

Ascorbic Acid Infusion Attenuates the Pressor Response to Voluntary Apnea in Postmenopausal Women

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Published data from our laboratory indicate that estrogen-deficient postmenopausal women have an augmented blood pressure response to voluntary apnea compared to premenopausal women. This finding could have clinical relevance since transient surges in blood pressure are thought to be an important stimulus for end-organ damage in obstructive sleep apnea (i.e., a disease that is more common in older adults). Both obstructive sleep apnea and the healthy aging process are associated with an increase in oxidative stress, which may impair reflex cardiovascular responses. **PURPOSE:** To determine the effect of acute antioxidant infusion on physiological responses to voluntary apnea in healthy postmenopausal women. **METHODS:** Eight healthy postmenopausal women (64 ± 2 yr) provided written informed consent to participate. Studies were performed in the supine posture following intravenous infusion of normal saline (100 mL) and ascorbic acid (3500 mg/in 100 mL); each subject received both infusions approximately 1 hour apart. Beat-by-beat mean arterial pressure (MAP), heart rate (HR), and brachial artery blood flow velocity (BBFV, Doppler ultrasound) were measured throughout the study. Subjects performed maximal voluntary end expiratory apneas and peak changes (Δ) from baseline were compared between infusions. **RESULTS:** The breath hold duration and oxygen saturation nadir were similar between saline (29 ± 6 s, 94 ± 1 %) and ascorbic acid (29 ± 5 s, 94 ± 1 %). Ascorbic acid attenuated the pressor response to voluntary apnea (Δ MAP: 6 ± 2 mmHg) as compared to saline (Δ MAP: 12 ± 2 mmHg, $P= 0.034$) and also attenuated forearm vasoconstriction (Δ BBFV: 4 ± 9 versus $-12 \pm 7\%$, $P = 0.049$) but did not affect Δ HR (2 ± 1 vs. 0 ± 2 bpm). **CONCLUSION:** Ascorbic acid lowered the blood pressure response to voluntary apnea in postmenopausal women by inhibiting vasoconstriction in the limb vasculature. Whether ascorbic acid has similar effects in patients with sleep apnea remains to be prospectively tested.

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