**TACSM Abstract**

**Vaporized Nicotine Inhalation Increases Arterial Pressure in both Supine and 70° Head-up Positions**

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**ABSTRACT**

Electronic cigarettes (e-cigs) are popular with smokers looking for a healthier alternative to tobacco cigarettes. E-cigs utilize a battery, activated on inhalation, to heat propylene glycol-suspended nicotine which is inhaled as vapor, and which does not include harmful poisons found in conventional cigarettes. Although the health claims of e-cigs continue to be debated, the effects of nicotine delivered as vapor on the cardiovascular system have not been studied. Because nicotine is a sympathomemetic agent, we tested the hypothesis that e-cigs would increase arterial pressure and protect against challenges associated with upright posture. Ten non-smoking subjects (5 male) participated in two experimental trials, separated by one week (randomized). Seated blood pressures were taken after a 10 min quiet rest period, and then subjects either inhaled (once every 30 s for 10 min) on an e-cig with a placebo cartridge (0 mg nicotine) or an active cartridge (18 mg nicotine). After an additional 10 min quiet seated rest, we measured blood pressure again, and then subjects provided a urine sample for analysis of cotinine (a nicotine biomarker). Cotinine readings failed to register the presence of nicotine in urine, but a majority of subjects experienced dizziness and nausea after the active, but not the placebo cartridge. We recorded ECG and finger photoplethysmographic arterial pressure. Subjects breathed to a metronome set at 15 breaths/min for 5 min supine, 5 min head-up (70°), and 5 min supine (recovery). Cotinine readings failed to register the presence of nicotine in urine, but a majority of subjects experienced dizziness and nausea after the active, but not the placebo cartridge. Seated arterial pressures were similar after the placebo cartridge (p ≥ .05), but increased from 112 ± 3/62 ± 2 mmHg to 115 ± 3/67 ± 3 after the nicotine cartridge (p ≤ .05). Systolic and diastolic pressures were higher (all p ≤ .05) after the nicotine trial compared to placebo for supine (115 ± 3/69 ± 2 vs. 106 ± 4/62 ± 2 mmHg), tilt (105 ± 4/66 ± 3 vs. 93 ± 4/60 ± 3 mmHg), and recovery (117 ± 5/72 ± 2 vs. 106 ± 4/64 ± 3 mmHg). No subject experienced presyncope during tilt for either trial. We show, for the first time, that inhalation of vaporized nicotine increases arterial pressure in the seated, supine and head-up tilt positions - suggesting sympathomemetic properties. Although mild, acute increases in arterial pressure may seem harmless, it is possible that daily, continuous use of e-cigs could result in consistently elevated arterial pressure, resulting in higher afterload and chronic cardiac strain.