Alpha-Lipoic Acid and N-Acetyl Cysteine Ameliorates Oxidative Stress and Hepatic Injury in Alloxan-Induced Diabetic Rabbits

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Abstract:

Insulin dependent diabetes mellitus is a chronic metabolic disorder that continues to present a major worldwide health problem. It characterized by high level of glucose in blood due to deficiency of insulin. Generation of ROS is thought to mediate the cytotoxic action of alloxan on the pancreatic β-cell and play an important role in the complication of diabetes. The aim of the present work to evaluate the efficacy of antioxidant α-lipoic acid and N-acetylcysteine to ameliorate the oxidative stress in hepatic tissue that induced by alloxan treatment in rabbits. Thirty-two male white rabbits were used in the present study classified into four groups. Group worked as normal control group, 2nd worked as untreated diabetic rabbits, 3rd and 4th groups diabetic rabbits treated with α-lipoic acid and N-acetyl cysteine respectively. Diabetic rab-bits showed weight loss, increase in relative liver weight, plasma glucose level and ALT activity. Also, showed morpho-logical changes in the liver with increased in LPO, NO, CP and DNA fragmentation % and alteration in the non-enzymatic antioxidant levels (Vit E and GSH) and enzymatic antioxidant activities (CAT, SOD, GPx, GR, GGT, and GST) compared to control. Treatment of diabetic rabbits with either α-lipoic acid or N-acetyl cysteine overcome the loss of body weight gain and normalized relative liver weight, plasma glucose and ALT activity. Moreover, treatment improves the oxidative tress parameters and morphological changes that induced by alloxan and hyperglycemia. Conclusion: oxidative stress in alloxan induced diabetic rabbits plays a crucial role in hepatic degenerative changes. Treatment of diabetic rabbits with α-lipoic acid or N-acetyl cysteine caused normoglycemia and liver cell reprogramming due to its antioxidant activities. Bene-ficial action seems to result mainly from direct scavenging of ROS and restoring GSH redox state.

Keywords:

Diabetes, Alloxan, α-Lipoic Acid, N-Acetyl Cysteine, Oxidative Stress, Liver and Rabbits

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