aortic stiffness and BP demonstrating that it clearly exerts an unfavorable effect. EC over 30 min induces an unfavorable effect on aortic stiffness similar to TC smoking. The influence of EC smoking over 5 min on aortic stiffness is not as prompt (peak effect at 15 min) and is less potent compared with the effect of TC smoking.

Given the prognostic role of aortic stiffness and increased BP for future cardiovascular events and mortality, as well as the prolonged exposure to EC smoking throughout the day matched with the strong tendency of this form of smoking to spread worldwide, especially within younger ages, our findings have important implications that could aid recommendations regarding the use of EC smoking.

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Treatment of Pure Aortic Regurgitation Using a Second-Generation Transcatheter Aortic Valve Implantation System

Transcatheter aortic valve implantation (TAVI) procedure is truly challenging in patients with pure aortic regurgitation (AR). The J-Valve TAVI device (JC Medical Inc., Burlingame, California) is characterized by a U-shaped anatomically orientating device—the "clasper" (1). This design could facilitate intuitive "self-positioning" valve implantation and provide extra-axial fixation by embracing the native valve leaflets. We report the results of TAVI in patients with pure AR using this valve.

From March 1 to December 30, 2014, 33 patients with pure AR and high surgical risk underwent TAVI using this valve including 7 women and 26 men, with mean age 74.2 ± 5.2 years. Mean logistic EuroSCORE I (European System for Cardiac Operative Risk Evaluation) was 24.4 ± 5.1%. Eighty-two percent of patients were symptomatic with New York Heart Association functional class III/IV.

The transapical-based procedure with this valve has been described previously (1). Briefly, the delivery system was inserted into the left ventricle via the apex and then advanced into the ascending aorta over a guidewire. The self-expanding clasper was released and positioned into the corresponding aortic sinus by gentle traction ventricularly. Gentle rotation or adjustment of the delivery system angulation allows the clasper to seat evenly into the aortic sinus, confirming by root angiogram and echocardiography. The valve stent was positioned in the annular plane under the guidance of the clasper and deployed without rapid ventricular pacing (**Figure 1**). All patients were followed for 6 months. Outcomes were analyzed according to Valve Academic Research Consortium-2 (VARC-2) criteria.