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Mutraashmari (Urolithiasis): Integrating Ayurvedic Concepts with Contemporary Evidence-A Comprehensive Review

Dr.Aswani K. V[1], Dr.N.Madhuri Devi[2]

[1]Ph.D. Scholar, Department of ShalyaTantra, Glocal University, Saharanpur, Uttar Pradesh, India.
[2]Professor and HOD, Department of ShalyaTantra, Glocal University, Saharanpur, Uttar Pradesh, India.

Abstract
Mutraashmari (urolithiasis) is a common urinary disorder characterized by the formation of calculi within the urinary tract and is associated with pain, dysuria, hematuria, and urinary obstruction. According to Ayurveda, *Mutraashmari* is described as an abnormality of the *Mutravaha Srotas* due to the involvement of the process of *Dosha-Dushya*, urine stasis, and gradual hardening of urine. *Mutraashmari* is also described among the *Astamahagada* (eight major diseases) in classical Ayurvedic literature, highlighting its clinical significance and potential severity. This literature review analyzes the integration of classical Ayurvedic concepts regarding *Mutraashmari* with contemporary views on the disease, including etiology, risk factors, pathogenesis, chemical composition of stones, clinical manifestations, diagnosis, and complications. Also, the review includes the correlation between Ayurvedic and contemporary views, which demonstrates the similarities in the clinical presentation and differences in pathogenesis. In addition, the review discusses the classical Ayurvedic methods of treatment, such as *Shamana* and *ShodhanaChikitsa*, *Mutrala* and *Ashmarighna Dravyas,* Ayurvedic preparations, and *Pathya-Apathya*. Some preliminary preclinical and clinical findings indicate the possibleantilithiatic effect of some Ayurvedic interventions, but currently, there is a limited amount of available evidence about their effectiveness.

Keywords: *Mutraashmari*,Urolithiasis, *Ayurveda*, *Ashmarighna*, Urinary Calculi.

1. Introduction

1.1 Overview of Urolithiasis

Urolithiasis is a common disorder of the urinary system characterized by the formation and accumulation of crystalline concretions within the urinary tract, including the kidneys, ureters, urinary bladder, and urethra. Urolithiasis occurs when there is an oversaturation of stones within the urinary tract due to substances like calcium, oxalate, phosphates, uric acid, or cystine, after which crystallization, crystal growth, aggregation, and retention take place. The clinical manifestations of the disease include renal or ureteric colic, pain in the flank or abdomen, dysuria, hematuria, nausea, vomiting, and urinary tract obstruction.[1] It is caused by various factors,

including insufficient water intake, dietary habits, metabolic disturbances, obesity, environment, genetics, and medications. Another distinctive feature of urolithiasis is the high possibility of recurrence its prevention and management should be prioritized. Modern-day management strategies range from adequate hydration and conservative treatment to medical expulsion and endourological or surgical interventions, depending on the size, location, composition, obstruction, and complications associated with the stones. In accordance with Ayurveda, urolithiasis is similar to *mutraashmari.*[2] This disease is among the diseases of the urinary system. Classic Ayurvedic literature includes information about the causative agents, *Dosha* involvement, pathology, symptoms, and treatment options of *Ashmari.* The contemporary Ayurvedic literature is devoted to the correlation of *Mutraashmari*and urinary stones and the possible use of Ayurveda for alleviation of symptoms and treatment of stones.

1.2 Global and Indian Burden

Urolithiasis remains an important global public health problem, affecting populations across different geographical and socioeconomic settings. A recent 2026 systematic review and meta-analysis estimated the global prevalence of urolithiasis at 10.85% (95% CI: 8.76–13.14%), based on 22 studies involving 1,276,826 participants. The pooled prevalence was approximately 11.8% in Asia, with substantial geographical and methodological variation.[3]The burden is also substantial in India. Recent comparative analyses have identified India as having a high urolithiasis burden, with important differences according to age and sex. The available evidence indicates that population growth and aging contribute substantially to the increasing absolute burden, while Indian women have shown an increasing age-standardized incidence trend. A 2026 analysis further emphasized that the burden of urolithiasis remains considerable among younger populations and women in India. Environmental temperature, inadequate hydration, dietary patterns, metabolic factors, and socioeconomic conditions may contribute to geographical differences in the occurrence of urinary stones. These factors are particularly relevant in regions with hot climates and changing dietary and lifestyle patterns.[4]

1.3 Rationale for Integrating Ayurveda with Contemporary Medicine

The high incidence of urolithiasis and its recurrence, along with medical expenses related to urolithiasis treatment, emphasizes the need for an approach that not only takes into account acute symptoms of urolithiasis but also underlying risk factors and recurrence prevention. The theory of Ayurveda presents a unique model for the treatment of *Mutraashmari* based on *Nidana*, *Dosha-Dushya* interaction, *Agni*, *Srotas* involvement, and *Samprapti*, in addition to individualized treatments using dietary intervention, lifestyle change, medicinal plants, medicines, and *Shodhana*and *Shamana* therapy.[5] The above-mentioned approach might offer interesting perspectives on prevention, symptom relief, and recurrence inhibition once properly analyzed using current scientific research methods. In addition, there are new clinical findings proving the necessity of further exploration of Ayurvedic treatment modalities. Nonetheless, there is not enough clinical evidence available therefore, more large-scale RCTs with appropriate interventions, objective urolithiasis endpoints, and adequate safety evaluation are required. Thus, combining the principles of Ayurveda with current research can be more effective to give a better understanding of *Mutraashmari.*[6]

2. Concept of *Mutraashmari* in Ayurveda

2.1 Definition and Classical Description

In *Ayurveda, Mutraashmari i*s the condition wherein a concretion similar to a stone develops in the urinary system. The term "*Ashmari"* is composed of two terms, "*Ashman,"* meaning "stone," and hence implies a concretion, which is a pathological condition of stone-like consistency. *Sushruta*mentions *ashmari* as a condition that is one of the eight great diseases,*Ashtamahagada*, indicating its severity, difficulty in treatment, and potential for causing urinary obstruction.[7] This condition is mainly a manifestation in the *Mutravaha Srotas*, and in

particular, the urinary bladder *(basti)* is an important site for the formation of stones. The classical explanation of the formation of*ashmari*by the interaction of vitiated *Doshas* with urine leading to hardening explains well the clinical significance of urolithiasis.

2.2 *Nidana* (Etiological Factors)

The development of *Mutraashmari* is understood in relation to *Dosha* vitiation, impairment of *Mutravaha Srotas,* and improper urinary habits. In particular, the Ayurvedic texts point out the causes that impair the normal flow of urine and contribute to urine concentration and dehydration.[8] In *AshtangaHridaya,* blocking or retention of the urge to urinate *(MutravegaDharana)* is specifically mentioned as an important etiological factor for *ashmari* formation. *Vata,* causing obstruction of the bladder outlet and dehydration of the urine, helps in creating *ashmari*along with *Pitta, Kapha,* or *Shukra.* Some other causes listed in classical sources are unhealthy diet practices, excessive consumption of heavy and harmful foods, retention of natural urges, and factors responsible for *Dosha* imbalance and stagnation of urine.[9] These etiological factors can be understood from the modern perspective in the light of insufficient hydration, poor diet, urinary stasis, and metabolic propensity to stone formation.

2.3 Dosha and Dushya Involvement

The *Tridoshas*are involved in the pathogenesis of *Mutraashmari*, especially *Kapha,* whose role is important in the formation of the stone matrix. *Vata* and *Pitta* are involved in the development and symptoms of the disease. According to Sushruta, there are four types of *Mutraashmari* depending on the causative factor:*Vataja, Pittaja, Kaphaja (Shleshmaja),* and *ShukrajaAshmari*.[10] The role of *Vata* is due to its *Ruksha*and *Shoshana* properties, which facilitate the drying and hardening of the urine. *Pitta* acts due to its *Ushna* and *Tikshna* properties and is involved in the alteration of the urinary environment. *Kapha* acts because of its property of cohesion and is necessary in the formation of the stones. The *Doshas* act mainly on the *Mutra* and *Meda Dushyas,* and *Mutravaha Srotas* and *Basti* are the sites.

2.4 *Samprapti* (Pathogenesis)

The Ayurvedic pathogenesis of *Mutraashmari* can be understood as a progressive process beginning with *Dosha* vitiation and disturbance of normal urinary physiology. *Vata* obstructs the urinary passage and promotes drying of urine, while *Pitta, Kapha,* or *Shukra* become associated with the altered urinary contents. The concentrated and progressively hardened material subsequently develops into an *Ashmari.*[11]*AshtangaHridaya* describes this process by stating that when *Vata* obstructs the opening of the *Basti* and dries the urine, its association with *Pitta, Kapha,* or *Shukra* results in the formation of *Ashmari.*

3. Contemporary Understanding of Urolithiasis

The current concept of urolithiasis represents a complicated interplay of several metabolic, dietary, genetic, environmental, and urinary parameters, which lead to stone formation in the urine. The process starts with supersaturation of the urine, after which follows crystallization, crystal growth, crystal aggregation, and crystal retention. Depending on the size, composition, and location of the stone, as well as on the extent of urinary obstruction, the symptoms can be various.[12] Understanding the mechanisms underlying urolithias is and its forms is important for the correct diagnosis, therapy, and prevention of urolithiasis recurrence. The principal aspects of contemporary urolithiasis are presented in Table 1.

Table 1. Contemporary understanding of urolithiasis: etiology, pathogenesis, stone composition, clinical manifestations, and complications

Aspect	Contemporary understanding	Key points
Etiology and risk factors[13]	Urolithiasis is a multifactorial disease resulting from interaction between genetic, metabolic, dietary, environmental and urinary factors.	Low fluid intake and low urine volume are major modifiable risk factors. Other important factors include hypercalciuria, hyperoxaluria, hyperuricosuria, hypocitraturia, abnormal urinary pH, high dietary sodium, excessive animal protein intake, obesity, metabolic syndrome, recurrent urinary tract infection, family history, anatomical abnormalities causing urinary stasis, and certain medications. Genetic disorders such as cystinuria and primary hyperoxaluria may cause recurrent stone disease.
Pathogenesis of urinary stone formation[14]	Stone formation is a dynamic process initiated by urinary supersaturation with stone-forming solutes.	The major steps include supersaturation → crystal nucleation → crystal growth → aggregation → crystal retention → stone growth. Supersaturation is influenced by urine volume, urinary concentration of calcium, oxalate, phosphate and uric acid, urinary pH, and the balance between crystallization promoters and inhibitors such as citrate and magnesium.
Crystal retention and renal factors[15]	Crystal formation alone is insufficient for clinically significant stone development; crystals must remain within the urinary tract and undergo further growth or aggregation.	Renal papillary injury, Randall's plaques, tubular plugging, urothelial injury and crystal adhesion contribute to retention. The mechanism differs according to stone type and underlying urinary abnormalities.
Calcium stones[16]	Calcium-containing stones constitute the majority of urinary calculi.	They mainly consist of calcium oxalate and calcium phosphate, either individually or in combination. Hypercalciuria, hyperoxaluria, hypocitraturia and low urine volume are important risk factors.

Uric acid stones[17]	Uric acid stones are associated mainly with increased urinary uric acid concentration and persistently acidic urine.	Important associations include hyperuricosuria, high purine intake and metabolic abnormalities. Low urinary pH is particularly important because uric acid solubility decreases markedly in acidic urine.
Struvite/infection stones[18]	Infection stones develop in association with urinary tract infection caused by urease-producing microorganisms.	They are predominantly composed of magnesium ammonium phosphate (struvite) and may also contain calcium phosphate deposits. These stones can grow rapidly and may form staghorn calculi.
Cystine and other stones[19]	Cystine stones result from inherited defects in renal tubular amino-acid transport.	Other uncommon stones include xanthine, 2,8-dihydroxyadenine and drug-related calculi. These are particularly important in recurrent or high-risk stone formers.
Clinical manifestations[20]	Clinical presentation depends primarily on stone size, location, degree of obstruction and associated infection.	Common manifestations include renal/ureteric colic, flank or loin pain, hematuria, dysuria, urinary frequency, nausea and vomiting. Small ureteric stones may be asymptomatic or may pass spontaneously.
Complications[21]	Urolithiasis may cause obstruction and progressive damage to the urinary tract, particularly when associated with infection or prolonged obstruction.	Important complications include hydronephrosis, recurrent urinary tract infection, pyelonephritis, urinary obstruction, renal impairment and, in severe/recurrent disease, chronic kidney disease.
Recurrence[22]	Urolithiasis has a substantial tendency to recur, particularly in individuals with persistent metabolic or genetic risk factors.	Recurrence prevention requires identification and modification of underlying dietary, metabolic, and urinary risk factors.

4. Correlation Between *Mutraashmari* and Urolithiasis

4.1 Ayurvedic–Modern Correlation

Mutraashmari is a significant disease condition of the *Mutravaha Srotas* found in classic Ayurvedic medical literature and is usually linked to urolithiasis/urinary calculi in conventional medicine due to the marked similarity of their anatomical location, clinical presentation, and pathogenesis. *Sushruta* mentions *Ashmari* as a hard pathological stone-like mass associated with the urinary system whereas conventional medicine terms urolithiasis

as the development or existence of any calculi at any part of the urinary tract.[23] Contemporary Ayurvedic literature has confirmed this linkage mostly due to similar symptoms like renal/loin pain, dysuria, hematuria, obstruction of urine and difficulty in micturition. Nevertheless, the link must be considered clinical and conceptual and not literal[24]. The cause and explanation for *Mutraashmari* from an Ayurvedic perspective includes *Dosha, Dushya, Srotas, Agni, Nidana,* and *Samprapti* while the cause and explanation for stone development from a conventional medical perspective include urinary supersaturation, crystal nucleation, growth, aggregation, retention and biochemical alterations.

4.2 Similarities and Differences in Pathogenesis

There appear to be conceptual similarities between the two descriptions of the condition's pathogenesis. According to Ayurveda, the vitiated state of *Doshas,* in particular, *Kapha* along with *Vata* and*Pitta,* interacts with urine to form *Ashmari*. *Vata* is responsible for obstruction and dryness, whereas *Kapha* causes cohesion and hardness. On the other hand, in modern medicine, the process of stone formation in the urine starts from supersaturation of the urine, nucleation, crystal growth, aggregation, and retention of crystals in the urinary tract. Hence, the Ayurvedic ideas of *Mutra Shoshana, Sang*a, and progressive hardening might be considered general analogs of urinary concentration, stasis, crystallization, and stone growth. However, it is important to note that they are not molecular analogs since classical *Dosha*-related mechanisms and contemporary physicochemical mechanisms belong to different explanatory levels.[25] Modern research has made it possible to enhance the correlation through objective evaluation of the phenomena under discussion. Recently, one study was conducted to analyze the morphology of urinary crystals in the case of *Mutraashmari* and found that there were stones such as calcium oxalate, calcium carbonate, uric acid, and triple phosphate. Nevertheless, this research is based on five patients only; hence, further studies should be done to establish any correlation between the different Ayurvedic categories and certain stone types.

4.3 Correlation of Clinical Features

The clinical features of *Mutraashmari* show considerable similarity with the presenting features of modern urolithiasis. Classical descriptions of *Ashmari* include severe pain, difficulty and discomfort during micturition, burning sensation during urination, hematuria, and urinary obstruction. In contemporary medicine, urolithiasis commonly presents with renal or ureteric colic, flank or loin pain that may radiate toward the lower abdomen, groin, or genital region, hematuria, dysuria, urinary frequency, urinary urgency, nausea, vomiting, and, in cases of significant obstruction, difficulty in passing urine.

Pain represents one of the most prominent overlapping clinical features. In modern urolithiasis, acute ureteric obstruction may produce severe, intermittent colicky pain because of ureteric spasm, increased intraluminal pressure, and distension of the urinary tract. The location and radiation of pain may vary according to the position of the stone. Stones located in the kidney may cause flank or loin discomfort, whereas ureteric stones may produce pain radiating toward the lower abdomen, groin, or genital region. In the Ayurvedic description of *Ashmari*, severe pain is associated with obstruction of the urinary pathway and the involvement of *Vata*. Thus, although the underlying explanatory frameworks differ, both descriptions emphasize pain associated with obstruction within the urinary tract.[26]

Burning micturition and dysuria constitute another important area of clinical correspondence. Burning during urination may occur when the stone irritates the urinary tract mucosa or when an associated urinary infection is present. In the clinical trial of *Mutrashmari* by Kumari and Tukaram, burning micturition was specifically included among the diagnostic clinical features, and it was observed in 69.78% of the assessed patients. Dysuria was also included as a graded clinical parameter. Similarly, contemporary descriptions of kidney stones recognize

pain during urination as a possible manifestation, particularly when the stone is moving through the lower urinary tract.[27]

Increased frequency of micturition may also occur in patients with urinary stones, particularly when a calculus is located close to the vesicoureteric junction or lower urinary tract. The clinical study of *Mutraashmari* reported increased frequency of micturition among patients and assessed it as one of the principal symptomatic parameters. The study observed increased urinary frequency in 27.91% of the patients. Therefore, *Mutravega* or frequent urination described in clinical presentations of *Mutraashmari* can be correlated with the urinary frequency observed in contemporary urolithiasis.[28]

Hematuria is another important overlapping manifestation. Passage or movement of a calculus can cause mechanical irritation or minor mucosal injury within the urinary tract, resulting in microscopic or visible blood in the urine. Modern clinical references recognize pink, red, or brown urine due to hematuria as a symptom of kidney stones. In the aforementioned *Mutraashmari* clinical trial, hematuria was included among the diagnostic features and was observed in 13.95% of patients. Thus, *Sarakta Mutrata* described in the clinical assessment of *Ashmari* has a clinically relevant correspondence with hematuria in modern urolithiasis.[29]

Nausea and vomiting may accompany severe renal or ureteric colic. These symptoms are recognized in modern descriptions of kidney stones and may occur during episodes of severe pain. Interestingly, nausea and vomiting were also included among the diagnostic clinical features used in the Ayurvedic clinical trial of *Mutraashmari*. This provides an additional point of clinical similarity between the traditional and contemporary descriptions.[30]

Urinary obstruction or difficulty in passing urine represents another important point of correlation. A calculus may partially or completely obstruct urinary flow depending on its size and location. Modern descriptions include inability to urinate or passage of only a small amount of urine among the possible manifestations of urinary stones. In *Mutraashmari*, difficulty in micturition and obstructive urinary symptoms are described in association with the presence of the calculus. The obstructive nature of the condition therefore provides an important clinical basis for correlating *Ashmari* with urinary calculi.[31]

Overall, the clinical correspondence between *Mutraashmari* and modern urolithiasis is particularly evident in pain, burning micturition, dysuria, hematuria, increased urinary frequency, nausea and vomiting, and obstructive urinary symptoms. A clinical study of *Mutraashmari* reported pain, burning micturition, increased frequency of micturition, and hematuria among its observed manifestations, while another Ayurvedic clinical study similarly reported abdominal pain, frequency of micturition, burning micturition, and hematuria as important clinical parameters. Although Ayurvedic and biomedical systems explain these manifestations through different conceptual frameworks, the substantial overlap in symptom patterns, particularly those associated with urinary tract irritation, stone movement, and obstruction, supports the clinical correlation of *Mutraashmari* with urolithiasis.

5. Diagnosis and Assessment

The diagnosis of *Mutraashmari* (urolithiasis) requires integration of Ayurveda's approach to the clinical assessment with modern diagnostic methods. From the perspective of Ayurveda, the assessment is done on the basis of *Nidana*, predominance of *Doshas*, signs and symptoms, involvement of *Mutravaha Srotas*, and symptoms like pain, dysuria, hematuria, and obstruction of urine. Modern methods of diagnosis include history taking, physical examination, urinalysis, culture of the urine, serum creatinine, serum calcium, uric acid, and metabolic workup, especially in cases of recurrent urolithiasis and high-risk stone formers.[32] Imaging is an important aspect in the confirmation of the presence of stones, size, location, and extent of obstruction of urinary calculi.

Ultrasonography (USG) is often used in the preliminary investigations, while non-contrast computed tomography (NCCT) allows highly sensitive detection of stones and their size and location.

6. Ayurvedic Management of *Mutraashmari*

Ayurvedic management of *Mutraashmari* is directed toward relieving pain and urinary obstruction, facilitating stone expulsion, addressing the underlying *Dosha* imbalance, and preventing recurrence. Classical management includes S*hamanaChikitsa, ShodhanaChikitsa, Mutrala*and *Ashmarighna* drugs, specific Ayurvedic formulations, and appropriate *Pathya-Apathya*.[33] The therapeutic approach is individualized according to the type and stage of *Ashmari*, stone characteristics, symptoms, and the patient's overall condition. Contemporary clinical studies have also investigated selected Ayurvedic interventions, although the strength of clinical evidence remains variable.

Table 2.Ayurvedic management of *Mutraashmari*

Management approach	Major interventions / examples	Therapeutic rationale in Mutra Ashmari
ShamanaChikitsa	Use of *Ashmarighna*, *Mutrala*, *Bhedana*, *Lekhana* and Dosha-specific medicines	Aims to reduce D*osha* vitiation, relieve urinary symptoms, promote urine flow and facilitate the passage of calculi.
ShodhanaChikitsa	*Virechana* and, where indicated, other *Panchakarma* procedures according to *Dosha* and patient suitability	Intended to eliminate aggravated *Dosha*sand restore physiological balance; should be performed only after appropriate assessment and according to classical indications.
MutralaDravyas	*Gokshura (Tribulusterrestris), Punarnava (Boerhaviadiffusa), Ikshu, Varuna (Crataevanurvala)* and other traditionally described *Mutrala*drugs	Traditionally used to promote urine flow and support relief of urinary obstruction and dysuria.
AshmarighnaDravyas	*Pashanabheda (Bergenialigulata), Varuna, Gokshura, Kulattha* and other Ashmarighna drugs	Traditionally described for their role in reducing or facilitating the expulsion of urinary calculi.
Ayurvedic formulations	*PashanabhedadiKwatha, GokshuradiGuggulu, VarunadiKwatha, AshmariharaKwatha, PalashaKshara* and other formulations described in classical literature	Formulations combine multiple pharmacological actions such as *Mutrala, Ashmarighna, Shothahara* and *Vedanahara* effects.

***Pathya*(diet and lifestyle)**	Adequate fluid intake; appropriate dietary modification; avoidance of prolonged urinary retention; individualized diet according to stone type and *Dosha*	Supports adequate urinary volume, healthy urinary function and prevention of factors that may contribute to recurrent stone formation.
Apathya	Suppression of the urge to urinate, inadequate hydration, excessive intake of incompatible/heavy foods and other individualized dietary or lifestyle triggers	Avoidance is intended to reduce urinary stasis, *Dosha* aggravation, and recurrence-promoting factors.

Table 3: Important Ayurvedic drugs and their proposed roles

Drug	Ayurvedic role	Contemporary research perspective
Pashanabheda*(Bergenialigulata)*	*Ashmarighna, Mutrala*	Investigated for antiurolithiatic, antioxidant, and stone-inhibitory properties.
Varuna*(Crataevanurvala)*	*Ashmarighna, Mutrala, Basti*-related disorders	Preclinical and clinical literature suggests potential antiurolithiatic activity.
Gokshura*(Tribulusterrestris)*	*Mutrala, Shothahara*	Traditionally used for urinary disorders; experimental studies have investigated its effects on urinary calculi.
Punarnava*(Boerhaaviadiffusa)*	*Mutrala, Shothahara*	Traditionally used to support urinary function and reduce edema/inflammation.
Kulattha*(Macrotylomauniflorum)*	*Ashmarighna*	Traditionally described in relation to urinary calculi and studied for potential antiurolithiatic activity.

7. Evidence-Based Evaluation and Integrative Perspective

There is evidence that certain Ayurvedic drugs, like *Pashanabheda*, *Varuna*, and *Gokshura*, exhibit antiurolithiatic, antioxidative, and crystal inhibition properties. Nevertheless, all this evidence is based on experimental studies and needs to be proven clinically. There is clinical evidence of this disease, but some clinical trials have shown promising results.

Conclusion

Mutraashmari and urolithiasis share considerable clinical and pathological similarities. Integrating Ayurvedic principles with contemporary diagnostic and therapeutic approaches may provide a comprehensive strategy for

symptom relief, stone management, and recurrence prevention. However, larger, well-designed clinical studies are required to establish the efficacy and safety of Ayurvedic interventions.

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