



Review Article

CONCEPTUAL STUDY ON ASHMARI W.S.R TO UROLITHIASIS

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ABSTRACT

Ashmari is one of the most common diseases of *Mutravaha Srotas* (urinary system) which occur due to improper functioning of the filtration in the kidney. *Acharya Sushruta* considered *Ashmari* as a grave disease and fatal as death itself (*Astamahagada*). It has become a global problem but are particularly common in some geographic locations such as India, South Africa, and South-East Asia. Men are affected more than women and the peak age at onset is between 20 and 45 years. It is estimated that approximately 2-3% of the populations experiences renal stone disease at some time in their life. It is characterised clinically by colicky pain (renal colic) as they pass down along the ureter and manifest by haematuria, nausea or vomiting. It is highly prevalent disease with high recurrence rate due to westernization of lifestyle habits such as dietary changes, high salt intake in diet, less water intake, excessive use of medicine, increased body mass index etc. Despite the wide range of conservative treatment options, untreated or poorly treated, urolithiasis could result in urinary tract infection, urinary obstruction, chronic kidney diseases, end-stage renal failure etc. In ancient times, *Ashmari* was diagnosed only on the basis of the *Lakshanas* but in present era it's tough to make a diagnosis based just on clinical findings. So, it is confirmed by imaging techniques likes X-ray, CT scan. This article reviews the *Ayurvedic* concept of *Ashmari* regarding its classification, symptomatology, etiological factors as well as its contemporary science.

INTRODUCTION

Ashmari is a stone like structure present in the urinary system and is made up of urinary salts that bound together by a colloid matrix of organic materials. *Acharya Sushruta* mentioned *Ashmari* in *Astamahagada Roga* may be due to its potentiality to disturb the structure and functions of *Mutravaha Srotas* (urinary system).^[1] On the basis of symptomatology, *Mutra Ashmari* in Ayurveda resembles the renal stone or urolithiasis in modern science. Renal stone are common with a prevalence of about 12% worldwide.^[2] Their prevalence in India also reflects worldwide prevalence and stands at approximately 12%^[3] and is relatively more common

in the northern part of India, where it is 15%. Increasing prevalence is due to westernization of lifestyle habits such as dietary changes, increased body mass index. It is commonly seen in middle age people. The causes of renal calculi are high salt intake in diet, less water intake, excessive use of medicine etc. Urolithiasis is third most common disease of the urinary tract after urinary tract infections and prostatic disorders. In medical language, renal calculi are termed as nephrolithiasis or urolithiasis, where the root word 'Lith' means a stone. It is a common, painful and costly medical condition. A stone may form due to crystallization of lithogenic factors in upper urinary tract and is characterised clinically by colicky pain (renal colic) as they pass down along the ureter and manifest by haematuria, nausea, vomiting or fever. It is estimated that approximately 2-3% of the populations experiences renal stone disease at some time in their life with male-female ratio of 2:1. The peak incidence is observed in 2nd to 3rd decades of life. Once an

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individual had a stone, the prevention of a recurrence is essential.

Definition of Ashmari

In Ayurveda, *Ashmari* comprises of two words, i.e., 'Ashma' and 'Ari.' 'Ashma' means a stone and 'Ari' means enemy thus *Ashmari* involves formation of a stone or stones, resulting in severe pain as given by an enemy. It is one of the prevalent ailments of the *Mutravaha Srotas* (urinary system). *Acharya Sushruta* explained etiopathogenesis, clinical features, type and prognosis of *Ashmari* very well. *Acharya Madhava* stated that *Kapha* plays important role in pathogenesis of *Ashmari* as it is *Samavayi Karana (Prayo Shlesmashraya)*.^[4]

Ashmari as a Mahagada

The word *Mahagada* in Ayurveda is used to signify the eight diseases which are *Asadhya* in nature. The diseases are difficult to cure due to their *Ashraya* in *Marma Sthana* or involvement of *Bahu dosha*. *Acharya Sushruta* mentioned *Ashmari* in *Mahagada* may be due to following reasons:

- This disease is *Tridoshaja* in origin.
- It is *Marmashrayee*.
- *Basti* is *Vyakthasthana* of *Ashmari* and it comes under *Pranayathana*.
- It is fatal disease, if not intervened timely.

Types of Ashmari	Varna	Swarupa	Lakshana	Modern correlation
Vatika Ashmari	Syava	Parusha, Visham, Khara, Kadamba-pushpavatkantaka	Teevra Vedana,	Calcium oxalate stones
Paitika Ashmari	Sarakta, Peeta, Krishna, Madhu	Bhalatakasthivata	Vedana like Dushyate, Chusyate, Dahyate, Pachyate and Ushnavata	Uric acid stone
Shlaishmika Ashmari	Sweta, Madhukpushpa Varna,	Kukutandapratikasha, Snighda, Maheti	Basti Guruta, Dalyate, Bhidhyate, Nistudyate,	Phosphatic calculus

Shukrashmari ^[6]: The stone developed in seminal vesicle due to suppression of *Shukra*. If *Shukra Vega* is suppressed it takes *Vimargagamana* and lodged in between *Medra* and *Vrushana*. At this stage *Vata* dries up the *Shukra* and *Shukrashmari* is formed. It is compared to Spermolith.

Shukrashmari Lakshana: *Basti Shoola, Mutrakruchra, Vrushana Shotha.*

Samprapti

Tridoshas are involved in formation of *Ashmari* but *Kapha* plays important role as it is *Samavayi Karana*. The vitiated *Vata* dries up the urine in *Mutravaha Srotas* along with *Pitta* by its *Ushna Guna*, so that *Kapha* present in the urine attains the form of *Ashmari* (super saturation of urine takes place) gradually like *Gorochana* formed in cow. *Acharya Sushruta* narrates that just like clean water kept in a

- This disease is *Kruchchrasadhya Vyadhi*.

Etiology

Among the Ayurvedic classics *Sushruta Samhita* is the only textbook in which *Ashmari* described as a separate disease entity with its etiological factors. *Acharya Sushruta* stated that intake of food in the form of *Samashana* (combining both compatible and non-compatible foods), *Adhyashana* (eating food too frequently), *Viruddha Ahara* (Non compatible foods), over indulgence in *Vyayama* (physical exercise), excessive intake of *Ruksha Madya* (consuming alcoholic beverages), *Anupana Mamsa* (eating flesh of animals of marshy places) and *Ajeerna* (indigestion) are all considered to be causative factors of *Ashmari*. They are not only responsible for aggravation of *Dosha* but also predispose abnormality in *Mutravaha Srotas* and thereby produce *Ashmari*. In *Ashtanga Hridaya Mutravarodha* (suppression of urge of micturition) mentioned as important etiology of *Ashmari*. In *Hareeta Samhita* one more factor i.e., the *Pitramatruka dosha* (hereditary factor) has been added.

Classification of Ashmari:^[5] As per Ayurveda, *Ashmari* can be classified into four types i.e., *Vatika, Paitika, Shlaishmika* and *Shukraja*.

pot gets evaporate overtime, becomes muddy due to the substance present in the water, in the same way hardening of *Ashmari* occurs with the crystals of *Kapha* present in urinary system.^[7] As per *Ashtanga Hridaya* when the *Vayu* covers the mouth of the bladder and dries up the urine, then urine gets mixed with *Pitta, Kapha*, and semen giving rise to the formation of *Ashmari* gradually like *Gorochana* formed in cow.^[8]

Samprapti Ghataka

- *Dosha: Vata Pradhana Tridosha*
- *Dushya: Mutra*
- *Agni: Jatharagni Vikruti*
- *Srotas: Mutravaha Srotas*
- *Dushti Prakara: Sanga*
- *Udbhava Stana: Amashaya and Pakwashya*
- *Vyakta Stana: Mutravaha Srotas and Basti*
- *Rogamarga: Madhyam*

• *Vyadhi Swabhava: Krichra Sadhya*

Poorvarupa of Ashmari ^[9]

- *Bastyadhmanam* (distension of the urinary bladder)
- *Aasandeshesu Parito Atiruga* (severe pain around bladder)
- *Mutre Bastasagandhatwam* (uriniferous odour due to dribbling)
- *Mutrakruchra* (dysuria)
- *Jwara* (fever)
- *Aruchi* (anorexia)

As per Acharya Sushruta: ^[10]

- *Bastipeeda*
- *Arochaka*
- *Mutrakruchra*
- *Bastishiromushkashaphasa Vedana*
- *Jwara*
- *Bastigandhatwam*

Roopa ^[11]

- *Ruga Nabhi-Basti-Sevani-Murdha* (pain in the perineum and neck of the bladder which radiates to the back down the thighs, but is especially noticed at the end of the penis immediately after micturition).
- *Visheernadhara Mutra*
- *Tatsankshobhat sa ashram* (haematuria)
- *Mutradhara Sanga* (sudden ceasing of flow of urine)
- *Sasiktam Mutram Visrijati* (passing of gravels)

Sadhya Asadhya

Ashmari mentioned as one of the *Ashta-Mahagada* and *Mahagada* means difficult to treat since they are considered as *Asadhya* in character. *Ashmari* has a better prognosis in youngsters. The *Ashmari*, like the god of death, is a deadly sickness. When it is newly created and small in size, it can be cured with medication; but, when it has progressed, it requires surgical treatment. ^[12]

Urolithiasis

Urolithiasis means formation of urinary calculi at any level of the urinary tract. Urinary calculi are worldwide in distribution but are particularly common in some geographic locations such as in parts of the United States, South Africa, India and South East Asia. It affects about 12% of the world population at some stage in their lifetime. It affects all ages, sexes and races but men are affected more than women and the peak age at onset is between 20 and 45 years. Recent studies have reported that the prevalence of urolithiasis has been increasing in the past decades in both developed and developing countries. This growing trend is believed to be associated with changes in lifestyle modifications such as lack of physical activity and dietary habits and global

warming. Renal calculi are characterised clinically by colicky pain (renal colic) as they pass down along the ureter and manifest by haematuria, nausea, vomiting, fever, obstructive uropathy, urinary tract infection and blockage of urine flow.^[13] Abnormalities in the urine composition of a number of different chemicals are responsible for the chemical composition of kidney stones. The size, shape, and chemical composition of stones are varied. Supersaturation causes solutes to precipitate in urine, leading to nucleation and the formation of crystal concretions. The transformation from liquid to solid is affected by pH and specific concentrations of excess substances. The level of urinary saturation with respect to stone-forming constituents such as calcium, phosphorus, uric acid, oxalate, cystine, and low urine volume is a risk factor for crystallization. Therefore, calculi are typically classified into the following five types according to differences in mineral composition and pathogenesis:

- 1) Calcium stones
- 2) Mixed or Struvite (triple stones)
- 3) Uric acid stones
- 4) Cystine stones
- 5) Others

Calcium Stones

Calcium stones are the most common type of renal stone comprising 75% of all calculi. These stones are composed of calcium oxalate (50%), calcium phosphate (5%) or much more commonly in combination with calcium phosphate or calcium oxalate (45%). Hypercalciuria, low urine volume and hypocitraturia all predispose to the development of calcium stones. About 10% of the calcium stone associated with hypercalciuria and hypercalcemia which commonly due to hyperparathyroidism, defect in the bowel or in the kidney. Alkaline urine is a risk factor for the development calcium phosphate stones. Other predisposing factors are decreased urinary volume and increased excretion of oxalate and uric acid. Dietary oxalate may be important in stone development; spinach, beets and rhubarb in particular, contain large amounts of oxalate and they may increase urinary oxalate excretion and predispose to the development of calcium oxalate stones. Calcium stones are usually small, ovoid, hard, dark brown coloured and have granular rough surface.

Mixed (Struvite) Stones

About 10–15% of urinary calculi are made of magnesium-ammonium-calcium-phosphate, often referred to as infection induced stones and triple phosphate stones or mixed stones. They are formed as a result of chronic urinary tract infections with urea splitting organism that produce urease. The most common organism is *Proteus mirabilis* and less

common pathogens include *Klebsiella pneumonia*, *Pseudomonas aeruginosa*, and *Enterobacter*. *Escherichia coli* is not capable of splitting urea and is not associated with struvite stones. Struvite stones are yellow-white or grey in colour, soft and friable and irregular in shape. 'Staghorn shape' which is a large, solitary stone that takes the shape of the renal pelvis is an example of struvite stone.

Uric Acid Stones

This accounts approximately for 3–10% of all stone types. Uric acid stones are frequently formed in case with hyperuricaemia and hyperuricosuria such as primary gout or secondary gout and those on chemotherapy and administration of uricosuric drugs. High purines rich diet especially animal protein diet such as meat and fish, results in hyperuricosuria, low urine volume, and low urinary pH (pH < 5.05). The solubility of uric acid at pH of 7 is 200mg/dl while at pH of 5 is 15mg/dl. Thus, as the urine becomes more acidic, the solubility of uric acid in urine decreases and precipitation of uric acid crystals increases that exacerbates uric acid stone formation. These stones are smooth, yellow-brown in colour, hard and multiple.

Cysteine Stones

This comprises less than 2-3% of all stone types. It is a genetic defect in the transport of cysteine and other amino acids across the cell membrane of the renal tubules. It results in an excess of cysteine in urinary excretion which is an autosomal recessive disorder caused by a defect in the rBAT gene on chromosome 2 that results in impaired renal tubular absorption of cysteine and leaking cysteine into urine. It does not dissolve in urine and leads to cystine stone formation. These are small in size, round shape, yellow & waxy, smooth and often multiple.

Others Calculi

Other rare types such as due to inherited abnormality of enzymes metabolism and due to drugs, such as guaifenesin, triamterene, atazanavir, and sulfa drugs induce these stones. This accounts for about 1% of all stone types. People who take the protease inhibitor indinavir sulphate, a drug used to treat HIV infection, are at risk of developing kidney stones.

Risk Factors

The risk factors can be categorized as dietary, nondietary and urinary.^[14]

- **Dietary factors:** Dietary factors associated with increased risk include animal protein, oxalate, sodium, sucrose and fructose. Dietary factors associated with lower risk include calcium, potassium and phytate.
- **Non-Dietary factors:** Age, race, body size and environment.

- **Urinary factors:** Low urinary volume, higher urine calcium, higher urine oxalate, lower urine citrate excretion, higher urine uric acid, urine pH.
- **Genetic factors:** The risk of renal stone is more than twofold greater in individuals with a family history of stone.

Diagnosis

The diagnosis of renal calculi made on the basis of the history that includes past or family history of calculi, duration and evaluation of symptoms. The physical examination is often more valuable for ruling out non-urolologic disease and urinalysis should be performed. Imaging technique plays a critical role in the initial diagnosis, follow-up, and urological management of urolithiasis that includes plain radiography of the kidneys, ureters, and bladder, intravenous pyelogram (IVP), ultrasound (US), magnetic resonance urography (MRU), and computed tomography (CT), each with its advantages and limitations. Until recently, IVP was considered the gold standard for diagnosing renal calculi, but this modality has largely been replaced by non-contrast CT (NCCT) due to its high sensitivity and specificity of 99% and the ease of performing the study. In addition, it can show indirect or secondary signs of obstruction such as periureteral fluid collection, perihepatic fat stranding, or hydronephrosis. Also, Helical CT is preferable because it is highly sensitive, allows visualization of uric acid stones. It also detects stones as small as 1mm that may be missed by other imaging modalities.

Management of Ashmari

Different types of *Chikitsa* are mentioned in ancient science. A newly formed *Ashmari* can be treated with medicines while chronic or big *Ashmari* can be removed by surgical procedure.

- 1) **Aushadha Chikitsa:** *Ashmari* has been mentioned as fatal and grave disorder. It is mandatory to diagnose and treat the disease at an early stage. Following drugs should be used for the treatment purpose.
 - In *Vataja Ashmari Pashanbheda*, *Shatavari*, *Gokshura*, *Kantakari* etc drugs should be used in form of *Kshara*, *Yavagu*, *Kwatha*, milk, food etc.
 - In *Pittaja Ashmari Shaalimoola*, *Gokshura*, *Shyonaka*, *Punarnava*, *Shirisha*, *Pashanbheda*, *Evaru* (cucumber), *Vidaari-varahkanda*.
 - In *Kaphaja Ashmari Varunadi Gana*, *Gugglu*, *Ela*, *Devdaru*, *Haridra*, *Maricha*, *Chitraka* etc used in the form of *Kshara*, *Kshira*, *Yavagu*, *Kwatha*.
- 2) **Basti Chikitsa:** *Acharya Sushruta* mentioned *Uttarbasti* in the management of bladder stone.
- 3) **Kshara Chikitsa:** Preparing *Kshara* from the drugs *Pashanbheda*, *Shatavari*, *Punarnava*, *Shirisha* etc.

This *Kshara* destroys calculi, abdominal swelling and urinary gravel.

4) **Shashtra Chikitsa:** Surgery has to be the ultimate treatment because even with expert surgeons' success is uncertain. It should be carried out by the well-meaning persons after taking the consent of the authorities.

DISCUSSION

Acharya Sushruta considered *Ashmari* as a grave disease (*Astamahagada*). In modern science, it can be correlated with renal stone. The most common presenting symptom of a stone is pain. In *Vataja Ashmari* pain caused by small, moving calculi that causes periodic colicky pain (renal pain) and is similar to calcium oxalate stones. *Pittaja Ashmari* is similar to hyper concentration of fluids linked with inflammation and haematuria and is similar to uric acid stones. The stone can be compared to *Kaphaja Ashmari* because of its dull agony and big size. It is similar to phosphate calculi. The *Samanya Lakshana* are *Nabhi Basti Mehana Vedana, Visheernadhara mutra, Tatsankshobhat sa ashram, Mutradhara Sanga and Sasiktam Mutram Visrijati* etc. In ancient times, *Ashmari* was diagnosed only on the basis of the *Lakshanas* but in present era it's tough to make a diagnosis based just on clinical findings. In the current practice, the diagnosis is based only on imaging techniques such as radiography, CT scan, ultrasound etc which has enhanced the diagnostic capability of the disease.

CONCLUSION

Ashmari is one of the most common diseases of *Mutravaha Srotas* (urinary system) which occur due to improper functioning of the filtration in the kidney gets formation of crystals such as calcium, oxalate, uric acid etc. Due to food and life style variations, it has become a global problem varying its incidence as per geographical distribution, sex and age group. It is one of the most common and painful diseases of urinary system. On the basis of symptoms *Ashmari* and urolithiasis are apparent quite similar, however the pathogenesis explained in *Ayurveda* and modern medicine differs because of different ideological differences.

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