

Evaluation of a targeted Ayurvedic formulation in the treatment of Ashmari (Urinary Calculi)

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Abstract

Mutrāshmarī is one of the most common diseases that affects the Mutravaha Srōtasa (the body channel that carries urine). Mutrāshmarī is hard to treat and needs extra care. Acharya Sushruta called it one of the Ashta Mahāgāda, or eight terrible diseases. It is linked to urolithiasis, which is the modern medical term for urinary calculi. The modern world is seeing an increase in Mutrāshmarī for a number of reasons, such as changes in eating habits, changes in lifestyles, stress and strain, and pollution in the environment. A traditional formula uses the herbs Cucumis melo and Leea indica, and the goal of this review is to find out how well these herbs work to treat Ashmari. Data on Ashmari was obtained from Ayurvedic texts, modern literature, and prior research studies (from both primary and secondary sources). People thought that two herbs could help with Ashmari, so a review of the literature on those two herbs was done. The chosen herbs were also analyzed for their Pancha Padārtha (five elements of the herb) and pharmacological properties. The chosen paste exhibits anti-urolithiatic and anti-hypercalciuric properties. A literature review and Pancha Padārtha analysis indicate that the selected herbs are effective in the treatment of Ashmari.

Keywords: Ashta Mahāgāda, Mutrā Ashmari, Pancha Padārtha, and Urinary calculus are some of the words.

1. INTRODUCTION

Urolithiasis is a condition in which stones (calculi) seem to be in the kidney, ureter, or bladder. Urolithiasis is a prevalent condition in Sri Lanka, characterized by a significant recurrence rate, predominantly affecting men. Intermittent dull or colicky flank pain, dysuria, cloudy or malodorous urine, hematuria, and nausea or vomiting are prevalent indicators of urolithiasis [1]. In the past decade, there has been a significant change in how urolithiasis is treated, and the management needs to find a balance between removing the stones and clearing them [2]. Chemical analysis of stones is beneficial because the majority of stones naturally traverse the urinary tract. Over the last few decades, urolithiasis has become more common in both developed and developing countries. Even though it is well known that stone disease changes with the seasons, no one knows how long it takes for urinary calculi to form. The date of entry into this region signifies the onset of an elevated risk of urinary calculi, as southwestern Asia is a high-risk area for stone disease development. According to Ayurveda, Mutrāshmarī is one of the most common conditions in which stones form in the urinary tract. The Sanskrit word "Ashmari" means "calculus" or "stone," and the word "Mutra" means "urine" that is carried by the ureters. Ayurveda says that Ashmari is talked about in Vriddhatraya (3 major classics) and Laghutraya (3 minor classics). The three main classical texts that make up Vriddhatraya are the Charaka Samhitā, the Susruta Samhitā, and the Ashtāṅga Hṛdaya Samhitā. The Charaka Samhitā says that calculus forms can be understood in terms of Dōsha. For example, Kadamba flowers that stimulate or have a triangular shape are Vātika, while smooth, stony Paittika and soft Paittika because of Kapha and semen are Paittika [3]. The Susruta Samhitā states that Kapha is dominant in people who don't purify themselves often and who eat and behave badly. It inflames, mixes with urine, and travels to the urinary bladder, where it stays and forms calculi (stones). Some of the warning signs are fever, pain in the bladder, loss of taste, trouble urinating, and pain in the scrotum and penis. You should take the right medicines for these symptoms. Some Ayurvedic treatments used to break down the pathogenesis of Ashmari are Ashmari Bhēdana, Mutrala, Deepana, Pāchana, Vedanāsthapana, and Shotahara [4].

Alkali and allopurinol are used to treat uric acid nephrolithiasis in modern medicine. Thiols and alkali are used to treat cystine nephrolithiasis, and dietary and pharmaceutical interventions are used to treat calcium nephrolithiasis. Thiazides and alkaline citrate salts are the most commonly prescribed drugs for calcium nephrolithiasis because they stop new stones from forming. Urolithiasis is becoming more common, which is making healthcare more expensive all over the world. Additionally, this rise has been associated with a change in the epidemiology of urolithiasis regarding the age and sex distribution, as well as the type and location of calculi [5]. Stone disease often recurs, with over 50% of patients who have a calculus developing additional stones within a decade. The present study is predicated on an Ayurvedic medicinal formulation utilized for renal treatment. The herbal paste selected from a traditional formula employed in conventional practice comprises the following ingredients: Cucumis melo and Leea indica [6]. The study rigorously examined the pharmacological properties of the components in a chosen formula for obesity management. Its aims were to ascertain the anti-urolithiatic efficacy of these components in addressing Ashmari. This study was conducted as part of the literature review to ascertain the specific efficacy of selected herbs in the treatment of Ashmari.

2. METHODOLOGY FOR RESEARCH

The review of Mutrā Ashmari was based on classical Ayurvedic texts such as the Charaka Samhitā, Susruta Samhitā, Mādhava Nidāna, Bhāvaprakāshaya, Bhaisajja Ratnāvali, and the Ayurveda Pharmacopoeia. Kumar and Clark's Clinical Medicine, Davidson's Medicine, and other modern books. Recent scientific explanations and findings published on official websites and in indexed journals, articles, and books. The analysis is based on the pharmacological traits of Pancha Padārtha: Rasa (taste), Guna (quality), Veerya (potency), Vipāka (last taste), and Prabhāva (specific action). The final step is to understand what the conversation and result mean in table 1.

2.1. Review of selected herbs Herbal paste selected from a traditional recipe

Table 1 Review of Selected Herbs Ingredients

Ingredients	Cucumis melo	Leea indica
Family	Cucurbitaceae	Vitaceae
Sanskrit name	Kharbuja	Chattri
Part used	Pulp, roots, seeds and seed oil	Tender leaves

2.1.1. Cucumis melo (Kharbuja)

Flexuosus, also called the flexuosus group or the Armenian cucumber, is a yearly vine that is sensitive to frost and has tendrils. People grow it to get its long, thin, cucumber-like fruits, which are eaten as a vegetable. Vines usually grow to be 6 to 9 feet long. This ancestral plant was first grown in western Asia, between Armenia and Turkey, and then south along the eastern Mediterranean to Egypt in the 1400s. This fruit is a muskmelon, but it looks and tastes like a cucumber. In places where there is no frost, yellow flowers with 5-parted corollas bloom for most of the year. Cucumis melo had two kinds of polyphenols: flavonoids and tannins. Cucumis melo also had amino acids, saponins, and sterols in it. Seeds from Cucumis melo had phenolic glycosides in them. The peel of Cucumis melo contained a number of different substances, such as alkaloids, flavonoids, tannins, steroids, saponins, glycosides, and phenols. Melon seeds contain multiflorenol, isomultiflorenol, 24-methylenecycloartenol, α - and β -amyrin, teraxerol, lupeol, euphol, 24-methyl25 (27)-dehydrocycloartanol, 24-methylene-24-dihydrolanosterol, 24-methylene-24-dihydroparkeol, stirucallol, and cycloartenol. Cucumis melo has Madhura (sweet) in Rasa (taste), Guru (heavy), Snigdha (unctuous) in Guna (quality), Sheeta in Veerya (cold potency), and it balances Pitta and Vāta dōsha. So, it works well to control Ashmari [7]. It has many effects, including being cytotoxic, protecting nephrons, killing worms, killing bacteria, lowering cholesterol, lowering blood sugar, lowering calcium levels, lowering thyroid levels, protecting the stomach, lowering inflammation, relieving pain, and increasing thyroid activity. It is traditionally used to treat ascites, anemia, constipation, diabetes, obesity, leprosy, fever, jaundice, kidney stones, flatulence, and other stomach diseases. When added as a supplement, Cucumis melo seed extract had a regulating effect on the body's oxalate production by lowering the high levels of oxalate in the urine. The results indicate that Cucumis melo seed exhibits anti-urolithiatic properties [8]. The treatments with melon and potassium citrate lowered the kidney index, the levels of calcium and oxalate in the urine, the number of calcium oxalate deposits, the scores for crystal deposits, the scores for

histopathological damage, and the scores for inflammation. Nonetheless, urinary pH, magnesium concentrations, citrate levels, and the expression of the UMOD, *spp1*, and *reg1* genes in the kidneys of treated animals were elevated [9]. *Cucumis melo* seed methanolic extract supplementation diminished the heightened renal oxalate levels, indicating a regulatory effect on endogenous oxalate synthesis. The research by Afzal et al. (2021) shows that *Cucumis melo* seeds can help with nephrolithiasis [10]. The chloroform extract of the *Cucumis melo* peel and pulp exhibited anti-urolithiatic efficacy, as indicated by serum creatinine, uric acid, and BUN levels [11]. A hydro-ethanolic extract of *Cucumis melo* seed can significantly diminish the inflammation associated with urolithiasis, a key contributor to the formation and growth of kidney stones. The present findings indicate that a hydro-alcoholic extract of *Cucumis melo* fruit skin may facilitate the elimination of kidney stones by diminishing crystal size. Consequently, it could inhibit the formation of the primary nucleus of kidney stones [12]. The seeds of *Cucumis melo* extract exhibited a superior litholytic effect on calcium oxalate kidney stones compared to allopurinol, as evidenced by enhancements in the renal histology profile. The results help to explain why Indian traditional medicine uses *Macrotyloma uniflorum* and *Cucumis melo* to treat kidney problems. The preceding review demonstrates that *Cucumis melo* preparations are efficacious in the treatment and prevention of urolithiasis by fragmenting calculi, facilitating crystal excretion, and mitigating their recurrence within the urinary tract [13].

2.1.2. *Leea indica* (Chattri)

Leea indica is a shrub, treelet, or small tree that grows 2 to 10 meters tall. It has many or just one stem, often with stilt roots, and its stems are smooth or hairy. The leaves are 2–3 pinnate, have seven leaflets, a rachis that is 10–35 cm long, and a petiole that is 10–25 cm long. The obovate stipules can measure up to 6 cm x 4 cm, are early caducous, and are usually hairless. The leaflets are ovate-oblong to ovate-lance-shaped or elliptical to elliptical-lance-shaped and measure 10-24 cm x 3-12 cm. They have a wedgeshaped base, a rounded, acute to acuminate apex, and a serrate to shallowly dentate margin, with small pearl-glands that are not very noticeable and quickly fall off. In addition to eleven hydrocarbons, phthalic acid, palmitic acid, 1-eicosanol, solanesol, farnesol, three phthalic acid esters, gallic acid, lupeol, β -sitosterol, and ursolic acid, *Leea indica* also produced twenty-three other known chemical compounds—they can be mention as Phytochemical screening isolation a novel carotenoid, leeatene, and nine other known compounds including squalene, hexadecanoyl-0-amyirin, vitamin E, 1 - tetratriacontanol, P-amyirin, 3-hydroxy12-oleanen-28-oic acid, Psitosteryl- P-D-glucopyranoside, 2a,3a,23-trihydroxy-12-oleanen-28-oiacc id and phloridzin. In Rasa, *Leea indica* is Kashāya (astringent), Tikta (bitter), Laghu (lightness), Sheeta (coolness), and Pittahara (reducing pitta). In the ethylene glycol-induced urolithiatic model in rats, *Leea macrophylla* extract diminished and inhibited the formation of kidney stones and mitigated renal impairment, indicating that the *Leea indica* species may exhibit significant anti-urolithiatic potential [14]. In the ethylene glycol-induced urolithiasis model in rats, the administration of the ethanolic extract of the entire *Leea indica* plant (500 mg/kg orally) for 14 days significantly reduced and prevented the growth of kidney stones. Furthermore, the renal dysfunction is noted to be ameliorated [15]. The study by Krishnaiah et al. (2011) demonstrated that *Leea indica* exhibits significant anti-urolithiatic properties [16]. In Turkish traditional medicine, the fruits of *Leea indica* Mill have been employed as a sedative and for the treatment of diabetes, burns, bronchial asthma, constipation, kidney stones, and rheumatic pain [17]. In summary, research findings from the available literature indicate that dietary plants and their phytonutrients may be beneficial in the treatment and management of urolithiasis.

3. RESULTS AND DISCUSSION

Different Āchāryas talk about Mutrā Ashmari in different ways. Āchārya Bhāvamishra and Charaka discussed the various types of Ashmari, whereas Bhaisajya Ratnavali and Susruta Samhitā delineate the pathogenesis, signs, and symptoms of Ashmari. Mādhava Nidāna elucidates additional signs and symptoms. Ayurveda and contemporary science have both elucidated the management of Mutrā Ashmari or urinary calculi [8] [9]. Ashmari is a disease characterized by a predominance of Kapha, while Shōshana of Kapha arises from Tikta, Kashāya Rasa, and Laghu Guna. Urinary retention contributes to the development of Ashmari. The chosen herbs possess Madhura Rasa, Sheeta Virya, and Guru Snigdha Guna, imparting a Mutrala effect. Because of its Mutrala action, it helps break up urinary stones and makes it easier to urinate. Both herbs are Sheeta in Veerya, which means they make things more alkaline [8]. The synergistic effect of the alkalizer is amplified, yielding favorable

outcomes in the disintegration and removal of urinary stones from the urinary tract. Most of the studies say that both herbs stop kidney stones, high calcium levels in the urine, and high oxalate levels in the urine. These properties break down stones, stop them from forming in the urinary tract, and stop them from forming again. Both herbs lower the levels of potassium citrate, calcium oxalate, urine oxalate, urine calcium, and crystal deposits, which means they can help prevent kidney stones [14] [15]. Measuring serum creatinine and uric acids is important for checking how well anti-urolithiatic activity works [17]. So, the herbs that were chosen are important for treating Ashmari.

4. CONCLUSION

The findings indicate that certain herbs may address stone deposition in the kidney by inhibiting hyperoxaluria. These herbs also have the ability to fight microbes, so they may also stop a second bacterial infection in the kidneys. The findings suggest that these herbs may serve as effective anti-urolithiatic and antihypercalciuric agents for the removal of kidney stones. According to the literature review and the Pancha Padārtha examination, Cucumis melo and Leea indica can help control Ashmari. Research on pharmacological effects has demonstrated that these herbs possess potent anti-urolithiatic properties.

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