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Comparison of Renal Toxicity and Oxidative Stress between Aristolochic Acid itself and Aristolochic Acid-included herbal medicine in mice

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Background: Korea Food and Drug Administration prohibited aristolochic acid (AA)-included herbal medicine in 2005. However, we recently experience of AA nephropathy with high concentration of AA in young woman. We obtained remained herbal medicine and tested toxicity of this herbal medicine in mice .

Methods: We divided C57BL/6 mice into control, vehicle, AA and herbal medicine groups, and each group comprised five mice. Same dose of AA and herbal medicine (5 mg/kg) was given to mice intraperitoneally for 5 days. The AA dose was chosen based on previous study that 5 mg/kg of AA produces characteristic AA nephropathy in mice. We observed the number of death, and measured body weights and serum creatinine. As a marker of oxidative stress, we measured serum 8-hydroxy-2'-deoxyguanosine (8-OhDG) levels.

Results: After five days, survival rate was significantly decreased in the mice treated with AA and CH groups (60% and 20%, respectively) compared with the control and vechicle groups (100% and 80%, respectively). There was markedly decreased body weight in both of AA and CH groups (18.3 ± 0.9 g and 18.2 ± 0.8 g, respectively) compared to the control and vehicle groups (21.2 ± 1.0 g and 22.0 ± 0.5 g, respectively) ($p<0.01$, respectively). Serum creatinine levels were considerably increased in both of AA and CH groups (0.26 ± 0.05 mg/dL and 0.27 ± 0.02, respectively) compared with control and vehicle groups (0.13 ± 0.02 mg/dL and 0.11 ± 0.03 mg/dL, respectively) ($P<0.01$, respectively). Serum 8-OHDG levels as a marker of oxidative stress were significantly increased in AA and CH groups (1.6 ± 0.4 ng/mL and 3.5 ± 0.6 ng/mL, respectively) compared with control, vehicle (1.4 ± 0.3 ng/mL and 1.4 ± 0.4 ng/mL, respectively) ($P<0.05$, respectively). There was no significant difference between AA and herbal medicine groups in body weight, serum creatinine and serum 8-OHDG levels.

Conclusion: Our experiment demonstrates that herbal medicine containing AA shows similar renal dysfunction and oxidative stress compared to AA itself.

Keywords: aristolochic acid, Chinese herbal medicine, renal toxicity