

EFFECTS OF ALPHA-LIPOIC ACID UPON HISTOLOGY OF URINARY BLADDER IN DIABETIC RATS

Hypothesis / aims of study

Oxidative stress is implicated in the pathogenesis of diabetic neuropathy. Recently antioxidants could improve or prevent diabetic pathogenesis. This study was performed to evaluate effects of alpha-lipoic acid, a potent antioxidant, on oxidative damage of smooth muscle cell and urothelium of urinary bladder in diabetic rats.

Study design, materials and methods

Forty five male Sprague-Dawley rats (200-250g) were divided into 3 groups, control and streptozotocin-induced diabetic groups treated with or without alpha-lipoic acid, which were injected intra-peritoneally as 50mg/kg/day just after induction of diabetes. After four weeks of treatment, bladder tissue were sampled and was studied by hematoxyline-eosin staining, immunohistochemical staining for Redox factor-1 (Ref-1) protecting cell from oxidative damage and 8-hydroxy-2'-deoxyguanosine (8-OHdG) indicating oxidative stress, and electron microscopy for ultrastructures like cytoplasmic process and intracellular vacuoles presenting cellular activity.

Results

Even though hematoxyline-eosin staining did not show any differences histologically between experimental groups, 8-OHdG was not or weakly expressed in smooth muscle cell and urethelium of control and lipoic acid treated group, but was increased in diabetic group. Immunohistochemical staining revealed weak nuclear expression of Ref-1 in smooth muscle cell and urethelium in control and lipoic acid group, but increased staining in diabetic group. In electron microscope, intracellular vesicles and cytoplasmic process around membrane of smooth muscle cells in control and alpha-lipoic acid treated groups were well developed. But those in diabetic group were much decreased.

Interpretation of results

Diabetes resulted in increased oxidative stress in smooth muscle and urothelium of bladder of rat and damaged to ultrastructures of the functional cells, which could cause bladder dysfunction. Antioxidant treatment prevented bladder from diabetes-induced damage or damaged bladder less compared to no treatment group.

Concluding message

This study suggests that early treatment with antioxidant like alpha-lipoic acid may play a role in preventing the damages by oxidative stress and additionally in improving diabetic cystopathy in animal model.

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Is this a clinical trial?	No
What were the subjects in the study?	ANIMAL
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	Yes
Name of ethics committee	animal ethical committee