

Protective effect of dandelion extract on inducers of cisplatin-induced acute renal failure in cell cycle in Wistar rat.

Abstract

Background: Acute renal failure is a sudden decrease in renal function that is associated with increased serum levels of urea and creatinine, decreased urinary excretion, electrolyte disturbances, accumulation of fecal metabolites and drugs. Acute kidney failure can have a variety of causes, including damage to toxins and drugs that damage the DNA and stop the cell cycle. Increased expression of TIMP2 and IGFBP7 by inducing cell cycle arrest can initiate acute renal damage. In this study, cisplatin was used to create a model of acute renal failure, one of the most important side effects of which is nephrotoxicity. Dandelion is rich in flavonoid compounds and has antioxidant and anti-inflammatory properties and can play a role in repairing acute kidney damage. In this study, the effect of dandelion root extract on the expression of TIMP2 and IGFBP7 genes, which induce cell cycle arrest and the onset of acute renal damage, was evaluated.

Aim: To determine the protective effect of dandelion extract on inducers of cytoplasmic-induced acute cell cycle arrest in renal Wistar rats.

Methods and material: In this study, 20 Wistar rats in 4 groups of 5 were used. The experimental groups were: 1- Negative control group: receiving physiological serum for 7 days 2- Positive control group: receiving physiological serum for 7 days and receiving a single dose of cisplatin (7.5 mg/kg) on the fourth day 3- Group receiving dandelion extract (250 mg/kg) for 7 days and single dose of cisplatin (7.5 mg/kg) on the fourth day 4- Group receiving dandelion extract (500 mg/kg) for 7 days and single dose of cisplatin (7.5 mg/kg) on the fourth day. On the eighth day, the rats were anesthetized and blood samples were taken from the heart after 10-12 hours of fasting. Serum levels of ALT, AST, GGT, albumin, total protein, urea and creatinine were measured by photometry and standard kits. Tissue homogenization of all groups was used to extract total RNA and then synthesize cDNA. Then, the expression of TIMP2 and IGFBP7 genes was evaluated using relevant primers and Real-Time PCR.

Results: IGFBP7 gene expression was significant between the control group and cisplatin and 500 mg/kg extract groups ($P < 0.001$). There was a significant difference between cisplatin group and 250 mg/kg extract group ($P < 0.01$). TIMP2 gene expression was significantly different between the control group and the cisplatin group ($P < 0.01$). There was a significant difference between the control group and the 500 mg/kg extract group ($P < 0.05$). There was a significant difference between cisplatin group and 250 mg/kg extract ($P < 0.01$).

Conclusion: The results of our study showed for the first time that dandelion extract at a dose of 250 mg/kg can, in addition to reducing serum levels of urea and creatinine (as an indicator of acute renal failure), increase the expression of TIMP2 gene, which is a potential inhibitor of the cell cycle. Increased data and it seems that increased TIMP2 expression can exert cellular protective effects on renal tubular cells.

Keywords: AKI, Dandelion, TIMP2, IGFBP7