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Rosmarinic acid and kidney ischemia reperfusion damage

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Core tip

Renal ischemia and reperfusion (I/R) injury is the main reason of acute renal failure (ARF) and may also be related to the occurrence and development of chronic kidney disease. Amongst various plants, recent researches have revealed favorable finding about efficiency rosmarinic acid on improvement of renal ischemia reperfusion injury.

Renal ischemia and reperfusion (I/R) injury is the main reason of acute renal failure (ARF) that may also be engaged in the occurrence and development of chronic kidney disease (1). Kidney after ischemia usually experiences some complicated pathophysiological difference, as well as inflammation, apoptosis regeneration, and interstitial fibrosis (2). The major cause of these changes is the considerable influx of oxygen free radicals, calcium, and inflammatory cytokines. Oxygen free radicals have a number of cytotoxic special effects, including protein oxidation, DNA damage, lipid peroxidation, apoptosis induction, and nitrosylation, which directly cause danger to tubular and glomerular integrity, the factors cause the progress of acute tubular necrosis (3).

According to previous study antioxidant therapy has been well verified to improve renal injury. More interest has been paid to the protecting effects of natural antioxidants in the plants. One of these plants is rosmarinic acid (RA) that used to treat numerous diseases because of main anti-oxidant compound.

RA (a-O-caffeoyl-3, 4-dihydroxyphenyl lactic acid) is an ester of 3, 4-dihydroxiphenyllactic acid and caffeic acid. It is in considerable quantities in lemon balm, oregano, marjoram, sage, and rosemary. It has some noticeable biological properties, e.g., antioxidant, anti-mutagen, anti-inflammatory, antiviral, and antibacterial (4).

In one study Noguchi-Shinohara et al evaluated the safety, and tolerability of single dose of *Melissa officinalis* extract which contained RA, and concluded single dose of *Melissa officinalis* extract including 500 mg RA was safe and endurable in healthy persons (5).

The findings of a study that conducted by Tavafi et al reported reducing histopathological injuries of renal I/R, by RA and finally decreasing serum urea and creatinine in rats (6). Similarly, a survey performed by Ozturk et al showed the possible protective effects of RA on rats exposed to ischemia/reperfusion renal injury, and concluded RA prevented ischemia/reperfusion injury in the kidneys via reducing oxidative stress (7). Also other investigations were assessed the effect of RA on other renal disease in the animal. Jiang et al investigated the efficacy of RA on diabetic nephropathy. Their results suggested that RA had an initial renal protecting role to diabetic nephropathy in rat (8). In the another study Tavafi et al showed RA alleviated gentamicin sulphate (GS)-induced nephrotoxicity via antioxidant activity (9). This finding is in agreement with findings of Makino et al which showed the perilla decoction - that its main active component was RA - may control IgA nephropathy through modulation of the intestinal mucosal immune system (10). This information indicates curable importance of RA in improvement of renal disease in rats. Hence, RA consumption may have therapeutic effect in humans.

Author's contribution
MK is the single author of the manuscript.

Conflicts of interest
The author declared no competing interests.

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