

Genistein acts like estrogen on inhibiting intimal hyperplasia from vascular injury in ovariectomized rats

Abstract

Introduction. Hormone replacement therapy can reduce cardiovascular disease incidence in menopausal women. However, hormone replacement is still controversial. In animal model, the ovariectomy leads to estrogen deficiency and nitric oxide (NO) reduction from endothelial cells. Ballooning injury at carotid arteries created intimal hyperplasia and the event was inhibited by estrogen administration. Genestein – an estrogen substitute is able to prevent neointimal changes and therefore conducted this experimental research to prove it.

Methods. Female Wistar rats weighing 240-270 g (N=32) were randomly divided into 4 groups i) the ovariectomized rats treated with dimethyl sulfoxide (DMSO) 100 μ l/day subcutaneous (sc) (n=8; OVX+DMSO), ii) the ovariectomized rats treated with Genistein 0.25 mg/kg/day.sc (n=8; OVX+Genistein), iii) the ovariectomized rats treated with 17 β -estradiol 0.2 μ g/kg/day.sc (n=8; OVX+E2) and iv) the sham group treated with DMSO 100 μ l/day.sc (n=8; Sham+DMSO). Three groups of ovariectomized rats underwent balloon injury of left carotid artery. The left carotid arteries were harvested two weeks after the surgery event for histology and immunohistochemical studies.

Results. Intimal hyperplasia was seen in the controlled arms (1.3 ± 0.2 in thickness). The estrogen and Genestein admin groups showed (0.58 ± 0.0 and 0.6 ± 0.0 in thickness). Immunohistochemistry study disclosed that the number of von Willebrand factor and endothelial nitric oxide synthase (eNOS)-positive cells were not significantly different in all groups. The immunostaining for inducible nitric oxide synthase (iNOS) and asymmetric dimethylarginine (ADMA), eNOS inhibitor showed more positive cells in the OVX+DMSO group compared with the Sham+DMSO group ($77.5 \pm 7.9\%$, $82.5 \pm 7.9\%$ respectively; $p < 0.05$). Meanwhile, the number of iNOS and ADMA-positive cells were significantly decreased in the OVX+Genistein group and the OVX+E2 group compared with the OVX+DMSO

group ($12.5 \pm 5.2\%$, $10 \pm 3.7\%$ and $25 \pm 5\%$, $18.7 \pm 6.3\%$ respectively; $p < 0.05$).