

Lipid Peroxidation Can be Enhanced in Kidney by a Short-term CCl₄- Treatment

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Purpose: Kidney functions as removing of metabolic wastes from blood and excretes them to the outside. Therefore, kidney is exposure to metabolic substance of nutrients and drugs in body. In previous study, oxidative stress and its consequent lipid peroxidation may be related in renal tissue injury by overload of iron, lead acetate, Diabetes mellitus and gentamycin. The effect of chronic exposure to CCl₄ as a toxic agent enhanced lipid peroxidation and fibrogenesis in the liver, but is little known in relation to the kidney. In this study, we investigated ① damage of kidney under the influence of CCl₄ induced liver cirrhosis, because liver disease can accompany proteinuria as a indicator of hepatorenal syndrome and glomerular nephritis, ② evaluated change of MDA as a lipid peroxidation metabolite and SOD as a protection enzyme of living cell in kidney.

Materials and methods: Female Sprague-Dawley rats were divided into two groups (normal and CCl₄ treated group), and a part of rats were treated orally with CCl₄ mixture (0.8 ml/rat, diluted 1:1 in olive oil) for the development of liver cirrhosis. All rats were sacrificed after observation, and a piece of liver and kidney and sera were used for the measurement of MDA, SOD and biochemical parameters (ALT, AST, ALP, BUN, creatinin and total bilirubin).

Results: Not only liver and kidney weight but also biochemical parameters were higher in CCl₄ treated group than in normal group. Especially, ALP and BUN as a parameter of protein urine were significantly higher in CCl₄ treated group than in normal group ($p < 0.005$). And MDA were significantly 3.14 times higher in the kidney of CCl₄ treated group (160.36 ± 26.02 nmol/g, $p < 0.001$) compared to the normal group (22.87 ± 15.55 nmol/g). The concentration of SOD decreased a very low range in CCl₄ treated group (5.94 ± 0.02 U/0.1g) compared to normal group (6.03 ± 0.14 U/0.1g).

Conclusion: It can be supposed that lipid peroxidation has been related by CCl₄ treatment in liver and kidney, but the protection system by SOD did not broken strongly in kidney.