

STRUCTURAL AND ULTRASTRUCTURAL CHANGES IN EXPERIMENTALLY INDUCED ALCOHOLIC LIVER INJURY AFTER CONSUMPTION OF CARBONATED MINERAL WATER FROM BAILE TUSNAD

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Abstract

Introduction: Hepatobiliary disorders are increasing as a result of enhancement of environmental pollution, consumption of alcohol and synthetic drugs. The mineral water from spring 3 in Băile Tuşnad, with a total mineral content of 3351.0 mg/l, is recommended in chronic liver diseases.

Objective: The studies aimed to assess possible changes in the liver following ethyl alcohol administration in rats, as well as to evidence anatomopathological differences between the animals that drank tap water and those that consumed Tusnad mineral water, after cessation of alcohol administration.

Material and method: The first study was performed on 25 white Wistar rats and lasted 100 days. The animals were divided into 3 groups: group I, negative control – 5 animals; group II, positive control – 6 animals; group III, experimental group – 14 animals. Group I animals were administered tap water (50-75 ml/day/animal) throughout the experiment, group II and III animals were administered 12% ethyl alcohol (12-15 ml/day/animal) during the first 70 days. Over the last 30 days of the experiment, group II animals received tap water (50-75 ml/day/animal) and group III animals received Tuşnad mineral water (50-75 ml/day/animal). On day 70 of the experiment, 5 animals were euthanized (2 in group I, 1 in group II and 2 in group III), and on day 100, the remaining 20 animals were euthanized. Liver fragments in the form of 4 mm thick slices were taken from the euthanized animals for electron microscopic histological examination. In the second study, the animals drank alcohol for 70 days and water for 50 days.

Results: In group I, a negative control, the liver structure was normal. After alcohol administration, a stimulation of lipid synthesis and a reduction of the protein synthesis capacity were observed. Small necrotic areas were seen. In group II, a positive control, the action of alcohol that diminished with time and tap water consumption led to the maintenance of alcohol-induced changes, but these were reversible. The group treated with ethyl alcohol and Tuşnad mineral water had a normal hepatocyte ultrastructure, with an increase in the number of lysosomes, showing the defense capacity of hepatocytes against alcohol intoxication. The second study also evidenced significant changes, which were correlated with the results of the biochemical hepatic, renal tests and of the ionogram performed.

Conclusions: These findings suggest that the mineral water from spring 3 in Băile Tuşnad may have hepatoprotective properties, through its capacity to diminish the toxic effect on the liver.