

Effect of Chronic Exposure to Diazinon on Glucose Homeostasis and Oxidative Stress in Pancreas of Rats and the Potential Role of Mesna in Ameliorating This Effect

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Abstract : Residential and agricultural pesticide use is widespread in the world. Their extensive and indiscriminate use, in addition with their ability to interact with biological systems other than their primary targets constitute a health hazards to both humans and animals. The toxic effects of pesticides include alterations in metabolism; there is a lack of knowledge that organophosphates can cause pancreatic toxicity. The primary goal of this work is to study the effects of chronic exposure to Diazinon an organophosphate used in agriculture on pancreatic tissues and evaluate the ameliorating effect of Mesna as antioxidant on the toxicity of Diazinon on pancreatic tissues. 40 adult male rats, their weight ranged between 300-350 g. The rats were classified into three groups; control (10 rats) was received corn oil at a dose of 10 mg/kg/day by gavage once a day for 2 months. Diazinon (15 rats) was received Diazinon at a dose of 10 mg/kg/day dissolved in corn oil by gavage once a day for 2 months. Treated group (15 rats), were received Mesna 180mg/kg once a week by gavage 15 minutes before administration of Diazinon for 2 months. At the end of the experiment, animals were anesthetized, blood samples were taken by cardiac puncture for glucose and insulin assays and pancreas was removed and divided into 3 portions; first portion for histopathological study; second portion for ultrastructural study; third portion for biochemical study using Elisa Kits including determination of malondialdehyde (MDA), tumor necrosis factor α (TNF- α), myeloperoxidase activity (MPO), interleukin 1 β (IL-1 β). A significant increase in the levels of MDA, TNF- α , MPO activity, IL-1 β , serum glucose levels in the toxicated group with Diazinon were observed, while a significant reduction was noticed in GSH in serum insulin levels. After treatment with Mesna a significant reduction was observed in the previously mentioned parameters except that there was a significant rise in GSH in insulin levels. Histopathological and ultra-structural studies showed destruction in pancreatic tissues and β cells were the most affected cells among the injured islets as compared with the control group. The current study try to spot light about the effects of chronic exposure to pesticides on vital organs as pancreas also the role of oxidative stress that may be induced by them in evoking their toxicity. This study shows the role of antioxidant drugs in ameliorating or preventing the toxicity. This appears to be a promising approach that may be considered as a complementary treatment of pesticide toxicity.

Keywords : Diazinon, reduced glutathione, myeloperoxidase activity, tumor necrosis factor α , Mesna

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