

Protective effects of herbal antioxidants on diabetic kidney disease

Sir,

Diabetes mellitus is a common chronic disease affecting a lot of people.^[1-3] More than 10% of deaths are attributable to diabetes mellitus and its related complications in patients over 35 years old. Sustained hyperglycemia can damage the kidneys, nerves, heart and eyes.^[4-6] Macrovascular (atherosclerotic) and microvascular (nephropathy and retinopathy) disorders are the leading causes of morbidity and mortality in diabetic patients.^[4] Diabetic nephropathy (DN) is also associated with increased cardiovascular mortality. About 33% of patients with diabetes mellitus may develop end-stage renal disease, which usually proceeds to DN, which in turn is the principal cause of mortality and morbidity in diabetes mellitus.^[3-6] Clinical evaluations suggest that there is no curative or preventive method for DN. Therefore, there is a need to find out reliable treatments in slowing the progression of diabetic complications.^[7-10] Recently some plants have shown beneficial effects not only on renal function in diabetes mellitus,^[9-11] but also on renal toxicities induced by some drugs or toxins.^[9-11] Herbal medicine seems to be a reliable source for new drugs. This article reviews and emphasizes the beneficial effects of some medicinal plants in prevention and treatment of diabetes-associated complications, with emphasis on renal function.^[11] Ethno-medicinal plants have traditionally been used for the treatment of diabetes and its complications. In fact, current pre-clinical and clinical studies have demonstrated that many have beneficial effects on some processes associated with reduced renal function in experimental animals.^[9-11] More than 70% of the world's population uses resources derived from traditional medicine to control diabetes. Modification of risk factors in diabetes has an impressive impact on morbidity and mortality in diabetic patients. Sustained hyperglycemia and hypertension seem to be the main causes of kidney injury in diabetes mellitus. Hyperglycemia leads to increased oxidative stress and activation of polyol pathway, which may cause inflammation and renal damage.^[6-11] Several plant extracts with hypoglycemic properties and renoprotective activities have been identified.^[8-12] It has been shown that metformin, a biguanide hypoglycemic compound from a herbal source (*Galega officinalis*), may be useful in the prevention of kidney injury.^[5-10]

Some other herbal medicines such as curcumin from *Curcuma longa*, *Panax quinquefolium*, *Vitisvinifera* and glycosides from *Stelechocarpus cauliflorus* have also

been shown to protect kidney injury.^[8-12] The active phytochemicals and the mechanisms responsible for activities of several herbal medicines have been identified. Some herbal medicines have a positive impact on glucose homeostasis in diabetic patients. These plants have compounds effective on diabetes mellitus or impaired glucose tolerance. Some plants lower blood pressure or improve the renal and cardiovascular functions, which are often seen in diabetic patients.^[9-12] The active agents identified in these plants include polysaccharides, flavonoids, xanthenes and peptides. There are various mechanisms by which renoprotection may be achieved; anti-oxidative properties seem to be very important. Kidney damage is usually associated with an increase in oxidative stress and the oxidative stress induced kidney injury is reduced by antioxidants. Increased activities and levels of antioxidants usually reduce kidney injury.^[8,9] Antioxidants usually give electrons to free radicals. People with low intake of vegetables and fruits have been shown to bear greater risk for development of kidney damage. Although free radicals contribute to kidney damage, atherosclerosis, diabetes, heart disease, nephrotoxicity and hepatotoxicity; however, clinical trials do not uniquely confirm a substantial impact on kidney damage.^[3-8] It seems that antioxidant in vegetables, fruits and grains help preventing kidney injury; however, there is little evidence that taking single antioxidants such as vitamin E or vitamin C protect against kidney injury. The findings about combination antioxidants are also complicated and not entirely clear.^[7-12] Natural whole products, such as vegetables and fruits, seem to act as parts of elaborate networks and therefore, no single antioxidant can do the work of the whole ones.^[7-12]

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REFERENCES

1. Tabesh M, Hariri M, Askari G, Ghiasvand R, Tabesh M, Heydari A, *et al.* The relationship between vegetables and fruits intake and glycosylated hemoglobin values, lipids profiles and nitrogen status in Type II inactive diabetic patients. *Int J Prev Med* 2013;4:S63-7.
2. Dash A, Maiti R, Bandakkanavar TK, Bhaskar A, Prakash J, Pandey BL. Prophylactic add-on antiplatelet therapy in chronic kidney disease with Type 2 diabetes mellitus: Comparison

- between clopidogrel and low-dose aspirin. *Int J Prev Med* 2013;4:902-10.
3. Nasri H. On the occasion of the world diabetes day 2013; diabetes education and prevention; a nephrology point of view. *J Ren Inj Prev* 2013;2:31-2.
 4. Morrish NJ, Wang SL, Stevens LK, Fuller JH, Keen H. Mortality and causes of death in the WHO multinational study of vascular disease in diabetes. *Diabetologia* 2001;44 (Suppl 2):S14-21.
 5. Behradmanesh S, Nasri P. Serum cholesterol and LDL-C in association with level of diastolic blood pressure in type 2 diabetic patients. *J Ren Inj Prev* 2012;1:23-6.
 6. Behradmanesh S, Nasri H. Association of serum calcium with level of blood pressure in type 2 diabetic patients. *J Nephrothol* 2013;2:254-7.
 7. Tavafi M. Complexity of diabetic nephropathy pathogenesis and design of investigations. *J Ren Inj Prev* 2013;2:61-5.
 8. Tavafi M. Diabetic nephropathy and antioxidants. *J Nephrothol* 2013;2:20-7.
 9. Behradmanesh S, Derees F, Rafieian-Kopaei M. Effect of *Salvia officinalis* on diabetic patients. *J Ren Inj Prev* 2013;2:57-9.
 10. Rafieian-Kopaei M, Baradaran A. Combination of metformin with other antioxidants may increase its renoprotective efficacy. *J Ren Inj Prev* 2013;2:35-6.
 11. Khajehdehi P. Turmeric: Reemerging of a neglected Asian traditional remedy. *J Nephrothol* 2012;1:17-22.
 12. Rafieian-Kopaei M, Baradaran A. Teucrium polium and kidney. *J Ren Inj Prev* 2013;2:3-4.

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