

Treatment of Kidney Stones Using Diosgenin

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Abstract---*Kidney stone is a common disease in the world. These stones are present in solid structures which lead to severe pain and discomfort in kidney. This problem is also known as urolithiasis which affects approximately 12 percent of the world's population. Kidney stone is the third most prevalent disease among the various diseases which are affecting the urinary system. The accumulation of crystals / stones, usually made of calcium oxalate, characterizes this disease. Having the stones repeated after treatment is the main challenge. In males there is a 78-81% and in females a 47-60% rate of recurrence. In contrast to women, the occurrence of stones is three times higher in men. Though some products are available on the market, most of them do not deal with reoccurrence problems. Our researches have shown the promising role of diosgenin in stone prevention, so it may address the reoccurrence problem. It is also a drug derived from plants and not artificial, and therefore may have fewer side effects. In this paper, treatment of kidney has been performed with the utilization of diosgenin.*

Keywords--- *diosgenin, kidney, urolthiasis, kidney stones*

I. INTRODUCTION

Kidney is an organ that cleanses and extracts toxic substances from the body. While the toxic substances are isolated and form a part of the urine, the kidneys return the useful substances back into the blood. If particles or crystals are found in the kidneys or in other areas of the urinary system, the filtration of the bladder, also known as urological condition, is messed with the filtration process. The toxic substances from the blood may be inappropriately drained, and blood levels of those substances may rise. Because of the blockage, severe back or abdominal pain can also occur in the patients. Nausea, foul smelling urine, vomiting and often urinate in very small quantity can also be other symptoms. Due to the progression of the illness, the deposited crystals can also cause inflammation or damage to that portion of the kidney tissue. This aggravates the condition further and further deteriorates the work of the kidneys. The kidney damage results in increased urea, uric acid and creatinine excretions in the kidney. The damage to the kidneys is also increasing because of free oxygen-derived radicals[1]–[5]. A recurrence after treatment of stones is the major challenge in urolithiasis. The reproduction rate in men amounts to 78-81% and in women to 47-60%. In a research, 10% of the population of urban countries are having urinary stone. Urolithiasis is worldwide, though in certain countries such as the USA, South Africa, India and Southeast Asia is particularly common[4]–[9]. Urinary stones are graded according to their placement or composition. These stones comprise calcium as monohydrate calcium oxalate and calcium hydroxygen (76%-90%), magnesium as ammonium magnesium (10%-16%), uric acid and urate (3%-95%) and magnesium magnesium (0.5%-1%) as cystine, hippuric and xanthine. Testosterone ability and the inhibitive capacity of oestrogen in stone formation cause urolithiasis three times higher in men than women. Uric acid and calcium oxalate stones have been

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seen predominant in males. Female organs are more widespread in calcium phosphate and struvite stones. The stones contain calcium phosphate, which is difficult to treat and to avoid. Stone formation is considered a medical challenge because a number of factors remain unknown and governed by the fields of etiology and pathophysiology. Unbalance between promoters and inhibitors results in stones forming and precipitation. The formation of renal stones and also the composition of stones has also been found to depend on patients age and gender. Older patients are more commonly seen having these stones. Recently, however, the emphasis on age and gender has shifted. Urolithiasis cases are uncommon in children. Increase in childhood obesity can present a risk for development of stone as it is for adults today. Figure 1 shows a clear picture of kidney stone.

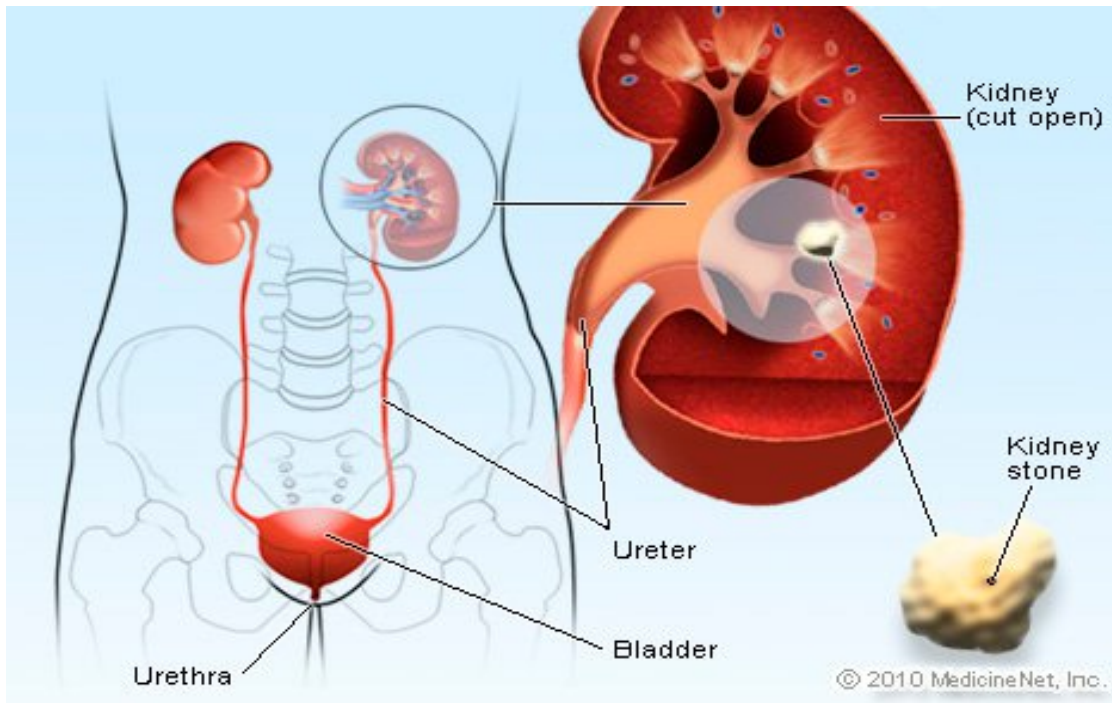


Figure 1:- Kidney stone inside human kidney

A variety of treatment options for kidney stones are currently available. Other drugs that can be used include allopurinol, Ibuprofen, Acetaminophen, Diuretics and naproxen. Surgical treatment may include the utilization of sound waves in removal of stones of kidney. However, serious side effects, such as blood around the kidney and nearby organs, can occur. However, the other problem is that of repeating stones, most of these treatments have side effects. Alternative therapies are therefore desirable with less side-effects. Saponins are a class of natural plant glycosides distinguished in aqueous solution by their solid foam forming properties. This is another characteristic of cardiac glycosides, which due to their unique biological function is categorized separately. Saponins do not usually affect the heart; as opposed to cardiac glycosides. The saponins are classified according to their composition as steroid or triterpenoidsaponins. Pharmacological studies of different plant extracts have shown strong anti-urolithic efficacy in plants containing saponins. Diosgenine is a saponin with numerous pharmacological effects including cardiac defense, anti-cancer protection, anti-diabetes, neuro protective effects, immunomodulatory effects, estrogenic, defensive skin effects, initiation of apoptosis, suppressing malignant transformation, decrease in

oxidative stress and inflammatory symptoms reduction. Plants with diosgenin like saponin, for example Tribulusterrestrish have been tested for kidney stone action and the results are promising. The purpose of this study was therefore to determine the efficacy of diosgenin in stone care. Diosgenin is a saponin with beneficial effects in several conditions such as increased oxidative stress and inflammatory events. Diosgenin is a steroidal saponin obtained from plant sources which is precursor of hormones estrogen and progesterone. These hormones serve as protective measures against the forming of kidney stones, as opposed to the testosterone, which promotes stem development. The higher prevalence of stones in men as compared with women was due to this disparity in activity of hormones. Diosgenin was used for the prevention of the development of kidney stones in our laboratory.

II. METHOD

Many studies have been conducted to demonstrate that the development of kidney stones is not immune to diosgenine. 30 Wistar male rats have been taken and divided into the following groups (each group of 6 rats). A detailed summary of these experiments is given below:

- Group I: Maintained on regular chow and water
- Group II: Drinking water used with 0.75% v / v of ethylene glycol.
- Group III: 0.75% v / v ethylene glycol in water and Himalayalcystonep.o. 750mg / kg were administered in drinking water.
- Group IV: Drinking water and diosgenin (50 mg / kg) p.o. administered 0.75% v / v ethylene glycol.
- Group V: 0.75% v / v ethylene glycol administered in drinking water or 100mg / kg diosgeninep.o.

All treatments were continued for a period of 28 days.

All animals have been placed in metabolic cages and urine collected after 28 days. After collecting urine, the blood was collected by the method of cardiac puncture. Different biochemical parameters analysed in urine were creatinine, sodium, calcium level, uric acid, urea, urine micro protein and potassium levels. Serum was separated from blood and different parameters measured were the levels of urea, blood urea nitrogen and uric acid. These estimates were made with the help of available commercial kits. The animals were then sacrificed and left kidney was used for histopathology and right kidney homogenate was used for analysis of oxidative stress (Measurements of reactive thiobarbituric acid and decreased glutathione).

III. RESULT

The biochemical estimations revealed that diosgenin was effective in preventing the formation of stones. The creatinine, calcium level, sodium, uric acid, urine micro protein, potassium and urea were increased in the untreated animals indicating that there was crystal deposition and damage to kidneys. In the rats treated with diosgenin there was improvement in these parameters implying that stone formation was prevented. Similarly, serum levels of urea, blood urea nitrogen and urea have also shown that kidney damage is less than that caused by untreated rats, in rats treated with diosgenin.

Histopathology studies of kidneys showed less damage to kidney glomeruli in treated rats as compared to untreated rats. Homogenate analysis showed that oxidative stress was less in animals which received diosgenin in comparison to animals which received only ethylene glycol. Thus, the results showed that diosgenin can be a potential drug for preventing the occurrence of kidney stones.

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