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Cisplatin Causes Oxidation in Rat Liver Tissues: Possible Protective Effects of Antioxidant Food Supplementation

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Abstract: Aims: In this study, we aimed to investigate the possible molecular mechanism of cisplatin hepatotoxicity and to establish whether some natural antioxidant foods, namely dried black grape and tomato, may provide protection against cisplatin hepatotoxicity. Materials and Methods: Twenty-eight rats were used throughout the study. Cisplatin was administered intraperitoneally (i.p.) in a single dose (10 mg/kg). Antioxidant food supplementation was started three days before cisplatin treatment. There were 7 animals in each group (control, cisplatin, cisplatin plus dried black grape and cisplatin plus tomato juice). Rats were sacrificed 72 h after the treatment. The livers were removed and prepared for the biochemical and histopathological investigations. Oxidant and antioxidant parameters were measured in liver tissues of the groups. Results: Malondialdehyde (MDA) level and xanthine oxidase (XO) activities were higher in the cisplatin group compared with the control values. Catalase (CAT) and glutathione peroxidase (GSH-Px) activities were higher but MDA level lower in the grape-supplemented group compared with the cisplatin group. In the histopathological examination, sinusoidal congestion, hydropic and vacuolar degeneration, extensive disorganization in hepatocytes, and significant fibrosis around central venules and expanded periportal areas were observed in the liver tissues from cisplatin-treated animals. In rats treated with cisplatin and fed with tomato juice, sinusoidal congestion was less in comparison to the cisplatin-treated group and no hepatocyte disorganization or hydropic degeneration was seen. In rats treated with cisplatin and dried black grape, disorganization of hepatocytes was mild in comparison to cisplatin-treated animals. Perivenular and periportal fibrosis was mild. Conclusions: Results suggest that cisplatin treatment causes significant oxidant load to the liver through both XO activation and impaired antioxidant defense system, which result in accelerated oxidation reactions in the liver tissue. Additionally, cisplatin treatment resulted in significant harmful effects on hepatocytes. We propose that supplementation with some antioxidant foods with high antioxidant power may ameliorate this toxicity.

Key Words: Cisplatin, hepatotoxicity, antioxidant foods, protection

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