

Light and Electron Study of Acrylamide-Induced Hypothalamic Changes

Authors : Keivan Jamshidi

Abstract : Distal swelling and eventual degeneration of axon in the CNS and PNS have been considered to be the characteristic neuropathological effects of acrylamide (ACR) neuropathy. This study was conducted to determine the neurotoxic effects of different doses of ACR (0.5, 5, 50, 100, and 500 mg/kg per day × 11days i. p.) on hypothalamus of rat using the de Olmos amino cupric-silver stain and electron microscopy. For this purpose 60 adult male rats (Wistar, approximately 250 g) were randomly assigned in 5 treatment groups as A, B, C, D, E) exposed to 0.5, 5, 50, 100, and 500 mg/kg per day × 11days i. p. and one control group as F received daily i. p. injections of 0.9% saline (3ml/kg). As indices of developing neurotoxicity, weight gain, gait scores and landing hindlimb foot splay were determined. After 11 days, two rats for silver stain, and two rats for EM were randomly selected; dissected and proper samples were collected from hypothalamus. Results did show no neurological behavior in groups A, B and F were observed in group C. Rats in groups D and E died within 1-2 hours due to sever toxemia. In histopathological studies based on de Olmos technique no argyrophilic neurons or processes were observed in stained sections obtained from hypothalamus of rats belong to groups A, B, and F while moderate to severe argyrophilic changes were observed in different nuclei and regions of stained sections obtained from hypothalamus of rats belong to group C. In ultra-structural studies some variations in the myelin sheet of injured axons including decompaction, interlaminar space formation, disruption of the laminar sheet, accumulation of neurofilaments, vacuolation, and clumping inside the axolem, and finally complete disappearance of laminar sheet were observed.

Keywords : acrylamide, hypothalamus, rat, de Olmos amino cupric, silver stain, electron microscopy

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