The Possible Protective Role of Methionine against Sodium Fluoride-Induced Pancreatic Changes in the Adult Male Albino Rat: A Histological, Immunohistochemical and Morphometric Study

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Abstract:

Background: Excess fluorides intake produces histopathological changes of many organs. Methionine is a potential natural antioxidant against oxidative radicals. Aim of the Work: To evaluate the possible protective role of methionine against sodium fluoride (NaF)-induced pancreatic toxicity. Material and Methods: Thirty 3-months (200-250gm) adult male albino rats were divided into three equal groups: group I (control), group II (Fluoride group) and group III (Fluoride+methionine group). Control group; was given 1ml distilled water. Fluoride group; was given 10 mg NaF/kg b.w. Fluoride+methionine group; was given 10 mg NaF/kg b.w. and 2 mg methionine/rat. All the treatment was given orally by gastric tube once daily for 35 days. After anesthesia, all groups were sacrificed. The pancreatic specimens were prepared for light and electron microscopic studies and anti-insulin antibody immunohistochemical staining. The mean numbers of zymogen granules and insulin positive β-cells of all groups were counted. Results: The mean numbers of zymogen granules and insulin positive β-cells of the fluoride group were significantly decreased when compared to control. The pancreatic specimens of the fluoride group revealed congested blood vessels, extravasated blood cells, vacuolated pancreatic acini, loss of the acinar cell architecture, dilated rough endoplasmic reticulum and degenerated mitochondria. By anti-insulin antibodies immunohistochemistry, there was a weak positive reactivity in the fluoride treated group when compared to control. The concomitant administration of NaF and methionine improved these changes. Conclusion: The concurrent administration of NaF and methionine ameliorates the structural alterations developed in the pancreas following excess NaF intake.

Keywords:

Albino rat, methionine, pancreas, sodium fluoride

Published In:

Egyptian Journal of Histology , 42(2) , 285-296