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Histological and Enzymatic Response of Carbamazepine-induced Liver Injury as A Biomarker in Male Mice

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Authors
Kareem D.A.*[1] *MSc,*
Sadoon A.H.[1] *PhD,*
Majeed M.F.[1] *PhD,*
Abbas B.A.[1] *PhD*

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ABSTRACT

Aims Synthetic drug-induced liver injury is the main concern of many pharmaceutical companies to obtain drugs with high safety level through continuous development in the international clinical treatment industry. Carbamazepine is one of the safest drugs for its users, but it has been found that some of these patients may develop cases of acute hepatitis. This study aimed to investigate the side effects of carbamazepine in liver injury and to elucidate the mechanism of liver toxicity caused by carbamazepine in mice.

Materials & Methods Twenty-four mature male Balb-C mice (Mus musculus) were divided into three groups, each group containing 8 animals: The control group was given 1 ml of normal saline for 30 days, Group II received 2.85 mg/kg/day of Carbamazepine for 30 days, and Group III received 5.7 mg/kg/day of Carbamazepine during 30 days. Then, histological and enzymatic changes were evaluated. Data were analyzed using one-way ANOVA and LSD test.

Findings Histological evaluation showed severe liver damage and acute inflammation of the liver tissue in mice that received oral carbamazepine. The serum level of liver enzymes and coenzymes showed a significant increase compared to the control group ($p \leq 0.05$).

Conclusion Biomarkers can be used as a warning about the pre-sensitivity of some patients to carbamazepine. Also, carbamazepine treatment may change the capacity of the liver to detoxify many toxic compounds.

Keywords Carbamazepine; Histology; Alanine Transaminase; Aspartate Transaminase; Glutathione Reductase; Glutathione-S-Transferase

[1]College of Veterinary Medicine, University of Basrah, Basrah, Iraq

***Correspondence**
Address: College of Veterinary Medicine, University of Basrah, Basrah, Iraq.
Phone: -
Fax: -
duha.adel@uobasrah.edu.iq

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