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Short term effects of estrogen therapy on endothelial relaxation in ovariectomized rats

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Background and Aims: Epidemiological evidence demonstrated that the prevalence of cardiovascular complications are increased in postmenopausal women and this has been ascribed to the protective effect of ovarien hormone especially estrogen. Whereas the use of hormone replacement on the vascular endothelium has been a controversial issue in recent years, thus the aim of this study was to elucidate the effect of estrogen replacement therapy on vascular function and weather nitric oxide (NO) and endothelium-dependent relaxation of thoracic aorta were modified using the high concentration of estrogen.

Methods: Female rats were allocated into 3 groups: ovariectomized (OVX); not ovariectomized (sham); and ovariectomized that were treated with subcutaneous 17β-Estradiol (E2) for 33 days (50μg/kg/day, OVX+E2) (n=7 per group). Then the thoracic aorta was isolated and mounted in organ bath for studying isometric contraction of aortic rings in all three groups. The contractile responses maximal of the aortic rings to potassium chloride (KCL) 80 mM were determined. The endothelium-dependent or – independent vasorelaxation were studied in phenylephrine precontracted tissues via cumulative doses of carbachol (CAB) and NO respectively. Data was analyzed using one-way (ANOVA) followed by Tukey's post hoc test.

Results: The maximal contractile response to KCL had no significant difference between three groups ($p>0.05$). Chronic estrogen treatment significantly increased endothelium-dependent relaxation in response to low doses of carbacol (0.2-0.4 μM) ($p<0.05$) in ovarectomized rats but it did not alter relaxation induced by increasing SNP ($p>0.05$).

Conclusions: The administration of E2 trepan to an increment of the relaxation induced by carbacol without modifying SNP-induced relaxation. In other words E2 increased NO release but did not alter response of NO in ovarectomized rats. There was no significant change in the activity of aorta. However, perhaps this result does not obtain in long term of ovarectomy.

Keywords: Ovariectomy; 17β-Estradiol; Endothelium; Nitric oxide