



Pathophysiological understanding of Mutravaha strota dushti W.S.R. to the Chronic Kidney Disease

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ABSTRACT:

Mutravaha srotas and Srotogata Vikaras are the urine system and diseases, respectively, that are considered paramount in Ayurveda. In addition to maintaining a steady internal fluid balance, the kidneys detoxify the body by excreting waste materials in urine. Disease symptoms include things like an increase or decrease in urine output, painful maturation, the creation of stones and subsequent obstruction of maturation, an increase or reduction in the frequency of micturition, and so on. When it comes to urinary system diseases, there are a lot of herbs that may help. Each plant has its own unique activity. Mutrasangrahaneeya refers to pharmaceuticals that decrease the increased flow of pee, while Mutravirechaneeya describes drugs that enhance the flow of urine, such as Jambu, Amrasthi, and similar substances. Drugs such as Padma, Utpala, and others are known as Mutravirajaneeya dravyas, and they give urine a normal hue. In order to eliminate calculi, asmarighna dravyas dissolve them in the urine. When administered correctly, these dravyas alleviate the discomfort and lethargy brought on by the illness.

Introduction

A wide variety of waste management technologies are available for use in households and communities. The human body also uses a number of interconnected systems to fulfill this need. The urinary system counts among these systems. Under the *Mootravaha srotas*, Ayurveda explains the urine system. Waste products are discharged while water and other important substances are conserved properly. In sickness states such as *Prameha*, *Somaroga*, *Mutrakrichra*, *Mutraghata*, *Ashmari*, *Udavarta*, etc., this balance is disrupted. Many herbs are used for this purpose; some of them have direct effects on the urinary system, while others have an indirect effect that keeps the system running normally. Nevertheless, when it comes to certain physiological

disorders, dietary changes and avoiding the cause take precedence over medication [1-3].

A better way to comprehend the medications used to treat Mutravaha srotas diseases is to classify them as either *Ashmarighna dravyas*, *Pramehagna dravyas*, *Mutravirechaneeya dravyas*, *Mutravirajaneeya dravyas*, or *Mutrasangrahaneeeya dravyas*. This place has covered some of them.

Classification of Mutra Roga (Urinary Disorders)

Mutravaha Srotas Dusti:

In Ayurvedic literature, however a close observation of *Bhritarayi's* it is found that following clinical entities mention as *Mutra Roga's* are:

Mutrakriccha – 8

Mutraghata – 13



Ashmari – 4

Prameha – 20

Mutrakshaya – 1

Mutravridhhi – 1 = 47

In addition, following diseases are also mention on the basis of 'dosha pradhanya':

Vatapradhanyamutrarooga - *shefasthambh, vankshanana, pakvashyagatavata, apanavrat vyan vayu, mutrakshaya*

Pitta mutravikar - Medrapaka, Haridratva

Kafaj mutravikar - shweta mutra

Out of the diseases mention above the various *mutravaha srotas vikar* may be put as:

| <i>Alpamuhurmhur Mutra pravriti</i> | <i>Atipravrittijanya Mutra roga</i> | <i>Apravrittijanya Mutra roga</i> |
|-------------------------------------|-------------------------------------|-----------------------------------|
| <i>Mutrakricchta</i> (8types) | <i>Prameha</i> (20types) | <i>Pakvashyagata vata</i> |
| <i>Mutraghat</i> (13types) | - | <i>Apanavrat Vyana Vayu</i> |
| <i>Ashmari</i> (4types) | - | <i>Mutra Kshaya</i> |
| - | <i>Mutra Vridhhi</i> | |

Trividha Ayatan(Nidan) for Mutravaha Srotas Dusti :

In Ayurveda literature, etiological factors are classified:

1) *Asatmya indriyarth samyoga(artha)* 2) *karma* 3) *kaal*.

Asatmya indriyatha samyoga: ayoga, atiyoga, heenyoga of indriya and it's vishaya known as *asatmya indriyarth samyoga*. Human being have five sense organs which helps to perceive things all around. But excessive, misuse of these reflexes disturbs the metabolism of human body. *Mithya yoga* (misconduction of senses), *Atiyoga* (exploitation of senses), *Heenyoga* (no use of senses) of *indriya arth* is the causative factor for the development of various diseases. In *Samhita's* numerous *Nidan's* described which affect the specific *indriyarth* and produce *vikriti* in body [4-6].

As per *Samhita*, *Mutravaha sansthangata roga* produces numerous symptoms due to *Rasanendriya Vikriti*. *Atiyoga* of *Madhur rasa, snigdha, guru dravya* vitiates *kapha dosha, Rasa, Meda, Rakt dhatu* which increases *kleda, sweda* in body which progressively produce *Prameha roga*. To remove excessive *kleda* for fluid regulation, frequency of micturation is raised develops *Mutravridhhi* (Polyuria).

Similarly, *Heenyoga* and *Mithya yoga* of different *rasa's* causes *kapha kshaya*, dominates *vata-pitta dosha*, change the composition of blood made the urine concentrated, reduces fluid and raise salts concentration which accumulates at different microscopic sites and form *Ashmari* (stones).

Karma: Various *Mutra roga* (urinary diseases) also arises from *ayoga, atiyoga* and *mithya yoga* of physical action. For example, loss of physical exercise, sleep

during day (*Diwaswapna*), sitting for long duration (*Asana*) vitiates *kapha dosha* while on rapid exertion, internal injury (*Abhighata*), sun exposure (*Atapsevan*), fasting (*upvaas*) vitiates *vata-pitta dosha*, all these *tridosha's* affected due to odd physical actions and develops *Mutravaha sansthangata vikar*.

Kaal: Most of the time urinary disease develops after impinging the urinary reflexes due to holding urine for long duration. In this way, *trividha ayatan* responsible for unbalancing the haemostatic of body and develop disease.

Chronic kidney disease (CKD)

Chronic kidney disease, also called chronic kidney failure, involves a gradual loss of kidney function. Your kidneys filter wastes and excess fluids from your blood, which are then removed in your urine. Advanced chronic kidney disease can cause dangerous levels of fluid, electrolytes and wastes to build up in your body.

In the early stages of chronic kidney disease, you might have few signs or symptoms. You might not realize that you have kidney disease until the condition is advanced. Treatment for chronic kidney disease focuses on slowing the progression of kidney damage, usually by controlling the cause. But, even controlling the cause might not keep kidney damage from progressing. Chronic kidney disease can progress to end-stage kidney failure, which is fatal without artificial filtering (dialysis) or a kidney transplant.

Prevention

To reduce your risk of developing kidney disease:

Follow instructions on over-the-counter medications



When using nonprescription pain relievers, such as aspirin, ibuprofen (Advil, Motrin IB, others) and acetaminophen (Tylenol, others), follow the instructions on the package. Taking too many pain relievers for a long time could lead to kidney damage.

Maintain a healthy weight

If you're at a healthy weight, maintain it by being physically active most days of the week. If you need to lose weight, talk with your doctor about strategies for healthy weight loss.

Avoid Smoking

Cigarette smoking can damage your kidneys and make existing kidney damage worse. If you're a smoker, talk to your doctor about strategies for quitting. Support groups, counseling and medications can all help you to stop.

Six Stages of Development of Mutra Roga:

Allied literature given the whole description of disease from before its onset till the symptoms arises with its complications. The process is divided into 6 stages called “*Shat-Kriya Kaal*”. There is no body without *vata*, *pitta*, *kapha* and *rakt*. By staying in these three states (*samavस्था*), they manifest the body and do not allow

diseases to arise in the body. But due to *asatmyaindriarth prayoga*, *asamyoga karma* and *kaal* disturbs the equilibrium of *tridosha's* which progressively causes disease. Similarly, *Tridosha vikriti* impinging the *Mutravahi srotas* and yield various *Mutravaha sansthangata Roga*. These 6 stages are:

Sanchya-avastha (Accumulative phase): In this stage, systemic symptoms of *pradhan dosha* accumulate in body But, when concern about *Mutra roga*, *ruksha-guna* of *vata* change osmolality (Hypotonic urine) of *mutra* (urine), *khara guna* of *vata* enhances, roughness, dryness in its own site (*pakvashaya*) develops structural injury in soft tissues, *chala guna* reducing volume of fluid and affects contraction & relaxation of bladder. Similarly, *Pitta dosha* changes pH, colour of *mutra*, concentration by raising *dravansha* while *kapha dosha* changes the composition of *mutra* through increase its viscosity [7-9].

Prakop avastha (outbreaking phase): In *prakop avastha*, vitiated *dosha's* aggravated individually and produce symptoms in its own sites.

Table 1 Prakopavastha (out breaking phase) of Shatkriyakaal.

| Dosha Prakopa | Adhishthan | Lakshan in Prakopavastha |
|----------------------------|---|---|
| Vitiated Vata (Apana Vayu) | Basti, malashaya, pakvashaya because these muscular organ have ability to contract and relax due to <i>vayu & akash mahabhuta</i> . <i>Shrotra, asthi and sparshan-indriya</i> . | Vida-mutra-vata sanga, adhamana, vedna, klama, udarashoola, kaas, Pratishyaya, shira:shoolavii, koshtha toda sancharanaviii |
| Vitiated Pitta | Rasa, lasika is deha udak picchabhaga (the ICF), ushna guna absorbs the fluid. | Pipasa (feeling of thirst), Amla-udgara (burning sensation with acid reflux) & dahaix |
| Vitiated Kapha | Meda dhatu, ura:pradesh | Annadwesh, hridutkledax |

Prasar avastha (Spreading Phase): In *Prasar avastha*, vitiated *doshas* reaches to its extinct and flows out from its site and lodges into other sites where *kha:vagunya* is present. So *Tridosha's* lodges into *vrukka* (kidneys), *gavini* (ureters), *basti* (bladder), *mutraendriya* (urethra) and vitiates *mutravaha srotas*. This is occurring due to *vimarga-gaman* of *tridosha's*. The main 4 causes for the stimulation of *prakopit dosha's* are:

1. Vyayama raised the *chala*, *ruksha*, and *khara guna* of *vayu* which is the *pradhan dosha* which carries *pitta* and

kapha dosha with it at different sites of body called *vimarga-gaman*.

2. *Ushma* and *tikshna guna* of *agni* or *pitta* raised the *dravansha* develops *osha-chosha-paaridaha* (inflammation, burning sensation with pain at infected site of renal-urinary tract)

3. *Ahitar ahara sevan* raised the *snehansha* (viscosity) and *guruta* (volume) in *kapha* which produces generalized symptoms, *arochak* (loss of appetite), *avipaka* (indigestion), *angasada* (weakness in body),



feeling of nausea. Simultaneously pitting oedema at ankle and periorbital region.

Sthan sanshraya (prodromal stage): In this stage, vitiated tridosha's involve dhatu's (rasa, rakt, meda) and its avkasha (srotas) cause dosha-dushya-sammurcchana

(srotas-dusti) in vrukka, gavini, mutraendriya and mutrashya. purvaroop of various Mutravahasansthangata roga like prameha, mutrakriccha, ashmari, mutraghata and mutradosha.

Table 2 sthan sanshrya avastha (Prodromal stage)

| Purvaroop | Dosha | Sthansanshraya (Mutravaha srotas) | Roga |
|--|---|--|-----------------------------------|
| Prabhuta avila Mutra, kara-pada suptata, daha, mukha- talukantha shosha, nidra, tandra, vis tra gandha. | Kapha-pitta dosha Prasar | Basti, sweda, hastha-pada, | Kaphaj Prameha, Pittaj Prameha |
| Vedna yukt mutra pravritti | Vata dosha Prasar | Basti, Pakvshaya, kati | Mutrakriccha |
| Basti peeda, arochaka, bastigan dha yukt mutra, jwar, sandraavil mutra. | Vata-Pitta-Kapha dosha | Basti, vrukka, sukra pradesha | Ashmari |
| mutraghata mutravrodha | Tridosha prasar | Mutravahasansthan (Basti, vrukka, gavini) | Mutraghata (13 type) |

Vyaktavastha: develop proper symptoms of *Mutra roga*.

General Features of Mutravaha Srotas Dustixv:-

| |
|--|
| Atishrishtam mutra Polyuria |
| Atibaddham mutra Anuria |
| Prakupit mutra Frequent micturation |
| Alpa-Alpa mutra Oliguria |
| SashoolYukt Mutra Dysuria |
| Bahal mutra Frothy urine |

Bheda avastha (Complication stage): The stage in which further disease is produced from previous disorder. In prameha, prameha-

pidika, vidradhi, alaji, atisar, trishna, daha, aruchi are the further complications arises after negligence.

This is the whole mechanism of origination and insertion of disease in body described in Samahita's. To break the mechanism of formation of disease, reverse the Nidan that causes influx of tridosha's from Koshta to Shakha. Five basic principles given in Ayurvedic texts, to reverse the pathological state in body. They are: 1. vridhi of

dosha 2. vishyandan (vilyana) 3. srotasmukha vishodhan 4. pachana 5. vayu nigrhana. The sutra given to keep the body healthy and to make diseased body healthy.

Pathophysiology of Mutravaha

Two Mula of Mutravaha Srotas, namely Basti (urinary bladder) and Vankshan (groin or inguinal area), have been examined by the Acharya Charak school [7]. Given that this institution is associated with medicine, it is likely that the surgical circumstances related to nephro-urology have not been taken into account. It is important to emphasise the pathology of this process while examining the physiology of Mutranirmana. Urine becomes temporarily stored in Basti. Basti is the area where Mutra gathers because, according to Ayurvedic literature, Mutra originates in Pakwashaya and dribbles down to Basti with the assistance of several Mutravaha Nadis [8].

The wall of the bladder neck, which is 2 to 3 cm long, is made up mostly of elastic tissue and the detrusor muscle. The internal sphincter is the name of the muscle in this region. Its proper tone prevents the bladder from



emptying until the pressure in the major bladder components reaches a crucial threshold because it maintains the posterior urethra and bladder neck devoid of pee. Urine is normally stored in the bladder[9].

If the bladder's sensory nerve fibres that connect to the spinal cord are damaged, the bladder's stretch signals will not be sent, which will hinder the contraction of the micturition reflex. Bladder control is lost in this situation. The bladder fills to full and overflows via the urethra, rather than emptying regularly. A few drips at a time. We refer to this as overflow incontinence [10]. It may also be connected to the way that Alpam-alpam Mutrata and Ati Srushtam, or frequent or excessive urination, are explained by Acharya Charak [11].

All pathogenic processes are said to have their roots in Acharya Charak's fourfold categorization of Srotodushti[12]. The Ayurvedic literature on Basti and Bastitoda makes explicit reference of Mutravridhhi and Mutrkshaya if we see the Atipravritti and Sanga characteristics, i.e., excessive flow and retention or blockage [13]. This indicates that Basti is the primary location where characters in Srotodushti appear.

It is not difficult to understand that increased frequency, urgency, and discomfort in the suprapubic area are the primary symptoms of illnesses such as cystitis [14]. The correlation between these characteristics and the lakshanas of Mutravaha Srotodushti, as expounded by Acharya Charak, is evident. Urinary discharge is a symptom of bacterial cystitis; it may sometimes be clear, but it is often purulent. The patient reports burning feeling, urgency, and frequency of complaints. Pain and discomfort above the pelvic area occur often [15]. Characters like Bahalam, Sashulam, Prakupitam, and Alpam-alpam are likewise explained by these, according to Acharya [16]. Patients who have an intraperitoneal rupture of their bladder often don't complain or feel the need to urinate. In addition to the inability to empty the bladder due to the loss of the bladder's nerve supply, there may also be significant bleeding and pelvic discomfort [17]. In Mutravaha Srotoviddha lakshanas, Acharya Sushruta explains that the urine bladder expands and dilates [18] It clarifies the primary location of Srotodushti and Srotoviddha character manifestation is Basti.

Vankshana means "the groyne or inguinal region," as the description makes clear. The thigh is situated inferiorly, the pubic tubercle is positioned medially, and the anterior

superior iliac spine is located superolaterally on the lower part of the anterior abdominal wall that makes up the inguinal area of the body. The pelvic cavity contains it. The many ligaments that are present in the pelvic cavity maintain the urine bladder in suspension. The bladder is thought to be supported by the different vesicle ligaments in their functional role. The majority of genuine ligaments aid in keeping the bladder in its ideal position, which is crucial for the removal of pee. Any surgical procedure or severe damage has the potential to rupture the neurovascular systems feeding the bladder's walls, disrupting the bladder's normal physiology. [19] Normally, the ureter is divided into two sections: the pelvic and abdominal halves. Each component is exactly the same length, measuring 12.5 cm. There are three constrictions at these locations in the ureter's lumen, which is irregular throughout. (i) At the pelviureteric junction, the point at which the ureter's upper end and renal pelvis converge. It is the highest constriction and is seen around 5 cm from the kidney's hilum. (ii) Where it crosses the common iliac artery at the pelvic brim. (iii) In the event of ureteric colic, there is the radiation of pain, the location of which indicates the position of stone arrest in the ureter, at the uretero-vesical junction (i.e., where ureter enters the bladder). The distribution of the iliohypogastric and ilioinguinal nerves causes the pain to go from the loin to the groyne when the stone is stopped high in the ureter. When the calculus is located in the bottom third of the ureter, colic begins at the base and travels up the two branches of the genitofemoral nerve, referring pain to the medial portion of the thigh, the labium majus in the female, and the testicles in the male. When a stone lodges in the intramural section of the ureter, both sexes have symptoms similar to strangulation and discomfort that refers to the tip of the penis.[21]

Given that the pelvic cavity's groyne area contains the major nerves responsible for the pain perception associated with ureteric colic, this area is where illnesses mostly appear.

The primary location of the inguinal lymph nodes is the vankshana, or groyne. These nodes are located in the skin fold known as the inguinal crease, which develops where the hipbone and lower limb meet. The superficial and deep layers are the two layers. The majority of urinary tract infections result in increased frequency of urination and enlarged lymph nodes. Because of the enlarged



inguinal lymph nodes, these infections might cause groyne discomfort. Additionally, groyne discomfort is a sign of various urinary issues, such as calculus in the bladder, herniation of the bladder in the inguinal canal, testicular and bladder tumours, and epididymitis. Groyne discomfort is a common symptom of inguinal lymphadenopathy and may be caused by a traumatic injury, urinary tract infection, or urethral infection. Major urinary difficulties are represented by characters that appear in Vankshana.

The male urethra is separated into three sections: (i) the prostatic urethra, which is the area where the prostate is located and enters into the urethra; (ii) the membranous urethra, which is the section that is between the prostate and the penis bulb; and (iii) the spongy urethra, which is the section that is housed inside the corpus spongiosum.[22]

The illness process known as benign prostatic enlargement has a known age incidence. Urinary reluctance, dysuria, increased frequency, urgency, retention of urine, and in certain more complex situations, haematuria may all be symptoms of prostate enlargement. The urethra may become distorted from its normal shape as a result of prostatic enlargement, and the bladder may thicken and eventually become atonic due to chronic urine retention, which can also cause changes in the vesicle muscles and bladder wall. Eventually, overflow incontinence may develop. It also results in calculus development, cystitis, and bladder infections. Urine reflux into the ureters causes ascending infections to reach the kidney, which may result in acute or chronic pyelonephritis, damaging the kidneys and perhaps causing anuria. Increased libido is seen in the early stages of prostatitis, but ultimately the patient experiences impotence.[23]

There are two forms of urethral trauma: ruptures of the bulbous portion and ruptures of the membranous urethra. Urinary tract haemorrhage, incapacity to pass pee, and localised discomfort in the perineum are symptoms of the rupture of the bulbous section. Micturation is not possible due to bleeding at the external urinary meatus in a membranous rupture. Urinary continence with impotence and urethral stricture are potential complications from both kinds of damage. Urine stagnation in the bladder as a result of the stricture leads to cystitis. Anuria may result from the ascending infection when it eventually reaches the kidney. An

further major consequence of this stricture is the production of renal and vesicle calculi.[24] Medra therefore assumes the role of the Mula of Mutravaha Srotas, which for the characters of Mutravaha Srovidha lakshanas serves as Samchara, niyantraka, and Abhivyakti sthana.

When talking about the plants and their effects, the terms "mutrala" and "Mutravirechaneeya" appear to mean the same thing, despite a little variance in interpretation. More urine is produced by mutrala dravyas, albeit they may not always pass it out. On the other hand, mutravirechaneeya dravyas support straightforward evacuation regardless of the volume of urine produced. Mutravirajaneeya dravyas are claimed to give urine a typical colour. More research in this field is planned since it is unknown how they impact urobilin, which current physiology indicates is crucial for colour.

Conclusion

Mutravaha srotas covers a wide range of ailments because of its expansive scope. The urinary system is involved in even disorders like general edema, hypertension, and so on. In the classics, dravyas (which operate on the system) are classified into several classes according to this aspect. Numerous novel medications have been made possible in this area by research and experimental tests. Numerous dravyas have diverse functions inside the urinary system. Substances such as Gokshura function as an Ashmarighna and a mutrala. Punarnava has hepatoprotective and diuretic properties. The wisdom of the doctor is what determines which herb is best for a certain ailment.

Conflict of interest

None

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