Urtica dioica Improves Glucose Control in Diabetes on the Basis of Animal Studies

Parisa Sarkhail
Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, Tehran, Iran

A comprehensive review on the Urtica dioica (common nettle) was recently published (Mehri et al., 2011) that revealed a lot of information about its efficacy and safety for management of type 2 diabetes and its complications. Urtica dioica has a long use tradition as an expectorant, antidiarrheal and for treatment of menstrual, hemorrhage, diabetes, rheumatism, eczema and anemia. Although at present, nettle root has a prominent position for treatment of Benign Prostatic Hyperplasia (BPH) (Akbay et al., 2003), several beneficial medical properties are currently attributed to this plant, such as antidiabetic, anti rheumatoid arthritis or osteoarthritis and diuretic (Chrubasik et al., 2007).

On the basis of Mehri et al. (2011) review, the most animal studies are in favor of benefits of U. dioica in diabetes, but only one human study showed efficacy of this herb when used in combination in the form of Glucolevel tablets. Moreover, one case study has been reported about hypoglycemia after taking herbal remedy for benign prostatic hypertrophy (Edgcumbe and McAuley, 2008). Nevertheless, latest researches on the pharmacological effects of isolated compounds from U. dioica support these findings (Chrubasik et al., 2007). In the recent year, dietary phenolic phytochemicals have received considerable recent attention as alternative candidates for treatment of diabetes (Rahimi et al., 2005; Momtaz and Abdollahi, 2010) and evidences confirm that U. dioica is a rich source of polyphenolic compounds (Chrubasik et al., 2007). One of the main bioactive isolated phenolic Compounds, Chlorogenic Acid (CGA), from this plant has been found as a potent hypoglycemic (Karthikesan et al., 2010) agent and antioxidant (Kahkonen et al., 2001). CGA can decrease the blood glucose levels and inhibit glucose-6-phosphatase (G-6-Pase), the key enzyme that catalyzes the final step of glyco genesis (release of glucose from the liver) (Hoseini et al., 2006) and gluconeogenesis (promotes the uptake of glucose by liver cells) and regulate overproduction of both glucose by inhibiting G-6-pase; thereby it controls glycemic status in type 2 diabetes (Karthikesan et al., 2010). Moreover, some flavonol glycosides have been found in this plant such as rutin that may potentially play a positive role in carbohydrate metabolism and protection of the functional β-cells to increase secretion of insulin from islets in diabetes (Prince and Kamalakkannan, 2006). Furthermore, compounds that structurally related cyclical peptides have shown to facilitate glucose uptake by forming unique glucose permeable pores (Domola et al., 2010).

Consideration all these findings, as well as data in the review by Mehri et al. (2011), it is apparent that U. dioica can decrease blood glucose by several mechanisms including pancreatic and extra pancreatic mechanisms especially antioxidant potentials (Hasani-Ranjbar et al., 2009). Despite its protective functions, few accessible research data showed that U. dioica causes some side effects in the kidney and liver (Mehri et al., 2011). Probably some compounds in U. dioica can cause kidney and other internal organs damage. For instance, one investigation on Chinese herbal medicine indicated that CGA induces liver and kidney injury in dogs (Li et al., 2010). However,
Setarud (IMOD™) that is a combination of Urtica and two other extracts has shown antidiabetic activity (Mohseni-Salehi-Monfared et al., 2010) without any serious side effects (Khairandish et al., 2009) or genotoxic adverse effects (Khorram Khorshid et al., 2008).

Although, there is no evidence that U. dioica directly produces renal or hepatic toxicity in human, but it should be standardized on the basis of active compounds and for more information on toxic doses and mechanisms. Therefore, high-profile animal and clinical studies should be planned. As combined herbal formulation containing nettle has been shown to be effective and safe for control of hyperglycaemia (Saad et al., 2008), type 2 diabetic patients can receive them as a supplement and regularly renal and hepatic function can be monitored in these patients.

REFERENCES


