Hepato-defensive Effect of Cysteine, Ursodeoxycholic acid, and Silymarin on Histopathological and Some Biochemical Parameters of Wister Albino Rat Intoxicated by Carbon Tetrachloride

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Abstract:

Background: The liver is the largest and the essential organ responsible for the digestive and excretory function, nutrition storage, and the synthesis of new substances. The liver is essential in charge of the detoxification of the exogenous xenobiotics, drugs, harmful chemical substances, and alcohol.

Objective: The present study was designed to investigate the hepatoprotective effects of L-Cysteine, Ursodeoxycholic acid (Ursoflor), and Silymarin against carbon tetrachloride-induced liver injury in rats.

Materials and Methods: Twenty adult male rats were used in this work; they were randomly divided into four groups (4 rats/group). The first group served as control group and received 0.5 ml normal saline orally daily, the second group injected intraperitoneally with carbon tetrachloride (CCl₄) (1.5 ml/kg body weight twice a week), the third group were treated orally with the plant extracted at dose of (200 mg/kg body weight in normal saline orally + CCl₄ daily, the fourth and last group were treated with Ursoflor drug at dose of (50 mg/kg body weight in 0.5 normal saline orally + CCl₄ daily, then some biochemical parameters were determined to investigate the live injury.

Results: At the end of this study, the biochemical assessment showed alterations in enzyme activity which indicates the hepatocyte injury due to CCl₄ toxicity. The generation of reactive oxygen species indicated by elevated levels in MDA and peroxynitrite which was noticed. This improved partially by antioxidant effect of L-cysteine, ursodeoxycholic acid, and Silymarin. These results further backed by histological examination of the liver showed that CCl₄ caused severe injury to the liver including high number of fat droplets deposition in the cytoplasm of the hepatocyte, clear vascularization appeared and disorganization of the liver cells were determined, on the other hand our plant has been showed well protection against these injurious effects of CCl₄.
Conclusion: This study demonstrated that CCl₄ when metabolized in the body is changed into very reactive free radicals that then induce hepatic damage marked by alteration observed in enzyme activities and elevated levels in MDA and peroxynitrite. On the other hand, the treatment L- Cysteine, Ursodeoxycholic acid, and Silymarin minimized the hepatocellular damage induced by CCl₄ due to their antioxidant activity.

Keywords: L-Cysteine, Ursoflor, Silybum marianum, carbon tetrachloride, hepatotoxicity