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Herbal Alternative for Kidney Stone Diseases

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ABSTRACT

Kidney stone disease is an increasing disorder of humans. It affects about 12% of the world population. Epidemiological data have shown that calcium oxalate is the predominant mineral in a majority of kidney stones. [1] It has been associated with an increased risk of end-stage renal failure. Kidney stones result from a succession of several physicochemical events including super saturation, nucleation, growth, aggregation, and retention within the kidneys. Kidney stones may cause extreme pain and blockage of urine flow .The average life time risk of stone formation has been reported in the range of 5-10 %.Recurrent stone formation is a common part of the medical care of patients with stone disease.[2] Kidney stone disease is usually treated with medications that may cause a number of side-effects. Even improved and besides the high cost that imposes, compelling data now suggest that exposure to shock waves in therapeutic doses may cause acute renal injury, decrease in renal function and an increase in stone recurrence. Data from *in vitro, in vivo* and clinical trials reveal that phytotherapeutic agents could be useful as either an alternative therapy in the management of urolithiasis. The present review therefore critically explains the potential usefulness of herbal medicines in the management of urolithiasis.

Keywords: Kidney stones, Calcium oxalate, Herbal plant extracts, Alternative medicine

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INTRODUCTION

Urinary stones affect 10–12% of the population in industrialized countries [3].With a prevalence of > 10% and an expected recurrence rate of ~ 50%, stone disease has an important effect on the healthcare system [4]. Once recurrent, the subsequent relapse risk is raised and the interval between recurrences is shortened [5]. Features associated with recurrence include a young age of onset, positive family history, infection stones and underlying medical conditions [6]. Epidemiological studies revealed that nephrolithiasis is more common in men (12%) than in women (6%) and is more prevalent between the ages of 20 to 40 in both sexes [7]. The etiology of this disorder is multifactorial and is strongly related to dietary lifestyle habits or practices [8].

Management of stone disease depends on the size and location of the stones In most of the cases the commonly occurring stones are calcium oxalate or magnesium ammonium phosphate type. In this regard, many plants have been traditionally used to treat kidney stones and have been shown to be effective.

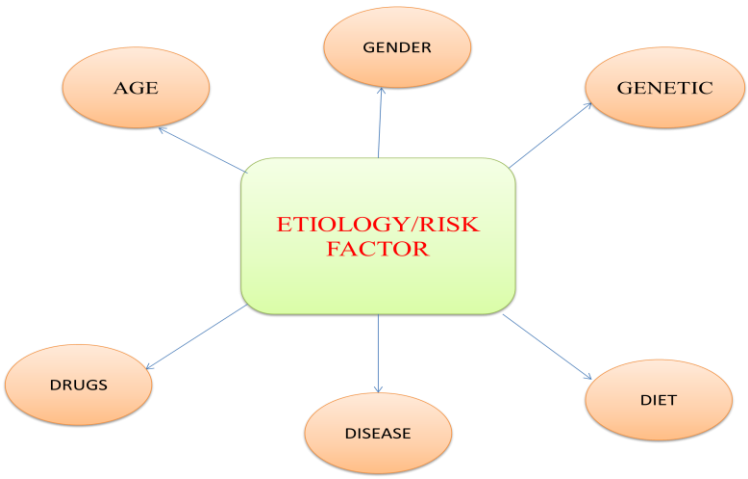
In India, in the Ayurvedic system of medicine, Varuna, Pashanabheda, Gokhru Kulatha were found to be effective in preventing the deposition of the stones in experimental rates. The purpose of this paper is to critically review about kidney stones and the role of herbal medicines in the management of urolithiasis. Pharmacotherapy can reduce the recurrence rate. The use of plant is very important as to reduce the side effects related to allopathic medicines and treatments. The present review could serve as a source of information on the present trends in research on plants having antiurolithiatic activity.

MECHANISMS OF HERBAL EXTRACT IN TREATING THE KIDNEY STONE: [9]

The phytoconstituents present in herbal plants exert their beneficial effects urolithiasis by multiple mechanisms like:

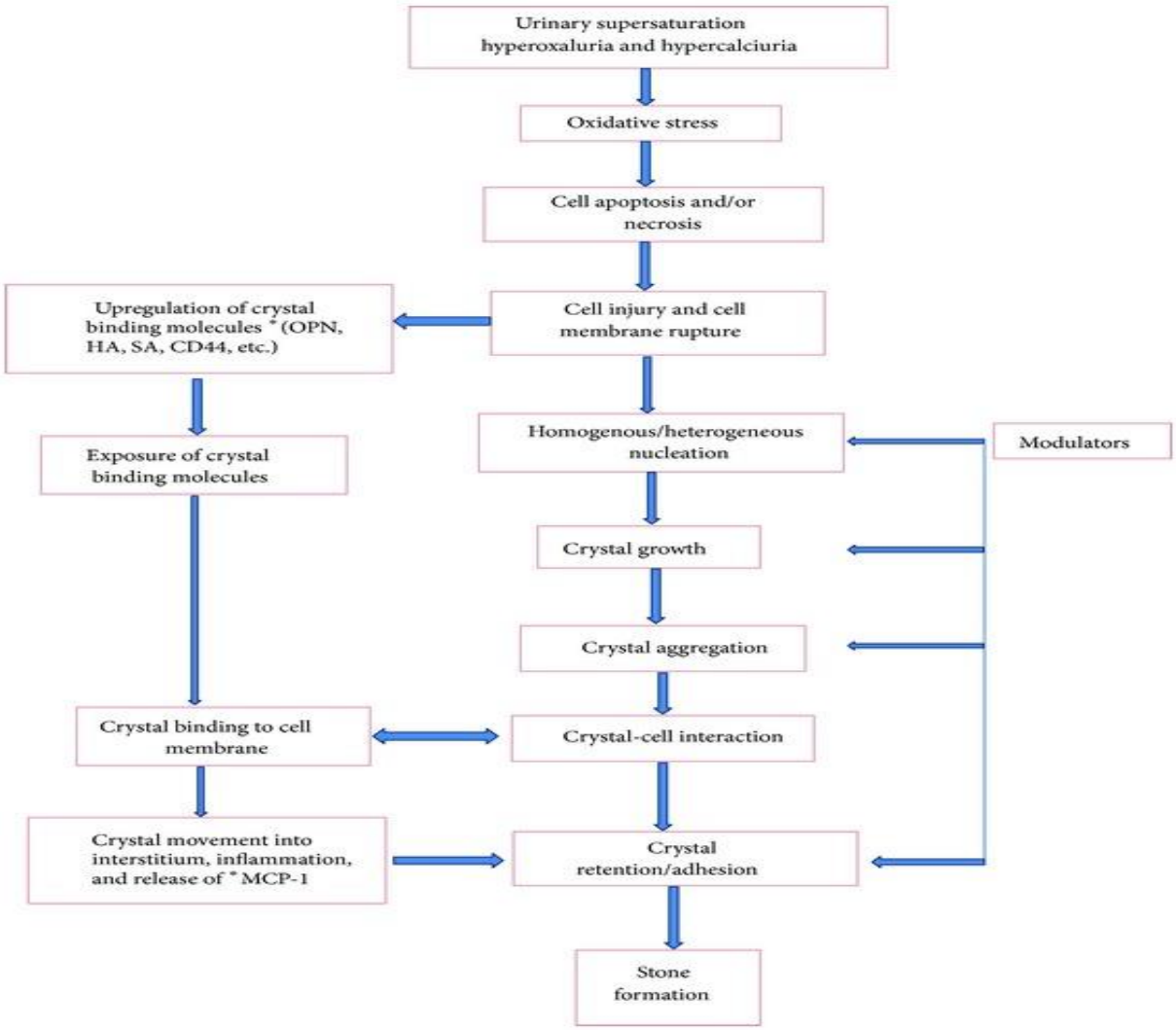
- Helping in increasing urine volume, pH so stone can easily pass.
- Balancing the factors which promote and inhibit the crystallization in urine.
- Relieving the binding.
- Improving the kidney function.
- Regulation of oxalate metabolism.
- Regulating imbalance of crystals and improve renal function. So chances of recurrence stone are very less.
- Improving antioxidant level.
- Inhibition of enzymes related to stone formation.
- Exerting antimicrobial activity.

ETIOLOGY OF KIDNEY STONE [10]



PATHOPHYSIOLOGY [11]

The pathogenesis of kidney stone formation is not a simple process and varies largely based on the stone phenotype. Although several theories exist to explain the pathogenesis of renal calculi, the exact cascade of events that lead to kidney stone formation is still unclear. The following steps are explaining the pathophysiology of urolithiasis.



HERBAL PLANTS AND PLANT PRODUCTS WITH ANTIUROLITHIATIC ACTIVITY

Dried rhizome of *Bergenia ligulata* (pashanbheda) is commonly used as a traditional herbal medicine with a wide range of therapeutic applications including urolithiasis. The best bioactive fraction of mother extract of *B. ligulata* has the curative property against urolithiasis.*B.ligulata* rhizome extract has been reported to suppress calcium oxalate crystal precipitation through interference with crystal growth and

aggregation. It changes the urinary chemistry of the patient and affects the lithogenic potential.[12]

Ammi visnaga was able to relieve the pain and proven effective treatment toward urolithiasis by removing stones from kidney and urethras. Uraemia and hyperbilirubinaemia observed in glycolic acid control group were found to be ameliorated by *Ammi visnaga* seed extract treatment.[13]

The chronic administration of a small volume of aqueous *Phyllanthus niruri* extract induced a significant reduction in calculus growth. The clinical beneficial effects of *Phyllanthus niruri* may be related to ureteral relaxation, helping to eliminate calculi or to clear fragments following lithotripsy, or also to a putative reduction of the excretion of urinary crystallization promoters such as calcium..

An ethanolic extract of the fruits of *Tribulus terrestris* showed significant dose dependent protection against uroliths induced by glass bead implantation in albino rats.[14]

The administration of methanolic extract of whole plant of *Biophytum sensitivum* showed significant anti-urolithiatic activity as indicated by improvement in disc weight and related biochemical parameters.[15]

The leaf extract of *Ipomoea eriocarpa* is useful to prevent the recurrence of urolithiasis as it proved its effect on the early stages of stone development. The mechanism causing this effect is still unspecified, but is possibly related to increased diuresis and lowering of urinary concentrations of stone-forming components.[16]

The ethanolic extract of *Solanum virginianum* has both preventive as well as curative property in urolithiasis of rats. The ethanolic extracts of *S. virginianum* plant extracts in both curative and preventive regimens caused diuresis along with loss of kidney weight and also decreased the elevated serum level of BUN, creatinine and urea. [17]

The aqueous and ethanol leaf extracts of Melia azedarach Linn possess potent antiurolithiatic activity against ethylene glycol-induced calcium oxalate urolithiasis in rats. The antiurolithiatic effects may be mediated possibly through a combination of calcium oxalate crystal inhibition, as well as via diuretic, antioxidant, renal epithelial cell protective, and hyper-magneseuric effects**.** [18]

The ethanolic extract of *Asparagus racemosus* had an inhibitory potential on lithiasis induced by oral administration of 0.75% ethylene glycolated water to adult male Albino Wistar rats. [19]

The fresh juice of Leaves of *Plectranthus amboinicus* has effect against renal calculi particularly of calcium oxalate origin induced by administration of 1% ethylene glycolated water [20].

The aqueous and alcoholic extracts of the root wood of *Moringa oleifera* significantly reduced the elevated urinary oxalate, showing a regulatory action on endogenous oxalate synthesis in hyperoxaluria induced with ethylene glycol [21]

CONCLUSION

The present review states the different steps involved in kidney stone disease. It explains the mechanism of formation of the kidney stones. As we know that the current surgical therapies are used to treat the kidney stone disease are expensive and also the chances of recurrence of stone in patient is high. The best option to avoid this situation is to go for herbal plants. In India so many herbal plants extracts are available easily used to treat the kidney stone with no side effects. The pharmacological study is done in different animal model but still the clinical establishment with chemical study is requiring for better humans health.

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