

Evaluation of the combination effect of voluntary exercise and testosterone on angiogenesis and its intracellular signaling pathway in the sciatic nerve of gonadectomized diabetic male rats

Dr. Parviz Shahabi, Sona Barkabi Zanjani

Department of Physiology, Faculty of Medicine, Tabriz University of Medical Sciences

Abstract

Introduction: Diabetic neuropathy is one of the microvascular disorders. Various factors can be effective on angiogenesis, such as steroid hormones or exercise. In this study we investigated effect of testosterone and voluntary exercise on sciatic nerve.

Methods and Materials: Eighty adult male wistar rats (200-300 g) were subdivided randomly in eight groups (n=10): 1) diabetic (D), 2) diabetic gonadectomized (D+GDX), 3) diabetic with testosterone (D+T), 4) diabetic gonadectomized with testosterone (D+GDX+T), 5) diabetic with voluntary exercise (D+VX), 6) diabetic gonadectomized with voluntary exercise (D+GDX+VX), 7) diabetic with testosterone and voluntary exercise (D+T+VX), 8) diabetic gonadectomized with voluntary exercise and testosterone (D+GDX+VX+T). At the end of the study AKT and ERK proteins were measured. For evaluation of angiogenesis was used from immunostaining method (PECAM-1/ CD31).

Results: Testosterone decreased AKT protein in the diabetic and diabetic gonadectomized groups significantly ($p < 0.05$). Also testosterone reduced ERK protein in gonadectomized condition significantly ($p < 0.05$). Gonadectomy had no significant effect on angiogenesis, but testosterone treatment or combination of testosterone and gonadectomy showed significant effect on angiogenesis ($p < 0.05$). Voluntary exercise decreased AKT protein in the diabetic gonadectomized group and diabetic group that receive testosterone significantly ($p < 0.05$). Voluntary

exercise increased ERK protein in gonadectomized condition ($p<0.05$). Also combination of voluntary exercise and receiving testosterone decreased ERK protein significantly ($p<0.05$). The histological results showed that voluntary exercise in gonadectomized and receiving testosterone groups significantly enhanced angiogenesis ($p<0.05$).

Conclusion: According to results, can be offered that testosterone and voluntary exercise increase angiogenesis in gonadectomized diabetic condition.

Key words: Angiogenesis, Diabetic Neuropathies, Sciatic, Testosterone