Role of Nitric Oxide in $\beta_2$-Adrenergic Mediated Vasodilation in Postmenopausal Women

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Objectives: Postmenopausal (PM) women have a blunted $\beta_2$-adrenergic receptor-mediated responsiveness when compared to young premenopausal women in part due to a reduction in the relative contribution of nitric oxide (NO) to $\beta_2$-adrenergic mediated vasodilation. Hence, we tested the contribution of NO to $\beta_2$-adrenergic receptor-mediated vasodilation during terbutaline infusion.

Hypothesis: We hypothesized that the contribution of NO to $\beta_2$-adrenergic mediated vasodilation would be attenuated in PM women as compared to young women.

Methods: Venous occlusion plethysmography was used to measure forearm blood flow (FBF) in 7 healthy young premenopausal women and 9 healthy PM women (mean age = 27 ± 1 and 60 ± 1 years, respectively). FBF was measured at baseline and during terbutaline infusion at 0.1, 0.5, 1.0, 2.0 µg/100ml tissue/min before (with saline co-infusion) and during NO synthase inhibition with L-NMMA. Forearm vascular conductance was calculated from FBF and mean arterial pressure.

Results: In young women, there was a significant L-NMMA effect on forearm vascular conductance during terbutaline infusion with and without L-NMMA (1.7 ± 0.14, 3.56 ± 0.41, 7.13 ± 1.11, 7.87 ± 0.74, 10.54 ± 1.81 versus 2.08 ± 0.28, 5.54 ± 0.50, 9.32 ± 1.10, 10.77 ± 1.49, 13.29 ± 1.94 ml/100ml tissue/min/mmHg, respectively). However, there was no effect of L-NMMA in PM women during terbutaline infusion with and without L-NMMA (1.34 ± 0.26, 2.37 ± 0.32, 5.21 ± 0.99, 4.71 ± 0.99, 6.43 ± 1.37 versus 1.62 ± 0.31, 3.11 ± 0.55, 5.41 ± 1.12, 6.26 ± 1.38, 7.26 ± 1.44 ml/100ml tissue/min/mmHg, respectively).

Conclusions: These data suggest that NO contributes to $\beta_2$-adrenergic mediated vasodilation in young premenopausal women. In contrast, no contribution of NO to $\beta_2$ mediated vasodilation was observed in PM women. These data suggest a lower $\beta_2$-adrenergic responsiveness in PM women may be due to a reduced contribution of NO.