SCIENTIFIC LOOK INSIGHT THE AYURVEDIC CLASSICS FOR ANTI UROLITHIATIC PLANTS  
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ABSTRACT  
Urinary stone is considered as a surgical condition usually. Despondently, the available modern pharmacotherapies are very costly as well as they are associated with side effects. However, a number of alternative medical managements are available for the urinary stone which are not only break the existed calculi but also prevents its recurrence. Ayurveda, being one of the oldest health care systems offers an effective management of urolithiasis. In Ayurvedic classics urolithiasis is mentioned with the term Ashmari. The great Indian surgeon Acharya Sushruta describes all the aspects of ashmari in detail including pathogenesis and medical management along with surgical intervention. In the present article an attempt was made to summaries simple and effective single herbal based formulation for the ashmari i.e. urinary calculi.  
Key words: Urinary stone, Ayurveda, Ashmari, herbal

INTRODUCTION  
Urolithiasis is the third prevalent disorder of the urinary system after urinary tract infections and benign prostatic hyperplasia. It has afflicted human being since olden times worldwide, sparing no geographical, cultural or racial groups.¹ Urinary stones can persist, with serious medical consequences (such variable degree of pain, hydronephrosis, infection and bleeding), throughout a patient’s lifetime.² The urinary stone estimated to occur in approximately 12% of the world population³ and 11% population in India.¹ Men are three times more likely to be affected than women. Different types of calcium oxalate (monohydrate, dehydryate, and basic calcium, phosphate) (70-80%),⁴ magnesium ammonium phosphate (10-15%), uric acid (3-10%) and cystine 0.5-1% contributes in stone.⁵ Pathogenesis of urolithiasis is a multifaceted process that includes a series of several physicochemical events, beginning with crystal nucleation, growth and aggregation, and ending with retention within the urinary tract.⁶ The mechanisms governing the induction of all of these processes remain speculative. Supersaturation of precipitating salts is the most important contributory factor in the stone formation. One of the most important phenomena that characterize urolithiasis is its high recurrence.⁷,⁸ Reactive oxygen species (ROS) also seem to be responsible for cellular injury, therefore a reduction of renal oxidative stress could also be an effective
therapeutic approach. Unfortunately, the available therapies thiazide diuretics, alkali-citrate, extracorporeal shock wave lithotripsy and percutaneous nephrolithotomy remain costly and in most cases are invasive with side effects. The side effects may be impairment in renal function, haematuria, hypertension, tubular necrosis or renal fibrosis. Therefore, in recent years researchers looking for phytotherapeutic agents effective in urinary tract stone as an alternative or adjunct therapy. Herbal drug therapy is the most trusted system of medicine in South East Asian countries like India, where plants are a part of culture and life style. A variety of plants were previously investigated for their usefulness in urolithiasis without any adverse effect. So, it is important to find out an alternative approach for the management of urinary stone, therefore phytotherapy is being sought.

**AIM AND OBJECTIVE**
1. Summarize ayurvedic prospective of urinary calculi
2. Compile single drug effective in the urinary calculi treatment

**AYURVEDIC PROSPECTIVE OF UROLITHIASIS**

Ayurveda, the science of traditional Indian medicine has taken its origin long back even before the origin of other contemporary sciences. The searching of the ancient knowledge helps us to build enhanced future. So here an attempt has been made to explore the past literature regarding concept of urolithiasis, which comes under the heading of Ashmari (ashma- meaning stone).

The Mutrarogas (urinary problems) are prevalent since the vedic period and our ancient physicians had detail knowledge about their etipathogenesis and management. Basti (urinary system) is the main seat of urinary disorder. In classic it is described that basti (urinary bladder), vankshana (pelvic region), gavini, medra (penis), mutravaha dhanyates (arterial supply of urinary system) all together constitute mutravaha srotas (urinary tract). The term basti cannot be taken only with reference to urinary bladder, but the entire urinary system has to be taken with reference to the term basti. This can be noticed in the description of disease like mutraghata (injuries in urinary system), mutra-krichra (dysurea) and prameha (diabetes). Ashmari is included in the mutravaha sroto vikara and it is also enumerated as one among the mahagada (most serious disease). Ashmari merely does not refer the occurrence of stone and its symptom varies from asymptomatic to obstructive uropathy. In ashmari vitiated doshas solidified to attain the shape of a stone and produce various symptoms. Since it is krichra sadhya vyadh (difficult to cure), its prevention is always important than its treatment. This is possible only when the cause is established. “sankshepataha kriya yogo nidana pariwarjanam”. Therefore nidana pariwarjana (prevention) is mandatory in all forms of chikitsa (treatment).

**SAMPRAPTI (PATHOGENESIS)**

The complete course right from indulgence in different nidana (etiological factor), vitiation of doshas till the manifestation of disease is collectively termed as Samprapti. According to Acharya Charaka, the mutra (urine), pitta (the biological fire) and kapha ((The water humor or protective humors)) in basti when dried up by vata (the air or nervous system humor), it results in mutrashmari (urinary calculi) in the same way as goro-chana is formed in pittashaya (gall bladder) of cow. While explaining pathophysiology of ashmari, Chakrapani explain that all the
ashmari are tridoshaja (vata, pitta and kapha) in origin, as the water present in the atmosphere is dried up by wind and heat, in the same way, kapha present in the basti is dried up by vata and pitta.\textsuperscript{14}

Sushruta, while explaining the samprapti of mutrashmari says that, by indulging in nidanas such as asamshodhana shilata and apathyya sevana (irregular dietary habit) the aggravated kapha along with mutra forms the mutrashmari in the basti\textsuperscript{13}. Vagbhata while dealing with samprapti says the above explanation in slightly different way. He says that the aggravated vata covers the basti mukha and does the shoshana (condensation) of mutra associated with pitta, kapha and shukra (semen) and results in the gradual formation of ashmari as the muddy deposition takes place even in the pot of clean water. He also says that all the ashmari are shleshmashraya (Fig. 1).\textsuperscript{17}

![Flowchart of Samprapti of Ashmari](image-url)

**Fig. 1. Samprapti of Ashmari (Pathogenesis of Urinary stone)**

**POORVAROOPA** (PRODORMAL SYMPTOM)

Avila mutrata (change in character of physical urine i.e. turbidity), sandra mutrata (concentrated urine), bastagandhi mutra (goat like smelling urine), basti, muska & asana desha soola (pain in the lower abdominal region), mutra krichra (difficulty in urination), aruchi (loss of appetite) and jwara (fever).\textsuperscript{13,18,19}

**LAKSHANA (SYMPTOM)**

Basti, nabhi & mehana vedana (pain in the lower abdominal region especially bladder, umbilicus, and penis), mutraarga nirodhana (obstruction in urinary tract), mhumuhur-mutrayati (increase frequency of urination), srujati alpam alpam (passes smaller quantity of urine with pain), kathashchit sampravar-

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**Details of Symptoms**

- **POORVAROOPA**
  - Avila mutrata
  - Sandra mutrata
  - Bastagandhi mutra
  - Basti
  - Muska
  - Asana desha soola
  - Mutra krichra

- **LAKSHANA**
  - Basti
  - Nabhi
  - Mehana vedana
  - Mutraarga nirodhana
  - Mhumuhur-mutrayati
  - Srujati alpam alpam
  - Kathashchit sampravar-
tana, bindu bindu sravatyapi (passes drop by drop urine), mutradhara sanga or vishirna dhara mutra (disturbance in flow of urine), basti adhmana (feeling of bladder fulness), vit sanga (constipation), vrishana-yoswayathusarudhira mutra, avila mutrata, shanka churna prakasha, sasikatam mutra (presence of crystals in urine), gomeda sana mutra (urine similar to gomeda a precious stone). Pain felt in basti pradesha, nabhi and sevani increase by running, walking, traveling and fasting. These activities may dislodge the ashmari causing pain.13,14,16

Table 1. Character of different type of Mutrashmari

<table>
<thead>
<tr>
<th>Mutrashmari</th>
<th>Vatashmari13</th>
<th>Pittashmari13</th>
<th>Kaphashmari13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape &amp; Appearance</td>
<td>Kadamba pushavat kantakachita (looks like flower of Anthocephalus cadamba)</td>
<td>Bhallataka sansthana (looks like fruit of Semecarpus anacardium)</td>
<td>Kukkutanda pratiksha sweta, snigdha (whitish and unctuous like Egg-shell)</td>
</tr>
<tr>
<td>Colour</td>
<td>Shyavaruna varna (dark colour)</td>
<td>Madhu varna (colour like honey like)</td>
<td>Mudhuka pushpavarna (colour like flower of Madhuca indica)</td>
</tr>
</tbody>
</table>

Table 2. Comparison of symptoms

<table>
<thead>
<tr>
<th>Ayurveda Parlance</th>
<th>Modern Parlance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ruja is the prominent feature</td>
<td>1. Pain is the prominent feature</td>
</tr>
<tr>
<td>2. Basti avatodha is present</td>
<td>2. Obstruction in the pathway gives raise to intermittent renal colicky pain</td>
</tr>
<tr>
<td>3. Shyavavarna ashmari with rough, irregular surface with spike and similar to kadamba pushpa</td>
<td>3. Calcium oxalate stones are extremely hard with dark colour and spikes</td>
</tr>
<tr>
<td>4. Shape is similar to that of Bhallataka the colour being red or honey coloured in pittashmari</td>
<td>4. Usually non-opaque but when admixture with calcium it becomes opaque, moderate hard having yellow to dark brown colour.</td>
</tr>
<tr>
<td>5. Kaphaja ashmari is shweta, mahathi and similar to Kukkutanda sama\ Madhuka pushpa.</td>
<td>5. Uric acid stones are red, range from yellow to reddish brown and has smooth surface. They are radiolucent.</td>
</tr>
</tbody>
</table>

SADHYASADHYATA (PROGNOSIS)
Sushruta says that the newly stones can be managed by conservative methods where as in the vigorous ashmari surgical intervention is necessary. Ashmari is considered as asadhya if it is associated with upadravas like vrishana shotha, baddha mutra, presence of sikata (crystal) and sharkara (gravel) in mutra which may result in immediate death.13

MANAGEMENT

According to Acharya Sushruta, there are four basic management strategies are described for the ashmari viz. Aushadha (Pharmacological measure), Uttara Basti Karma, Kshara (alkaline drug treatment) and Shastra Chikitsa (surgery).20 The main dosha involve in formation of Ashmari is Kapha. Therefore, treatment measure which pacify Kapha dosha are helpful in Ashmari. If, Ashmari was formed due to kapha sho-shana, the line of treatment contains drugs
having laghu (light) and snigdha (unctuous) properties. While, when ashmari was formed due to kapha sanghatana then the line of management should include drugs having laghu (light), ruksha (ruksha) gunas (properties) for smoothen the progress of the breakdown of the Urinary calculi.\textsuperscript{13, 17, 21}

Natural medicines are widely used by the people in developing countries. According to WHO 80% of the world population used the medicinal plants for their health related problems due to its safety and easy availability. However the availability of treatment modalities in remote areas is still a challenge before the health organizations. Therefore it is necessary to explore the ancient knowledge regarding an efficient, inexpensive, easily obtainable and acceptable medication. Several attempts were made previously to evaluate the plant origin drugs for their effectiveness in urinary calculi.\textsuperscript{22-25} In the present study, an attempt was made to assemble the treatment strategies for ashmari involve single drug or simple formulation from the Ayurvedic treaties.

**Single Drug Therapy for Urolithiasis**

- An alkali of Patala (Stereospermum suaveolens DC.) and Karvira (Nerium indicum Mill.) with sheep urine is useful in gravels.\textsuperscript{13}
- Karkota root (Momordica dioica Roxb.) taken with milk for ten days breaks and expels calculi and gravels.\textsuperscript{26}
- Kutaja (Holarrhena antidysenterica (Linn.) Wall.) bark taken with curd and on wholesome diet expels gravels through urethra.\textsuperscript{27}
- The Juice of Kushmanda (Benincasa hispida (Thunb.) Cogn.) along with yavakshara (Mixture of potassium salts) and jaggery alleviate retention of urine, gravels and calculus.\textsuperscript{28}
- Decoction of kshirivriksha [Ashvattha (Ficus religiosa Linn.), Plaksha (Ficus lacor Buch. - Ham.), Udumbara (Ficus racemosa Linn.), Vata (Ficus benghalensis Linn.) and Parisha (Thespesia papulnea Soland. Ex. Correa)] given as urethral douche expels the calculus and also blood clot from the bladder.\textsuperscript{13}
- Decoction of gokshur (Tribulus terrestris Linn.) seeds along with yavakshara (Mixture of potassium salts) alleviates dysurea, gravels and calculus.\textsuperscript{27, 28}
- Ghrita cooked with decoction of gokshur (Tribulus terrestris Linn.) and eight times milk are effective in calculus.\textsuperscript{14}
- Roots of gokshur (Tribulus terrestris Linn.), kokilaksha (Asteracantha longifolia Nees.), eranda (Ricinus communis Linn.), brihati (Solanum indicum Linn.) and kantakari (Solanum surattense Burm. f.) are pounded together with milk and dissolved in sweet curd, breaks calculus in a seven days use.\textsuperscript{14}
- Powder of the seeds of gokshur (Tribulus terrestris Linn.) mixed with honey and taken with sheep milk, breaks calculus in a week.\textsuperscript{13}
- Powder of the seeds of gokshur (Tribulus terrestris Linn.) mixed with svarn makshika and taken with buffalos milk breaks calculus.\textsuperscript{29}
- Roots of jati (Jasminum officinale L.) taken out in summer, cooked in goat milk and mixed with sugar. Its intakes relive pain due to retention of urine and expel calculus.\textsuperscript{30}
- Punarnava (Boerhaavia diffusa Linn.), aguru (Aquilaria agallocha Roxb.), haridra (Curcuma longa Linn.), gokshur (Tribulus terrestris Linn.), leaves of kakodumbara (Ficus hispida Linn.) and flowers of darbha (Imperata cylindrica Beauv.) pounded with milk,
water, wine and sugarcane juice is effective in calculus and gravels.\(^{14}\)

- Regular use of seeds of trapus (\textit{Cucumis sativus} Linn.) or flower of coconut (\textit{Cocos nucifera} Linn.) with milk alleviates gravels within a few days.\(^{27}\)

- Regular use of nala (\textit{Arundo donax} Linn.), pasanbheda (\textit{Bergenia ligulata} (Wall.) Engle.), darbha (\textit{Imperata cylindrica} Beauv.), ikshu (\textit{Saccharum officinarum} Linn.) and seeds of trapus (\textit{Cucumis sativus} Linn.) and ervaru (\textit{Cucumis utilissimus}) boiled in milk and added with ghee are effective in calculus.\(^{14}\)

- Milk cooked with triphala [powder of three fruits viz. Haritaki (\textit{Terminalia chebula} Retz.), Bibhitaki (\textit{Terminalia bellirica} Roxb) and Amalaki (\textit{Emblica officinalis} Gaertn. in equal qantity) or punarnava (\textit{Boerhaavia diffusa} Linn.) are effective in calculus.\(^{13}\)

- Pounded Seeds of bibhitaka (\textit{Terminalia bellirica} Roxb) taken with urine, removes defects of urine and destroys calculus.\(^{13}\)

- Roots of mayurshikha (\textit{Actiniopteris dichotoma} Bedd.) are taken with rice water and on diet of milk and cereals alleviate calculus.\(^{17}\)

- Intake of the root of matulunga with stale water removes pain caused by gravels.\(^{29}\)

- Ghee cooked with kusha (\textit{Desmostachya bipinnata} Stapf.), Kasa (\textit{Saccharum spontaneum} Linn.), shara (\textit{Saccharum munja} Roxb.), morata (\textit{Maerua arenaria} Hook. \textit{F.} \& \textit{Th.}) Pasanbhedha (\textit{Bergenia ligulata} (Wall.) Engle.) etc. is efficacious in calculus caused by pitta.\(^{13}\)

- Vandaka (\textit{Loranthus longiflorus} Desr.), syonaka (\textit{Oroxylum indicum} Vent.) and varuna (\textit{Crataeva nurvala} Buch. -Ham.) break the calculus especially caused by vata.\(^{13}\)

- Decoction of varuna bark (\textit{Crataeva nurvala} Buch. -Ham.), sunthi (\textit{Zingiber officinale} Rosc.) and gokshur (\textit{Tribulus terrestris} Linn.) mixed with yavakshara (Mixture of potassium salts) and jaggery destroys calculus caused by vata.\(^{28,31}\)

- Decoction made of varuna bark (\textit{Crataeva nurvala} Buch.-Ham.), pasanbheda (\textit{Bergenia ligulata} (Wall.) Engle.), sunthi (\textit{Zingiber officinale} Rosc.) and gokshur (\textit{Tribulus terrestris} Linn.) added with yavakshara (Mixture of potassium salts) disintegrates gravels.\(^{28,31}\)

- Regular use of decoction of varuna root barks (\textit{Crataeva nurvala} Buch. -Ham.) added with its paste, falls calculus.\(^{28,32}\)

- Use of decoction of Varuna root barks (\textit{Crataeva nurvala} Buch. -Ham.) mixed with jaggery, expels calculus and alleviates pain in pelvis.\(^{28}\)

- Use of soup made of the paste of shigru (\textit{Moringa oleifera} Lam.) root fried in ghee and oil, curd-scum and salt is effective in calculus.\(^{14,16}\)

- By taking haridra (\textit{Curcuma longa} Linn.) and jaggery in equal parts with sour gruels gravels pass away.\(^{33}\)

- Decoction of Varun (\textit{Crataeva nurvala} Buch. -Ham.) and Shigru stem bark (\textit{Moringa oleifera} Lam.) is effective in stone and pain induce by stone.\(^{31}\)

- Early morning intake of decoction of gokshur (\textit{Tribulus terrestris} Linn.), erand (\textit{Ricinus communis} Linn.) leaf and Varun bark (\textit{Crataeva nurvala} Buch. -Ham.) destroys calculus.\(^{31}\)

- Intake of gokshur (\textit{Tribulus terrestris} Linn.) seed along with honey and goat milk destroys calculus in a week.\(^{31}\)

- Early morning use of overnight soaking musali (\textit{Asparagus adscendens} Roxb.) churn
and endrayan root (Trichosanthes tricuspidata Lour.) churn destroys calculus in three days.31

- Early morning use of coconut flower (Cocos nucifera Linn.) with yavakshara (Mixture of potassium salts) destroys stone.31
- Paste of ginger (Zingiber officinale Rosc.), haritaki (Terminalia chebula Retz.), kaliyaka (Coscinium fenestratum Colebr.) and yavakshara (Mixture of potassium salts) added with dadhimanda destroys calculus quickly.27
- Use of decoction of Varun stems bark (Crataeva nurvala Buch. -Ham.) along with jiggery destroys calculus quickly.28
- Use of honey added with gokshur (Tribulus terrestris Linn.) seed along with milk of sheep destroys calculus in a week.28
- Decoction of pasanbheda (Bergenia ligulata (Wall.) Engle.) added with shilajatu and sugar destroys calculus caused by pitta.34
- Regular use of kutaja (Holarrhena antidysenterica (Linn.) Wall.) bark along with curd destroys gravels of penis.34
- Regular use of paste made up of kutaja (Holarrhena antidysenterica (Linn.) Wall.) root and cow’s curd destroys calculus.34
- Use of purified shilajatu along with honey is effective in calculus.34
- Early morning use of paste of arkapuspi (Holostemma annulare (Roxb.) K. Schum.) with cow milk destroys ashmari.34

DISCUSSION
In pathogenesis of urinary calculi all the three doshas are involve with predominance of kapha. Pain or dysuria is contributed by vitiated vata moreover vitiated pitta is responsible for the conditions like burning micturition or haematuria.35 Therefore the drugs possess its action on urinary system acts as urinary antiseptic, diuretic, antimicrobial or anti-inflammatory are useful in management of stone. Varuna, goksharu, punarnava and shigru are frequently used to cure urinary stone. These drugs possess all the properties which can split the stone and expel out through urine.23 Ushna virya and lekhana property of Bibhitaka, Shilajit, jaggy etc. are also helpful in kapha dosha and disintegration of stone. Drugs having Madhura vipaka and ushna virya like shunthi, haritaki etc. are pacify the vitiated vata dosha and reduces symptoms of calculi. Drugs like pashanbhedha, gokshuru, kushmanda, dhanya exerts mutrala (diuretic) effect by virtue of their sita virya. The mutrala action helps in the removal of morbid pitta dosha, which causes clinical features like burning micturition. Thus, the individual drugs mentioned in ayurvedic classics have capacity of samprapti vightana (to break up the pathogenesis of the disease) through diverse mechanism of actions.36

CONCLUSION
Being one of the ashtamahagada, early and effective management of ashmari is very important. The plant drugs are usually free from any toxic effect and thus can be given in Urolithiasis. It is hoped that the present article will be helpful to ayurvedic and traditional practitioners and be beneficial to the mankind.


REFERENCE


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