



View of Ayurveda on Pathophysiology of Nephrolithiasis Vis-à-vis Mootrashmari – A review Article

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ABSTRACT

Nephrolithiasis or calculi formation in kidneys, is a common problem worldwide with prevalence of 7% in the adults, and $\geq 30\%$ recurrence rate within 10years. The incidence of Nephrolithiasis is globally increasing with an estimated prevalence ranging up to 15%. During lifetime, approximately 7% of women and 13% of men will develop a kidney stone¹. Ayurveda explains *Mootrashmari*(Kidney stones), *Mootraghata*(Kidney failure), *Prameha* (Diabetes), *Shukradosha*(Disorders of semen), *Mootradosha* (Urinary disorders) are commonest disorders occurring in basti(Urinary system)². *Mootrashmari* is one of the *Ashtamahagadha* and regards as *Antaka pratima*(which is as severe as death)³. Scattered explanation of pathophysiology of Nephrolithiasis (*Mootrashmari*) is available in different Ayurveda texts. Collection, Critical understanding and interpreting these scattered information is essential treasure for present day Ayurveda practice.

KEY WORDS: Nephrolithiasis, Mootrashmari, Pathophysiology, Review article.

INTRODUCTION

Nephrolithiasis or calculi formation in kidneys, is a common problem worldwide, with prevalence of 7% in the adults, and $\geq 30\%$ recurrence rate within 10years. The incidence of Nephrolithiasis is globally increasing with an estimated prevalence ranging up to 15%. During lifetime, approximately 7% of women and 13% of men will develop a kidney stone¹. Ayurveda explains *Mootrashmari*(Kidney stones), *Mootraghata*(Kidney failure), *Prameha* (Diabetes), *Shukradosha*(Disorders of semen), *Mootradosha* (Urinary disorders) are

commonest disorders occurring in *basti* (Urinary system)². *Mootrashmari* is one of the *Ashtamahagadha* and regards as *Antaka pratima* (which is as severe as death)³. Pathology is the medical discipline that describes conditions typically observed during a disease state, whereas physiology is the biological discipline that describes mechanisms operating within the diseases process. *Samprati* of the disease (Pathophysiology) is one of the essential tool to treat a disease. Scattered explanation of pathophysiology of Nephrolithiasis (*Mootrashmari*) is available in different Ayurveda texts. Collection, Critical understanding and interpreting these scattered information is essential treasure for present day Ayurveda practice.

OBJECTIVES: 1. Collection and to provide a critical evaluation of Ayurveda literature review on Nephrolithiasis Vis –a- vis *Mootrashmari*.

2. Review and to provide a critical evaluation of different Ayurveda research articles related to Nephrolithiasis Vis –a- vis *Mootrashmari* conceptual studies.

MATERIALS AND METHODS:

An effort was made to collect & interpret various references pertaining to Pathophysiology of Nephrolithiasis Vis –a- vis *Mootrashmari* across relevant Ayurveda texts and articles.

Urinary system in Ayurveda:

Basti is identified as one among *Dashpranayatana* (ten resorts of life) and *Trimarma* (three vital parts)⁴. The main sites of *mootravaha srotasa* (Urinary channel) are 2 *basti* and *medra* (Genitals)⁵. This can be interpret as starting from collecting part to ending with evacuating part of urinary system. The word *basti* in this context is not only urinary bladder can also be referring to both kidneys. In case of *basti* description, whole anatomical and physiological aspects of urinary system are also included. Following points are supporting for *basti*, as kidneys. In *basti* description it is said that “*ek dwara tanu twak*”⁶ (one opening and thin skin)- bladder has only 3 openings- 2 of ureters and one of urethra, so discretion is not referring urinary bladder, it refers to kidney having only one opening of ureter. Next explanation is “*Adhomukha Alaabvaa eva rupen*”⁷- it resembles reversed fruit including a stem i.e. kidney with ureter. “*Sira snayu parigraha*”⁸-refers to high vascularity of kidney by renal artery and vein. “*Bastih Bastishirah cha eva paurusham vrushana gudam ekasambandhino dyote*”⁹-refers to other parts of urinary system they are *basti* –Kidneys, *bastishira*- ureters, *paurusham-Medhra*, *vrushanam*- testis and *gudam*- rectum are interconnected. “*Mutrashaya malaadharah*”¹⁰- refers to a single nephron within the kidney. “*Sukshmatwaat na upalabhyante mukhanyaasaam sahastrashah*”¹¹- refers to more than thousand minute structures and their openings opens into *basti*. These channels are not visible due to minuteness can referred as nephrons. Thus based on the entire available references one can conclude that *basti* is not only urinary bladder but it also both kidneys.

Pathophysiology of Nephrolithiasis in Ayurveda:

When the *nidana*(causative factor) alter the physiology into pathology, it leads to disease. Identification of *nidana* in the disease in an individual carries prime importance due its role in diagnosis and treatment. Those who neglect the *Samshodhana*(Purification therapy) of internal channels/*asamshodhana sheelasya* and those who are engaged in unwholesome dietary habits/*apathya sevana* become the victim of Mootrashmari¹². “*Pakwashaya gataah tatra naadyo mutravahaastu yaah*”¹³- here, *pakwashaya* refers large intestine from where fluid absorption occurs and enter into the kidneys through renal vessels. “*Jaagrutah swapatah cha eva*”¹⁴- this process is continuous day and night 24 hours. “*Nihsyandena*”¹⁵- refers to glomerular filtration, tubular secretion, and reabsorption processes of nephrons, involved in urine formation. This urine is finally collected in “*ghata*”¹⁶-means pot- refers to minor and major calyces in to pyramid and sent to *bastishira*(ureters) and then finally in the bladder. In the same way “*Aamukhaatsalile nyastaha parsvebhyaha puryate navaha*”¹⁷ – Just as a fresh earthen pot kept immersed in water up to mouth get filled with water through its sides, in the same way bladder also gets filled with urine. Urine enters in to the *basti* in the same way *vata*, *pitta*, *kapha* lodge in the *basti* by the process of *upasnehana*(osmosis). This process of *upasnehana* is facilitated by *sampeeda kledana*. After entering *basti* these *dosha* collectively result in the formation of Mootraashmari¹⁸.

This process is explained and cleared by giving following examples- As the crystal clear water, when stored in a new earthen vessel, after some time mud appears at the bottom of the vessel. Such is the case with *Mootraashmari* also. When urine stays in the bladder for some time, the stone formation is initiated. Another example is given in the process of formation of hailstones. As the hailstones are formed by the action of air & fire of lightning in the sky. Hail is the prime warm season species of frozen precipitation, born of severe thunderstorms¹⁹. The process exactly simulates with the formation of the stone. Others opines that *kapha* situated in *basti* is consolidated by *ushna* or *pitta* associated with *vata* in the same way as the *jalamsha* of the environment is dried away by heat and air resulting in formation of hailstone²⁰.The pathophysiology is supported mainly by *kapha*, is explained with the similes of formation of pebbles in *gorochana* and sedimentation of salt even by the clean water, which remain stagnant for longer period²¹. The process of *ashmari* formation is explained as-In *basti* the *mootra*, *pitta*, *pavana*, *kapha* or *shukra* dries up (*shoshana*) leading to the formation of the *Mootrashmari* similar to the bile hardening in the gallbladder of the cow to form the ‘*gorochana*’²²

All the three *dosha* are the causative factors of *ashmari*. Like *ruksha*, *khara guna* of *vata dosha* dries up the *mootra*, *teekshna*, *ushna guna* of *pitta dosha* hardens the *mootra* and because of *sthira*, *picchila guna* of *kapha dosha* it gets consolidated by *vata* and *pitta*. *Kapha* and *vata dosha* are the predominant *dosha* in all types of *ashmari* and is the *ashraya dosha*.

Review of published articles:

Article No-1²³: Conceptual Review on Etiopathogenesis and Management of Urolithiasis in Ayurveda with Proven Clinical Trials

Monika¹, Kuldeep R. Choudhary², International Journal of Health Sciences And Research

ISSN: 2249-9571, Vol.6; Issue: 10; October 2016.

This article opines *Kapha Dosha* is vitiated (by indulging in unhealthy diet and lifestyle; non purification of the body) and reaches urinary system; with the help of Vata - Pitta dosha, Kapha reaches and stays in Vasti (urinary bladder) and forms Ashmari.

Article No-2²⁴: Ayurveda Perspective On Mootrashmari And its Management: An Literature Based Review

Dr. diwakar patel¹, Dr. deepak kulshrestha², Journal of Drug Delivery and Therapeutics

ISSN: 2250-1177, 2018; 8(5):77-80

According to this article *Ashmari* involve development of a calculus as a foreign body inside the urinary system; kidney, ureter and bladder. It is believed that dries up of urine by *Vayu* the *Asmari* leads calculus development in urinary system another aspect of formation of calculus believe that lack of cleansing procedures and indiscrete dietary habits leads aggravation of *sleshma* which enters into urinary bladder after mixed with urine and produces calculi. Drying of *kapha dosha* by *vata* and *pitta dosha* also initiate pathogenesis of disease.

Article No-3²⁵: An Ayurveda Approach To Renal Stone.

Verma Astha¹, Mishra Ratnaprava², International Ayurvedic Medical Journal,

ISSN: 2320 5091 , Volume 3, Issue 2, December, 2018 – January, 2019.

According to *Susruta*, people who do not take proper cleansing procedure (*asamshodhana*) and are indiscrete regarding their dietary habit (*apathya karina*) gets their *Shlesma Dosha* aggravated, then mixed with urine and enters the *Vasti* (urinary bladder) to produce calculi. *Charaka* described the *Ashmari* in the chapter of *Mutrakrichra*. He explains excessive physical exercise, strong and irritant medication (*tikshna - ausadhi*), riding on fast moving horses or vehicles, drinking of dry wine in excess, ingestion of flesh of wet land, fishes and other food staffs, eating before the digestion of previous meal (*adhyasana*) are the basic causes of eight varieties of *Mutrakrichra* and ultimately *Ashmari*. In *Madhava Nidana Kapha* is described as the basic *Dosha* for *Ashmari*. He also says *Ashmari* gets formed when *Vata* dries up the semen, urine, *Pitta* or *Kapha*, stored in the urinary bladder just as bile gets solidified in the cow and all types of *Ashmari* is are caused by the combination of all the three *Doshas*. *Kashyapa* described the etiology of *Mutrakrichra* and *Ashmari* as

carrying heavy loads on the loins (*kati*), shoulders (*skandha*) by which Pitta is vitiated then in combination with *Kapha* and *Vayu* enters the *Vasti* affecting the same. *Kashyapa* emphasised more on Pitta than *Kapha* and *Vata*. According *Susruta Samhita* – i) *Shleshma* is essential; it is the seat (*adhithana*) for *Ashmari*. ii) Children are more affected. iii) Subject not observing cleansing procedure. iv) *Apathyakarina* i.e. indiscriminate dietary habit. According *Charaka Samhita* – *Vata Dosha* is important as it dries up the other *Doshas* as well as the urine.

Article No-4²⁶: A Comprehensive Review on Urolithiasis an Ayurvedic Perspective.

Dr. Pradeep¹, Dr. Shripathi Acharya², Journal of Ayurveda and Integrated Medical Sciences ISSN: 2456-3110, July - Aug 2020, Vol. 5, Issue 4.

According to *Acharya Sushruta* -. In the persons who do not undergoes timely *Shodhana* procedures and use unwholesome diet, either *Tridosha* or *Kapha* gets aggravated and mixes with *Mutra*, enters into *Basti* and takes the shape of an *Ashmari*. *Acharya Sushruta*, *Charaka* and *Vagbhata* have the similar opinion and have explained the process of *Ashmari* formation by citing different examples as mentioned below, *Sushruta*'s view - As clear water kept in a new pitcher gets muddy in due course of time, similarly calculus is formed in *Basti*. *Acharya Sushruta* has given another example to explain the *Ashmari* formation. The way in which the air and electricity produced by thunders during rain freezes the water, similarly Pitta located in the bladder, in conjugation of *Vayu* consolidates *Kapha* to form *Ashmari*. *Charaka*'s view - Illustrates the process of formation of *Ashmari* with the example of *Gorochana*. He says that *Mutra* is converted into *Ashmari* when the *Dosayukta Mutra* or *Shukrayukta Mutra* enters into *Basti*, where they are dried up by the action of *Vayu* and *Pitta*. *Vagbhata*'s View - has described *Ashmari* formation same as *Acharya Charaka*.

Discussion:

After reviewing *Ayurveda samhita* anatomical location of calculi may be formed any part of urinary system. The word *basti* explained in the context of urinary stones formation, that is not only urinary bladder, *basti* can be consider as both kidneys and even whole urinary system. Most of the authors mentioned causative factors for formation are *asamshodhana sheelasya*/ those who neglect the purification therapy of internal channels and *apathya sevana* / those who are engaged in unwholesome dietary habits. But article -2 opines that *asamshodhana sheelasya* as lack of cleansing procedures. Unwholesome dietary habits also proven as an increased urinary concentration of stones constituents, such that it exceeds their solubility in urine (Super saturation). Most of the Authors believes *Shlesma Dosha* initially get aggravated and its necessary for the formation of *ashmari*. Later *kapha* mixed with urine and enters the *Vasti* (urinary bladder) to produce calculi. But *Acharya Kashyapa* emphasized more on Pitta than *Kapha* and *Vata* during the formation of *Ashmari*. By *Acharya Charaka*, *Vata Dosha* is important as it dries up the other *Doshas* as well as the urine by article-3. So by above references can be interpret like- formation of *mootraashmari tridosha* are necessarily important. Silent stones are because of *kapha dosha*, aggravated symptoms by *pitta dosha* and pain and complications

are by *vata dosha*. These features may be consider as progressive stage of any variety of stones. *Ashmari* can be considered as a foreign body inside the urinary system by article-1. *Mootraashmi* can be taken as the variety of *mootrakrichra* and *nidasas* of *mootrakrichra* also holds good for *ashmari*. Examples given by *Acharyas* for formation of stones are easily understandable and can be correlate as super saturation in the pathophysiology of nephrolithiasis.

Conclusion:

Reviewing scattered Ayurveda references of Nephrolithiasis Vis –a- vis *Mootrashmari* is essential treasure for present day Ayurveda practice. The word *Basti* in the context of *mootrashmari* can be consider as both kidneys and even whole urinary system. For the formation of *mootraashmari tridosha* are necessarily important. Silent stones are because of *kapha dosha*, aggravated symptoms by *pitta dosha* and pain and complications are by *vata dosha*. These features may be consider as progressive stage of any variety of stones. *Mootraashmari* can be considered as a foreign body inside the urinary system. Identification of pathophysiology in the Nephrolithiasis Vis –a- vis *Mootrashmari* is an individual carries prime importance due its role in further diagnosis and treatment.

References:

1. AdityaS.Pawar , Department of Internal medicine, Devision of Nephrology and Hypertension myoclonic, Rochester , MN, USA
<https://www.urologyannals.com/article.asp?issn=0974,7796;year=2018;volume=10;issue=1;spage=87;epage=93>;
2. Acharaya Sushrutha, Sushrutha samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 280.
3. Acharaya Sushrutha, Sushrutha samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 435.
4. Acharya Agnivesha. *Charaka Samhita*, elaborated by Charaka & Dridabala with Ayurveda Deepika commentary by Chakrapani Datta, Vaidya Jadavaji Trikamaji Acharya ed., 2009,Pp.738,Pg no.599.
5. Acharaya Sushrutha, Sushrutha samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
6. Acharaya Sushrutha, Sushrutha samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 468.
7. Acharaya Sushrutha, Sushrutha samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 468.

8. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 468.
9. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 468.
10. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 468.
11. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
12. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 277.
13. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
14. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
15. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
16. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
17. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 276.
18. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 280.
19. Acharaya Sushruta, Sushruta samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 280.
20. Vagbhata, Ashtangahrudayam sarvanga sundari commentary, edited by Shivaprasad Sharma, Chaukhambha Sanskrit series office, Varanasi,2008.pp.965.P.498.
21. Vriddha Vagbhata, Astanga Sangraha. Indu commentary.edited by Shivaprasad Sharma.Chaukhambha Sanskrit series office.Varanasi,2008.pp.965.P.387.
22. Acharya Agnivesha. *Charaka Samhita*, elaborated by Charaka & Dridabala with Ayurveda Deepika commentary by Chakrapani Datta, Vaidya Jadavaji Trikamaji Acharya ed., 2009,Pp.738,Pg no.599.
23. Monika¹. Kuldeep R. Choudhary². Conceptual Review on Etiopathogenesis and Management of Urolithiasis in Ayurveda with Proven Clinical Trials . International Journal of Health Sciences and Research. ISSN: 2249-9571. Vol.6; Issue: 10; October 2016.
24. Dr. Diwakar patel¹. Dr. Deepak kulshrestha². Ayurveda Perspective On Mootrashmari And its Management: An Literature Based Review. Journal of Drug Delivery and Therapeutics. ISSN: 2250-1177. 2018; 8(5):77-80.

25. Verma Astha¹, Mishra Ratnaprava². An Ayurveda Approach To Renal Stone. International Ayurvedic Medical Journal. ISSN: 2320 5091. Volume 3. Issue 2. December. 2018 – January. 2019.
26. Dr. Pradeep¹, Dr. Shripathi Acharya². A Comprehensive Review on Urolithiasis an Ayurvedic Perspective. Journal of Ayurveda and Integrated Medical Sciences. ISSN: 2456-3110. July - Aug 2020. Vol. 5. Issue 4.

