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Acute Administration of Estradiol Protects against Spinal Ischemic-Reperfusion Injury in Male Rabbits

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Abstract

Introduction: Postoperative neurological deficit is the most devastating complication after thoracoabdominal aortic aneurysm repair. Despite demonstrated neuroprotective effects of estradiol, its protective efficacy against spinal cord ischemia-reperfusion and underlying mechanisms are not yet elucidated.

Methods: Two groups, each of 10 New Zealand white male rabbits, were studied. Control group received sesame oil (vehicle) while the treatment group received 17-β-Estradiol Cypionate (1 mg/kg) dissolved in sesame oil, 30 minutes before abdominal aortic clamping for 18 minutes. A group of sham operated animals was also included, which consisted of 5 rabbits subjected to operative dissections without aortic occlusion. After 48 h reperfusion we investigated the efficacy of estradiol in attenuating the spinal cord ischemia-induced pathology through neurological, histopathological, and western blot assessments.

Results: The results showed that administration of estradiol 30 minutes before induction of spinal cord ischemia in rabbits improved functional outcome and prevented the worsening pattern of neurological function over 48 hours. Near to normal histopathological outcome of lumbar part of spinal cords in these animals confirmed neuroprotective effects of estradiol. Estradiol also reduced spinal cord Heat shock protein 70 and cleaved caspase-3 in this ischemic context.

Conclusion: Estradiol can be considered as a potential candidate to protect against spinal cord ischemia-reperfusion-induced paraplegia resulting from thoracoabdominal aortic aneurysm repairs.

Key words: Estradiol, Spinal cord ischemia-reperfusion, Heat shock protein 70, Cleaved caspase 3

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