

**REVIEW OF CLINICAL AND DIAGNOSTIC CRITERIA OF MUTRAASHMARI
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Article Received on 21/09/2020

Article Revised on 11/10/2020

Article Accepted on 01/11/2020

ABSTRACT

From the study of ancient surgical text Sushruta samhita, it becomes evident that the urological problems form an important part of medical sciences. Among all the urinary problems described in Ayurvedic texts, there is one variety where both the medicinal and the surgical treatments are advised and agreed upon by all the Acharyas and this entity is the Mutrashmari. The important factor i.e. the diagnostic part in case of a stone, the advice given by ancient Acharyas seems to be true even at present who were of the idea that before going for the treatment sure shot diagnosis is important both for the physician and the patient. The physician should first diagnose the disease and then should decide the line of treatment. Failure in the diagnosis will result into the failure of the treatment.

KEYWORDS: Sushruta samhita, Mutrashmari.**INTRODUCTION**

This part of the disease is more important when the subject is looked at from the complication view point i.e. from simple pain to serious infection to obstructed uropathy as well as complete renal failure. Hence so far as the diagnostic criteria are concerned we do find different types of clinical criteria to diagnose a case of Mutrashmari and similar must have been the case with the physician during the Hippocrates era. Since ancient times mainly the diagnostic methodology has two counter parts:-

1. Examination of the patient
2. Examination of the disease

For the diagnose of a disease 'Nidan Panchaka' is the specific method, where as Darshana, sparshana and Prashana are used for the examination of the patient. Ancient Acharya's were perfect in diagnosing a disease like Mutrashmari with their perfection in 'Nadi Pariksha' or with the help of Mutra Pariksha. But this art and perfection has lost now-a-days in the present physicians. Simultaneously for the last two to three centuries tremendous progress has been made so far as the diagnostic equipments are concerned. Till the last two to three decades 'Rountgenology' as well as 'Scanning' was considered to be one of the best diagnostic criteria, however it has now been experienced that both the plain x-ray as well as intravenous pyelography are not considered as a full proof diagnostic methodologies in cases of urinary calculi, like cystine and uric acid stones which are least opaque as well as radiolucent. All these

lacunae or short comings have compelled the scientists to know a new technique for all such problems related to many other branches of medical sciences and which has resulted into invention of U.S.G. However all these are to be supplemented / supported many a times by the clinical observations.

Sushruta the famous Indian surgeon has practiced extensive operative surgery on all the systems of the body. The proof of which can be understood in the words of Hirschberg "The Indians knew and practiced the ingenious operations which always remain unknown to the Greeks and which we the Europeans learn only from them with surprise". This all proves the highest glory of surgery in ancient India.

Now coming to the disease part i.e. Mutrashmari-Urolithiasis the older bladder stone so far discovered was obtained from a boy about 16 yrs. old buried at "ELAMARAH" in Upper Egypt and dates about 4800 B.C. It proves that humans of ancient time were undoubtedly affected with the disease stone just as humans are now.

However urinary calculogenesis is not a singular, simple or direct process but the result of multiple, complex and interrelated process. Many theories have been put forth in relation to urinary stone formation like supersaturated solution, hyperparathyroidism, vit. A deficiency etc. However the exact cause and the mechanism of stone formation is still obscure.

According to Ayurved Srotovaigunya resulting from Dushit Kapha localised in Basti in conjunction with Pradushit Vata and Pitta is responsible for the formation/cause of Ashmari. Initially vitiation of dosha occurs in the Mutravaha Sansthan, may be catalysed by the presence of an incipient lesion and ultimately be held responsible in the pathogenesis of Mutrashmari. An alarming rise in the incidence of urolithiasis coupled with a motivation provided by W.H.O. to explore the possibility of discovering cure on traditional line has created an impetus for further research in the light of Ayurvedic knowledge.

Further more renal calculus occurs in both the sexes at all the ages but commonly in the 3rd and 4th decades, stone in kidney or in ureter is probably little more frequent in men than women. Hence

“Ayurvedic as well Modern Diagnostic approaches for the proper management of mutraashmari”

Literary Review

Ayurveda the science of life and an upanga of Atharvaveda has described many diseases related to Basti. The learned Ayurvedic Acharyas have described in detail about various bodily systems in relation to their Anatomy, Physiology and Pathology etc. The Mutravaha Samsthana (Urinary system) is one of them, and meant for the formation and excretion of Mutra. They have

described the Anatomy and Physiology of urinary organs with embryology and etymology etc. The following is the short description of Mutravaha Samsthana given in ancient classics:-

1. Basti
2. Vrikka
3. Gavini
4. Mutrapraseka
5. Mutravaha Srotansi
6. Mutravaha Nadies
7. Mutravaha Dhamanis
8. Mutravaha Sira

Mutranirmana Prakriya

मूत्राशयोमलाधारः प्राणायतनमुत्तमम् ॥२०॥

पक्वाशयगतास्तत्रनाड्योमूत्रवहास्तुयाः।

तर्पयन्ति सदा मूत्रं सरितः सागरं यथा ॥२१॥

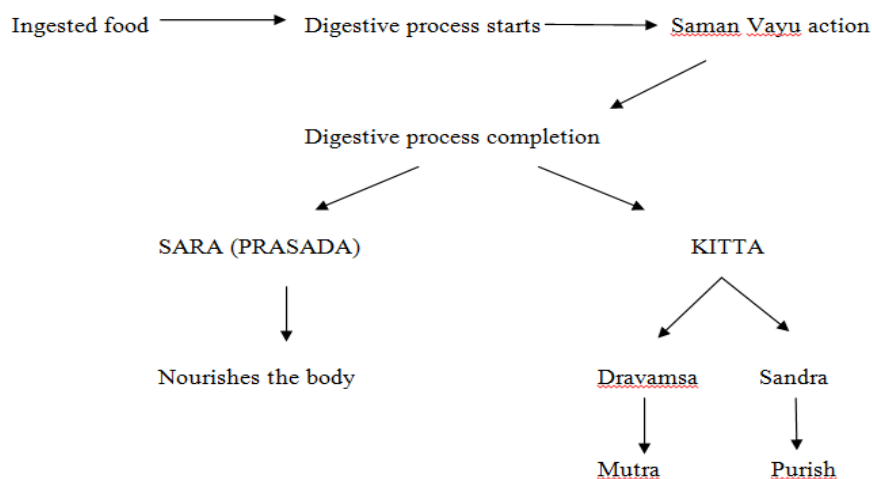
सूक्ष्मत्वान्नोपलभ्यन्ते मुखान्यासांसहस्रशः।

नाडीभिरुपनीतस्य मूत्रस्यामाशयान्तरात् ॥२२॥

जाग्रतः स्वपतश्चैव सनिः स्यन्देन पूर्यते।

आमुखात्सलिलेन्यस्तः पार्श्वेभ्यः पूर्यते नवः ॥२३॥

घटो यथा तथा विद्धि बस्तिर्मूत्रेण पूर्यते ॥२४॥ Su.Ni- 3/21-22-23



Now according to Sushruta this Mutra goes into the Basti from the several minute pores, as a new pitcher gets filled up with water from the minute pores, when it is kept in water upto its mouth. (Su. Ni. 3/23)

Mutrashmari is one of the most common and distressing maladies among the group of urinary disorders. Acharya sushruta, the pioneer in the art and science of surgery has described widely and comprehensively about the Mutrashmari with its classification, symptomatology, etiology, pathology, complications and its management.

Etymology

"Ashmanam Rati Dadati iti Ashmari" means the formation and presentation of a substance like stone.

- "Ashma" means "stone"

- "Rati" means "to present"

Definition

No satisfactory definition of the Ashmari is available in either of the Ayurvedic texts, still it can be defined as below :-

1. "Ashmari Mutra Krichhra Syat " (Amarakosha)
2. "Ashmari Mutra Krichhrabheda" (Ayu. Shabdhakosha)
3. Ashmari - Stone, gravel, strangury (M. William)

Synonyms

- * Sanskrit -Ashmari, Ashmarih
- * Hindi – Pathari
- * English - Stone, Gravel, Calculus, Vesical - Calculi.
- * Latin -Calculus (singular) Calculi (Pleura)

Description of Disease W.S.R. to Nidana – Panchaka**a) Nidana**

According to Sushruta, those who neglect the Samshodhana of internal channels and those who are engaged in unwholesome dietary habits become the victim of Ashmari. Acharya Charaka has not given separate chapter for the disease but explained it under the "Mutrakricchra". Hence the nidanas of both Mutrakricchra & Ashmari can be taken as same. They are:-

- * Practice of excessive exercise
- * Strong medicines
- * Ruksha Madyapana
- * Excessive intake of anupa - mamsa
- * Adhyashana
- * Ajeerna-bhojana
- * Matsya sevana (Ch. Chi. 26/3)

According to Vagbhata, the Nidanas are

- * Intake of heavy, fatty & sweet food excessively.
- * Day sleep
- * Ajeerna-bhojana
- * Adhyashan

Samprapti

Samprapti can be defined as, it is the process which starts from 'Sanchayavastha' of Doshas to the 'Vyadhi Vayktavastha'. It is possible through Samprapti to assess the Doshas, Dushyas, Srotodusti or Khavaigunya, Agni etc. It is also helpful because proper treatment is only fruitful if it is applied according to Samprapti of disease. As said 'Samprapti Vighatanama eva Chikitsa'.

Sushruta's View

- Apathya
- Asamshodhan Sheela Shleshma Mixes with Mutra Dushti Urinary bladder Attains shape of gravel Ashmari (Su. Ni. 3/4 & 3/24)

Sushruta's examples for clear understanding of the mechanism of stone formation

- A new pitcher filled with clear water can also show settling down of muddy particles in due course of time. In the same way the calculi are formed in Basti. (Su. Ni. 3/25)
- As air & fire of electricity in the sky consolidate water (to form hail storms) similarly Pitta located in the bladder, along with Vayu consolidates Kapha to form calculi. (Su. Ni. 3/26)

d) Purvaroop and Roop both are clinically diagnosed criteria, described later

तासां [१] पूर्वरूपाणि- ज्वरो बस्तिपीडारोचकौ मूत्रकृच्छ्रं
बस्तिशिरोमुष्कशेफसां वेदना कृच्छ्रावसादो
बस्तगन्धित्वंमूत्रस्येति ॥१॥

यथास्ववेदनावर्णदुष्टसान्द्रमथाविलम्]

पूर्वरूपेऽश्मनः कृच्छ्रान्मूत्रं सृजति मानवः ॥६॥ Su.
Ni – 3/5-6

अथ जातासु नाभिबस्तिसेवनीमेहनेष्वन्यतमस्मिन् मेहतो
वेदना मूत्रधारसङ्गः सरुधिरमूत्रता

मूत्रविकिरणगोमेदकप्रकाशमत्याविलंससिकतविसृजति;

धावनलङ्घनप्लवनपृष्ठयानोष्णाध्वगमनैश्चास्य वेदना
भवन्ति ॥७॥ Su. Ni – 3/7

e) Upashaya – Anupashaya

The factors which relieve the signs and symptoms of disease are called Upashaya, while the factors which aggravate the disease are called Anupashaya. None of the Ayurvedic texts have mentioned about Upashaya - Anupashaya in relation to Mutrashmari. But main factor involved in Ashmari formation is Kapha Dosha. Hence, all the measures leading to control of Kapha are considered as Upashaya and those which vitiate Kapha are Anupashaya of Ashmari.

f) Classification of Ashmari

All the Acharyas except Charaka have classified the disease

Mutrashmari into four types. i.e.

- Shleshmaja Ashmari
- Pittaja Ashmari
- Vataja Ashmari
- Shukraja Ashmari

Acharya Charaka has considered Mutrashmari as a variety under Mutrakricchra and classified it into Mridu Ashmari and Kathina Ashmari on the basis of consistency. Shukraja, Pittaja and Kaphaja varieties are the Mridu where as Vataja Variety is Kathina.

Sadhyasadhya

In our classics Acharyas have described about 'Ashta Mahagadas' and these Mahagadas are not easy to treat and they are not having good prognosis. As Ashmari is mentioned as one of them, so it requires great attention for its cure. In children because of the smaller space occupying lesion and less fat in subcutaneous and perinephric region the prognosis is better. Similarly early detected Ashmari can be treated with medicines because of its recent origin and small size, while an Ashmari of long time origin is difficult to cure and large Ashmari is also an indication for surgical treatment. (Su. Chi. 7/3) Ashmari associated with complications and Arishta Lakshanas should be avoided

Upadrava

- * Pain in the pericardium
- * Weakness of lower limbs
- * Pain in the flanks and shivering
- * Thirst
- * Blackish discoloration of body
- * Dislike for food and indigestion
- * Pale appearance of the body etc. (Su. Ni. 3/15)

Chikitsa

Mainly two types of Chikitsa are described in our Shastras for every disease viz.

- i. Samanya Chikitsa (General Rx)**
- ii. Vishesha Chikitsa (Specific Rx)**

Here the Samanya Chikitsa is more of a supportive nature and does not cure the disease completely but gives a little relief, where as the Vishesha Chikitsa is advocated after knowing about the type of disease, Doshas involved, status of Dhatus etc. 'Nidana - Parivarjana' is the main method of keeping one self free from the disease. As Ashmari iskapha predominant diseases, hence the measures aggravating kapha are to be avoided and the treatment to control Kapha is to be followed. The below said is the treatment of choice in Ashmari viz.

1. Aushadhi - Chikitsa
2. Basti Karama - Chikitsa
3. Kshara - Chikitsa
4. Shastra - Chikitsa
5. Pathya- Apathya

Pathya

Basti, Vamana, Virechana, Langhana, Avagaha sweda are useful in case of Mutrashmari.

Dietetic items advocated are Yava, Kulatha, Puranashali, Mudgha, Ginger, Yavakshara and all the Vatanashaka Ahara.

Medicines Advocated are

ssGokshura, Yavakshara, Varuna, Punarnava and Pashanabheda

Apathya

Ativyayam (Excessive exercise), suppression of micturition, ejaculation, incompatible constipation and heavy diets.

Dietetic items non advocated are

Shushka Ahara, Kapitha, Jamun, dry Dates, Kshaya Ras Sevana etc

Modern Review

The urinary system is one of the four excretory systems of the body, the other three being the bowels, the skin and the lungs. The following structures take part in its formation:-

1. The kidneys - the excretory organs.
2. The ureters- the ducts draining the kidneys.

3. The bladder- the urinary reservoir.
4. The urethra - the channel to the exterior

Ultrasonographic appearance of normal kidney

The position of kidney varies considerably in the patients. The renal dimensions on ultrasound are smaller than those noted by radiography because there is neither geometric magnification nor change in size from osmotic diuresis from contrast. The normal size depends on a no. of variables:- age, sex, body, habits and state of hydration.

length = 9-13cm.

Breadth = 5 cm.

Thickness = 2.5 cm.

To measure renal size, scanning must be done carefully to obtain the longest axis possible. Also the renal inclination (Angle of kidney with horizontal plane) must be taken into account.

It consists of renal cortex and renal medulla. The normal cortex generates low level echoes with density similar or little less than that of liver parenchyma. The normal medullary pyramids are hyperechoic and are usually 1.2 to 1.5 cm. thick. The corticomedullary differentiation is best demonstrated with high frequency transducer. The aureate vessels at the corticomedullary junction are recognized as discrete high level echoes, they serve as a marker for evaluation of cortical thickness. Renal columns of Bertin consists of cortical tissue extending between the adjacent pyramids

Urolithiasis

Lithiasis occurs in various forms and at various sites in the body. Most common sites are urinary tract and biliary tract. The oldest bladder stone obtained from a 16 yrs. old boy was very irregular in shape, approx. 1.5 cm. in its longest diameter and analysis showed it to be a compound of calcium and phosphate, with small amount of calcium oxalate

Hippocrates the father of modern medicine described the clinical features and management of stone in 460-370 B.C. and had done a study on heredity, race, climate, diet, drinking water and faulty metabolism.

- It is defined as an abnormal concretion (hardened mass) occurring within the animal body and usually composed of mineral salts.
- In Latin it is known as "PEBBLE"

Few countries and localities which are more prone to these calculi and those are called "STONE AREAS". The factors responsible for them are diet, water, climate and geographic conditions.

In India two belts of high index have been observed

- One starts from Amritsar in the north and extends to area in north west including Delhi, Agra and ends up in U.P.

- Second starts from the west coast at Jamnagar and extends inward to central India upto Jabalpur.
- Saurashtra region of Gujarat is very common for urolithiasis

Brief description of responsible factors

a) Vit A. Deficiency

It causes desquamation (shedding of material from a surface) of epithelium, which acts as focus / nucleus for stone formation.

b) Excessive administration of Vit. D

It may lead to calculi formation due to calcification with in kidney substance and the condition is Nephrocalcinosis.

c) Diet

Diet rich in purines (Red meat, fish) oxalates (tea, strawberries), Calcium (Milk, ice cream) leads to uric acid, oxalate and Calcium stones respectively.

i. Volume of water intake

Less volume intake leads to urine concentration and urine becomes acidic, which is the good media for stone formation.

ii. Hard water and mineral content of water

Hard water contains calcium sulphate and absence of Zinc in water is fit before hand to calcium crystallization, so both the condition may lead to stone formation

d) Infection

Favours stone formation particularly urea splitting organisms like staphylococcus, streptococcus and proteus. They split urea in the urine into ammonia and CO₂ and leading to an alkaline urine in which phosphatic calculi are prone to form.

e) Any foreign body

In the bladder e.g. a piece of catheter, unabsorbable suture after hysterectomy or self introduced material hairpins etc. may become coated with phosphate and form the calculus.

Pathogenesis

Various theories have been put forward regarding its pathogenesis, but it is still complex and ill understood.

- Crystalloids e.g., uric acid, urea, sodium, potassium, ammonium-magnesium phosphate, calcium carbonate, cystine etc.
- Mucin and chondroitin, sulphuric acid, urochrome are usually classified as colloid but it behaves like a crystalloid. The calculus consists of a nucleus of organic material and urinary salts are deposited in layers around it, bound together by an organic colloid matrix. These crystalloids are present in the urine as shape less granules or crystals. So many theories have been adopted but none has been able to define the exact cause of stone formation in every patient.

Following are the main groups of the theories :-

- These theories define that in stone formation, firstly the nucleus takes place either within the cells of the renal papillae or the renal lymphatic system. This nucleus when comes to renal pelvis, provides a nidus for stone formation.
- Under these theories the process of stone formation takes in four stages vide infra
 - Nucleation phase, during which crystal embryos are formed in the urinary tract.
 - The stage in which the initially formed embryos rapidly grow and aggregate to form larger particles.
 - The retention of one of these secondary particles, which becomes large enough, is trapped at some narrow point in urinary tract.
 - This last stage is the stage of the growth of the trapped particle into a stone.

Formation of Renal calculi

According to Randall, minute concretions firstly form in the tubules of the kidneys at the tip of pyramid and extend to the pelvis, where further increase in the size takes place. Here occasionally multiple stones form but usually the stones grow by further deposit and form the shape accordingly. A small stone often passes along the ureter to the bladder, producing the renal colic, associated with haematuria. When arrested or impacted, it causes hydronephrosis. When the obstruction is intermittent, the hydronephrosis may acquire a large size. The stone may be arrested at the narrow part of ureter i.e. the upper end, the middle part and the lower end, where there are natural anatomical constrictions.

Sites of different stones in urinary tract.

- Primary
- Secondary
 - Small stones
 - Large stones
 - Oxalate calculus
 - Phosphatic calculus
 - Uric acid and urate calculus
 - Cystine calculus
 - Rare calculus

Incidence of types of urinary stones in India

- Pure calcium oxalate
- Mixed calcium oxalate
- phosphate
- Pure calcium Phosphate
- Magnesium Ammonium
- Phosphate
- Uric acid
- Cystine
- Other

Ureteric Calculi

The patient suffering from ureteric colic may experience several episodes or may have a single attack of colic followed by the expulsion of the stone. The first pain is usually severe and occurs in the flanks. Later pain is felt

in the region of umbilicus and may follow the course of ureter or may refer to the genitalia. Pain varies according to the location of stone i.e. if stone is in mid ureter, the pain tends to radiate to the lateral flanks and abdominal area.

If stone is near to bladder the patient may experience frequency, urgency and strangury. The pain of ureteric colic may refer to perineum, bladder, penis or testicles. Inflammatory changes at the site of impaction of stone may cause more pain. Ureteric stone patients may feel pain in the thigh, hip or knee. At the time of injury haematuria may take place

Vesical calculi

The typical symptoms are intermittent and painful voiding with terminal haematuria. Patient may feel dull or sharp lower abdomen pain, which increases by sudden movements and exercises, may result from the movement of stone. Patient may get relief in lying down position. When the bladder becomes empty at the end of micturition, severe pain with terminal haematuria may occur. Sometimes pain may refer to hip, even the heel and sole of foot. Besides pain at the end of micturition there may be an interruption of the urinary stream from the impaction of stone or due to spasm of the sphincter. Frequency, dysuria and urgency may also be there.

Urethral calculi

In urethral calculus, patient experiences a stoppage and is unable to empty the bladder while urination. Dribbling, sudden urethral pain, sudden stoppage of stream and few drops of blood stain urine flow occurs during micturition. In case of presence of stone in the posterior urethra, patient feels pain in the perineum or the rectum, or if it is in the anterior urethra, the pain localises at the site of impaction and may be expelled with increased effort and straining to void.

A symptomless stone may sometimes be present in a diverticulum of the urethra. Urethral discharge may be observed as the result of infection in the diverticulum. In female having infection of lower urinary tract and calculus in urethral diverticulum shows symptoms like frequency, dysuria, nocturia, pyuria and haematuria. Pain during coitus is a prominent symptom, occasional pus discharge occurs which gives temporarily relief to the patient

Aims and objects

1. To diagnose the disease i.e. urinary stones with the help of:- Clinical sign and symptoms both Ayurveda as well as modern
2. Laboratory test
3. Radiological and imaging techniques i.e. Plain x-ray (abd.), I.V.U. and ultrasonography (K.U.B. region).

MATERIAL AND METHODS

The disease Mutrashmari has always proved to be a problematic ailment. This condition has been very elaborately described in ancient texts, which is quite evident from detailed description of the disease along with its classifications, symptomatology, complications and management. Urology has now become a separate speciality in modern science. Diagnosis in urological disorders had been difficult and were lacking in accuracy.

This sample basically shows the different diagnostic approach of Mutraashmari. The factors like- dietary history and life styles which play major role in precipitating any of the disease. Review of Ayurvedic and modern literature to find out the role of diagnosis tools to perform clear-cut judgment regarding mutraashmari. It was done by minute observation of OPD/IPD Patients, and with the help of previous work done, journals, books, classical texts, websites etc in the P.G. Deptt. Of Roga nidhan, Govt. Ayurveda P.G. College and Hospital, Varanasi.

OBSERVATION AND RESULT

Diagnostical tools

1) Purvarupa

Different classics have mentioned about the prodromal signs and symptoms of Ashmari viz.

1. Basti Pida
2. Aruchi
3. Mutrakricchra
4. Bastisirovedana
5. Mushka Vedana
6. Shepha Vedana
7. Jwara
8. Avasada
9. Bastigandhatwa
10. Sandra Mutra
11. Avila Mutra
12. Basti adhm

Rupa

Different texts have mentioned the Rupas of Ashmari as shown

1. Nabhi Vedana
2. Basti Vedana
3. Sevani Vedana
4. Mehana Vedana
5. Mutra Dhara Sanga
6. Mutra Vikirana
7. Gomeda Prakasha
8. Atyavilam
9. Sasiktam
10. Dhavan, Plavan
11. Vishirna Dhara
12. Sarudhira Mutra
13. Mrudanti Medhra
14. Makusakaran Munchati Mehana
15. Mutrarodha
16. Atimutratram

17. Pratata roditi
18. Kas

Laxana of different Ashmari

1. Shleshmaja

* Heavy & cold sensation in bladder area Cutting, incising, pricking pain. (Su. Ni. 3/8)

2. Pittaja

* Burning hot sensation and inflammatory changes in urinary tract. (Su. Ni. 3/9)

3. Vataja

* Severe bladder pain, umbilical pain and pain in the anus

* Frequent passage of flatus

* Urethral burning

* Dysuria

* Difficulty in defecation. (Su. Ni. 3/10)

4. Shukraja

* Dysuria

* Scrotal swelling

* Lower abdominal pain

* Special characteristic feature is, it can be crushed into powder by pressure. (Su. Ni. 3/12)

Clinical Sign and Symptoms

Renal Calculi

i. Pain

ii. Fever

iii. Haematuria

iii. Pyuria

iv. The other symptoms

- Increased pulse rate at the time of pain
- Nausea and vomiting
- Profuse sweating
- Subnormal temperature

A case of urolithiasis can be diagnosed on the following lines

1. History taking

2. Routine Radiological examination (Plain x-ray K.U.B)

3. Special investigations

a. Intravenous urography

b. Retrograde pyelography

c. Cystoscopy

4. Ultrasonography

5. Computerized Tomography

6. Radio-isotop method

Laboratory tests

1. Urine analysis:- Routine urine analysis is helpful in making the diagnosis of urinary calculus.

a) Colour

Normal urine - clear Presence of phosphates and bacteria - cloudy

b) Transparency

Normal urine - clear and transparent Amorphous phosphates - Form a white sediment in natural or alkaline urine. Presence of Blood :- Reddish brown

c) Haematuria

Causes

- a. Lesion of kidney :- Due to presence of kidney stones
- b. Lesions of lower urinary tract :-
- c. Infection of ureters or ureteric stones
- d. Cystitis or bladder stone
- e. Cells :- Presence or increased R.B.C. Pus cells
- f. Crystals :-

a) Uric acid:- Rosette (Crystals like of prism):* Presence is suggestive of kidney or bladder stones.

b) Calcium oxalate :- (Envelope shaped crystals): * Due to ingestion of cabbage, tomatoes, spinach, asparagus and chocolates in large quantity. * If clumped in masses may be due to stones.

c) Cystine:- Traces are normal in urine, may be from renal and cystic calculi.

d) Phosphates In alkalosis

2. Haematological Examination

Routine haemoglobin and blood group investigation should be under taken. Total leucocyte count, differential leucocyte count and E.S.R. can also be helpful. Because leucocytosis has been observed in ureteric colic patients. T.L.C. and E.S.R. can give an idea of degree of infection. In acute infection number of neutrophils, and in chronic condition lymphocytes increase respectively.

3. Blood biochemistry Estimation of S. calcium S. creatinine, S.uric acid and blood urea should be performed.

• Serum creatinine and blood urea is required to see the function of kidneys.

* Serum calcium if found increased, can be the causative factor of stone formation.

* Serum uric acid if increased, can produce uric acid stones

Prognosis

Prognosis of a case of urolithiasis can be assessed on the basis of the following lines :-

1. The degree of renal damage, it is most important feature to estimate the severity of the disease.
2. The nature and severity of co-existing infection
3. Size and location of the stone
4. The accuracy of diagnosis
5. The efficacy of treatment

DISCUSSION

1. The signs & symptoms which are indicative of a future disease are known as Purvarupa. Purvarupa play a very important role in the diagnosis and treatment of any disorder.

2. Signs & Symptoms when fully manifested are called Rupa. This is the stage when the disease comes out with full signs and symptoms indicating the specific characteristics of the disease like the dominance of Doshas various stages etc.

3. Most of the patients with renal stone experience discomfort or a dull pain in the renal region. Generally it occurs during the night or in early morning hours and usually affects the patients while at rest and may aggravate by exercise, manual labour and any physical activity. Continuous moving calculi create more amount of colic. Renal colic often has an acute onset without premonitory symptoms. The pain is usually confined to the renal region, particularly in renal angles (angle between 12th rib and lateral border of erector spinae muscle) and generally radiates along the ureter. In men it may refer to testicle and make them tender. In women, it may radiate to the labia majora, round ligament and anterior surface of the thigh. After the attack patient feels weak and exhausted.

5. Fever It is another presenting symptom but only happens in presence of urinary infection along with the calculus.

6. Profuse or microscopic haematuria occurs in patients with renal calculi or after an attack of pain. This may occur due to the injury to the urinary system by their projecting part at the time of movements.

7. In case of prolonged infection pus is found in the urine in varying amount. Stone leads to an increase in the number of white cells in the urine even in absence of infection.

8. History Taking

Usually a history of pain in or along the urinary tract, haematuria, pyuria or the passage of crystals and gravel are suggestive, but none of these are the characteristics

of urinary calculus. Previous history of passing a stone or attacks of colic may be there. History of cystinuria or gout suggest the possibility of lithiasis.

9. Routine Radiological Examination (Plain x-ray K.U.B.)

Routinely, in most cases of suspected urinary abnormality, a plain film of the kidneys, ureters and bladder, commonly abbreviated to K.U.B. is taken. Usually two films are needed to include the entire urinary tract. 85% of urinary calculi are radiopaque and are thus detected on plain radiographs. The radio opaque calculi are composed of a fibrous matrix of muco-protein covered by crystals of calcium oxalate, calcium phosphate, calcium carbonate, ammonium magnesium phosphate and urates. Cystine calculi are also radiopaque, but to a lesser degree. Mixed calculi are also fairly commonly seen. Approximately 15% of urinary calculi are radiolucent and are therefore, not seen in plain radiographs.

For detecting the urinary stones plain x-ray abdomen must cover the area, diaphragm above and lower border of symphysis pubis below. Only that K.U.B. x-ray is called ideal which gives well centralised and exposed psoas muscle shadow in the paravertebral region.

The following radio opaque shadows may confuse the diagnosis of calculi. These are :-

1. Gall stones
2. Calcified mesenteric lymph nodes.
3. Calcification in the aorta and its branches
4. Phlebolith
5. Foreign body in alimentary canal
6. Food material containing radio-opaque particles
7. Drugs like Fersolate, Gugglu etc.
8. Calcified tuberculous lesion of the kidney
9. Calcified supra renal gland.
10. Ossified tip of the twelfth rib.
11. Presence of TL (Tubal ligation) rings etc.

The following chart is showing that, Radio- opacity is directly related to the density of stones.

S.No	Variety	Density	Opacity
1	Calcium Phosphate	22.0	very opaque
2	Calcium oxalate	10.8	opaque
3	Magnesium ammonium phosphate	6.0	Moderately opaque
4	Cystine	3.7	Slight opaque
5	Uric acid	1.7	Non opaque
6	Xanthine	1.2	Non opaque

Radiographic Appearance of various types of calculi

a. Calcium oxalate:- Very dense, with a dotted appearance.

b. Calcium phosphate:- Amorphous (Shapeless) in appearance.

c. Ammonium magnesium phosphate:- Laminated in appearance.

d. Gall stones:- Usually round in shape with translucent central area and laminated in appearance.

e. Ureteric calculi:- They are seen to lie along the expected course of the ureter and are often "Cigar Shaped" with the long axis of the calculus along the expected course of ureter.

Plain x-ray (K.U.B.) also displays the position and outline of the kidneys along with number, size, position and composition of the calculi. The opacity of the calculus is influenced by its density along with its size, thickness, structure and chemical constituents. Stones in the bladder

are seen on a plane radiograph of the pelvis and are classically laminated demonstrating an unmistakable appearance. Bladder diverticulum calculi can better be seen with radiograph.

10. Special investigations

This is the most commonly performed contrast study for the urinary tract. This investigation gives a clear cut idea about the degree of renal obstruction, site of stone and very useful before going for any surgery. Important part of this investigation is that it gives an idea of the function of opposite kidney. By this procedure the renal shadows may also be outlined. Filling of pelvi-calyceal system with course and calibre of ureters are also seen along with filling and emptying of the bladder. Excretory urograph is of value in confirming whether the opacity is intra renal or extra renal, and if it is in the kidney at which part it is situated. This radiographic contrast study gives an apparent picture of urinary system along with its function. In non-opaque calculus it is very helpful and various degrees of hydronephrosis and dilatation of ureter is also noted with it. Therefore some physicians prefer intravenous urogram for detection of all types of urological disorders.

In case of non-functioning kidneys, it is used to evaluate the status of the pelvicalyceal systems and the ureters. It is also useful to locate the site of obstruction if there is any doubt after I.V.U. In this procedure a fine ureteric catheter is passed into the ureteric orifice, passed up until it is obstructed. Then a plain radiograph is taken and this shows the exact relationship, if any area of calcification to the ureter is there. It sometimes proves a means of displaying the presence of a ureteric calculus radiolucent to x-ray, due to the presence of obstruction into injecting dye. This procedure should always be carried out under fluoroscopy. It is the visual examination of the urinary tract with a cystoscope. This procedure is used both for diagnostic as well as treatment purpose. It has a great role to check whether a stone is at the lower end of the ureter or in the bladder, when an attempt is made at endoscopic removal of stone. The presence or absence of infection in the urinary tract affects the cystoscopic picture. A urethral stricture or prostatic obstruction can be diagnosed by cystoscopic examination. The bladder wall looks normal, unless cystitis is present. In the absence of infection cystoscopic study may be helpful and can give a normal picture. No abnormality is seen in the ureteric orifice when the stone lie in the upper part of ureter. Ureteric orifice becomes open or patulous when the stone comes in middle or lower third and its vicinity is scattered with minute patchial haemorrhages. As the calculus descends to just above the bladder wall, these haemorrhagic spots combine to form large and bright red. Urethral orifice becomes oedematous by the entry of stone into urethral intramural portion as is observed with cystoscopic examination.

11. Ultrasonography: This is of tremendous importance in the urinary tract, being of great value in demonstrating pathology of the kidneys and bladder. It is of less value in demonstrating ureteral pathology, especially mid ureteral. As it does not involve any radiation, so it can be easily used as the ideal follow up investigation in most cases. U.S.G. is able to detect all types of radio-opaque or translucent stones of kidney from smaller to bigger size with significant renal substance.

Upper ureteric, lower ureteric and bladder stones can very easily be scanned. In U.S.G. stones give white shadows with the presence of acoustic black shadows which move along with the movement of transducer. The stone lying in the prostatic part of urethra can also be seen in almost all cases, so it is the ideal diagnostic tool and can be repeated many a times.

12. Computerised tomography: This is probably the most effective diagnostic modality available today for the evaluation of urinary disorders. This has minimum role in the detection of urinary stones and is useful only in defining classically 'radiolucent uric acid calculi' and some have attempted it to define the composition of stones.

13. Radio- isotope method: This is useful in person sensitive to intravenous contrast agent. Radioisotope renography and scanning can assess the location of calculus and the degree of urinary obstruction.

14. Laboratory test and hematological tests also play major role

CONCLUSION

Explanation of Imaging techniques, Ayurvedic review, Modern review, Clinical study and Discussion. Above data collection plays major role in the management and prevention of Mutraashmari like disorder.

Ayurveda has emphasized on the *Nidana* (cause), *Samprapti* (pathogenesis), and *Chikitsa* (treatment). Various modalities of diagnosis were mentioned above, which are very very beneficial to make proper diagnosis and with its help it is possible to give necessary management to the patients. *Shamana* (palliative), *Shodhana* (detoxification), or *shalya karma* Depending on the stage of the disease and other assessment parameters, different treatment modules have to be incorporated. Thus, the quality of life is greatly improved.

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