Review Article

AYURVEDIC REVIEW OF ANATOMY, PHYSIOLOGY AND PATHOLOGY OF URINARY SYSTEM WITH SPECIAL REFERENCE TO MOOTRA VAHA SROTAS

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ABSTRACT

Urinary system of human body is explained in various ayurveda text books. Urine formation has a major role in human physiology. Despite the no availability of microscope, vision of apta jana (eminent scholars) of ayurveda is so clear, the detail of urinary system in their text is highly appreciable. Mootra nirman (urine formation), brikka sanrachna (anatomy of urinary system) and mutra roga (urinary disorders) are explained in detail. Knowledge of ayurveda in this aspect not only provide the better understanding about the urinary system but also open the new door in management of various incurable renal diseases like renal failure, nephropathy, urolithiasis etc.

Key Words: Mutravaha Srotas, Mutrakricchra, Mutraghata, Mutrashmari, Brikka, Basti.

INTRODUCTION

The Ayurvedic approach to urinary system is highly logical, conceptual and scientific. The pathology, clinical manifestations and restorative options in renal physiology are very well interconnected with fluid, blood and digestive system. The urinary physiology described in Ayurveda does not only describe the differential approach toward nephrology and urology, it also shows a very close intermingled and integrated approach in dealing with etiopathogenesis. The syndromic conditions and their pathological explanations described in this framework over three thousand years ago in Ayurvedic classics show an outstanding clinical acumen of ancient physicians.

AIM

The aim of this study is to present a compilation and collection in order to develop the overall understanding of urinary system, its functional anatomy and patho-physiology in the light of ayurveda.

REVIEW OF LITERATURE

FUNCTIONAL ANATOMY- Rachana Sharir

In the context of 13 different types of micro-channels or srotas of the body, Ayurveda describes the Mutravaha Srotas as the most fundamental element of urinary tract. As stated by Sushrut, mootravaha srotas are the paired structures and their moola are Basti and Medhira whereas Charak has mentioned Basti and Vankshana as their moola (root of origin). Vagabhatt supported Charak in this regard. According to Charak abnormalities of these srotas are responsible for voiding too much urine, abnormal composition of urine and occasional or frequent passing of thick urine associated with pain. In the texts, description of the following anatomical structures is given in relation to urinary system.

1). Brikka- The two kidneys are described as ‘Pratyanga’ and ‘Koshthanga’, which are considered as the moola of fatty channels. Embryologically, Brikkas takes their origin from the chief proportion of blood and fat 1. Kidneys are also responsible for the nutrition of abdominal fatty tissues 2.

2). Mutra Vaha Srotas- The following structures are considered as the main working unit in the renal system.
A. Mutravaha Srotas – These are the tabulated channels of kidney which have a clay pot like globular structure on their most proximal end. The process of nisyandana or filtration takes place here similar to as the clay pot mechanism explained in Ayurveda 1.
B. Mutra Vahi Dwe i.e., two major hollow tubes or channels of urinary transport comparing the two ureters to flow the urine from both the kidneys to urinary bladder.
C. Mutra Srotas i.e., the single main excretory tract i.e. urethra for exteriorization of urine.

All these structures have their close affinity to maintain the excretory system of body. The very strong relation of each and every unit, from micro to macro channels, enables the body to excrete harmful substances in the form of urine. Srotas is the name of the channels of all sizes which are solely responsible for smooth flow of various biological substances in our body to perform transportation and proper functioning.

The comparison of pores of clay pot with channels or srotas and shape of clay pot with Bowman’s capsule present the ancient analogy to understand the function and relation of whole urinary system in a very easy pattern is highly remarkable. The Srotas system is responsible for formation, circulation, excretion and transportation of biological fluids, nutrients, metabolites, bodily wastes and also medicaments whenever used.

3) Mootra vaha nadi

As stated by Sushrut, mootravaha nidi are situated in between the amashaya, pakwashaya and basti. These nadi have thousands of minute openings which are very small to visualize.
There function is mootre nisyandana (urine filtration), continuously whether in state of awakening or sleep, also drain the urine into basti and keep it moist or filled with urine in the same manner as river drain water into ocean.

4) Mootra vaha Dhamani

Dhamanis are basically of three types, depending upon the direction of their course. One type is adhogami dhamani, which are ten in the numbers. Each variant again sub-divides into three in between amashaya and pakwashaya, thus total thirty in the number. Adhogami dhamanis transport vata, mootre, purish, shukra,artava etc, downward the pelvic cavity. Two dhamanis which run toward mootre basti are termed as mootravaha dhamani. The function of mootravaha dhamani is said to be dharana and yapana of mootre and basti.

5) Mootra vahini sira

The description of mootre vahini sira is available in Ashhtanga Hridaya, where these are regarded as minute channels carrying the mootre to basti. These mootre vahini sira open in the lateral sides of basti and fill the basti with mootre continuously by the process of nisyandana. Sharangdhhar has emphasized that these mootre vahini sira carry aqueous part of mala drava of digested food to basti.

6) Basti – Basti is portrayed as one of the Ashaya, called 'moorshavaya'. Its description is widely available in ayurveda. It is mainly elaborated in the context of dusha-dushya, marma, panch karma, stri roga etc. This is said to be the organ of vital importance. Basti is one among of the three marma and considered as sadyo pranahara marma. That is why the term ‘Pranayatana’ is given to bladder by Sushruta. It is said to be a major seat of more or less all urinary diseases described in Ayurveda. The urinary bladder is thin walled, alabu shape (gourd-shaped) urinary reservoir located in the pelvis. The main function of Basti is to store the formed urine. Maladhara is another term for Basti. At some places the word, Basti is used also to indicate the entire urinary tract; kidney–ureter–bladder-urethra. The upper part of urinary bladder i.e. the fundus of bladder is termed as Basti-Shirsaa and is sometimes counted separately because of its distinct structure and function than the lower part of the urinary bladder. Two muscles are present in basti-shirsha.

Sthana- Basti is considered as a Koshtbang. According to Charak, basti is situated between the stool-gud (rectum), mushka (scrotum), seevani (perineal raphe) and shukravaha nadi. Sushrut explained the situation of basti in gudasthii vivara (pelvic cavity) and is surrounded by different structures like nabhii, prishtha, kati, mushka, guda, vankshana, shepha. Sushrut referred basti as a thin membranous organ covered with the network of sira and snayu having single opening which is directed downwards.

7) Mutra-Praseka or Mutra-Srota signifies the urethra, mainly its penile part.

8) Asthila is the glandular structure found in male, around the bladder neck comparing the Prostate. The term ‘Paurushah’ is given by Sushrut in the description of urinary tract anatomy. Gananath Sen says that Paurusha is the specific gland located at bastinmoola.

FORMATION OF URINE –Kriya Sharir

Ayurvedic physiology encompasses the phenomena of urine formation right from the process of digestion of food and its absorption, especially absorption of water (precursor of urine) from the Pakwashaya i.e. the Colon, up to the constant micro filtration of urine from blood through the Mattravaha Srotas i.e. Nephrans, leading further down to its collection in Basti i.e. urinary bladder through the Mutravahi Dwe i.e. the two ureters and micturition through Mutra- Praseka i.e. urethra.

Presumably Ayurvedic physiology presupposes that the process begins right from the gut and blood circulation because unless the water i.e. the Udak absorbed from the large gut and the metabolite wastes yielded by the circulating blood reach the filtering Srotas system, the urine cannot form. Hence the kidney as urine forming organ is in a continuum with the precursor structures viz. GIT and CVS. As we now know, the kidney is the most vascular organ of the body and it works as filter for the blood. Thus the Ayurvedic physiology depicts three phases of urine formation namely:-

1) Udak i.e. water or precursor of urine.
2) Kleela i.e. the excreted bodily wastes.
3) Mutra i.e. the fully formed urine located in Basti (bladder).

This phenomenon refers to the fact that when the food is digested the digested material along with the ingested water (Udak) trickle down to the lower gut, gets absorbed in circulation gets loaded with metabolic wastes (Kleela), passes to the Mattravaha Srotans i.e. Nephrans in the Basti (kidney) and further after filtration (Nisyandana) the outcome (Mutra / urine) gets collected in the Basti or the urinary bladder for final micturition.

Urinary micro-channels present in Pakwashaya, continuously fill the urinary bladder with urine, similar to the nonstop filling of sea with many small rivers. Each channel has thousands of microscopic openings. Process of filtration of toxic substances in nephrans is similar to the seeping of water from the pores of clay pot. This process of urine formation undergoes day and night continuously.

PATHOLOGY –Samprapti

The urinary disorders are solely pathological variant of srotas dysfunction and fractional disturbances of Dosha and Dushya. Common causes of deformity of urinary channels are drinking water, eating food and indulge in coitus, while there is urge of maturation. Disorders of urinary system lead to the signs like excessive urination, increased frequency of micturition, deformed urine, scanty, viscous and frequent urination with pain.

The detailed classification of urinary disorders in texts of ayurveda includes 20 syndromes or diseases namely, 8 Mutrakricchras i.e. dysurees and 13 kinds of Mutraghatas i.e. suppressions and retentions of urine. Vaghbhat also includes 20 types of Prameha or Diabetic conditions in the province of Mutraroga or urinary diseases. These 40 quantifiable variants form the clinical pathology system in Ayurveda. These clinical conditions are categorized below:-

1. Mutra-ati-Pravritti Mutraroga or Polyeuress:20 types of Prameha or Diabetes.
2. Mutra-ari-Pravritti Mutraroga or Dysurees, Obstructive uropathies, Urolithiasis, Oligourees, Anuarees.

The different clinical entities described under different categories in Ayurveda are procured below with nearest modern correlates which exhibit a high degree of clinical association.
1. **Mutrakricchra or Dysurias (8 types)**

1. **Vatika Mutrakricchra** i.e. Neurogenic or traumatic dysurea or acute sterile urinary colic.
2. **Pattika Mutrakricchra** i.e. Acute Urinary Tract Infection
3. **Kaphaja Mutrakricchra** i.e. Sub-acute Urinary tract Infection.
4. **Sannipatata Mutrakricchra** i.e. Acute or chronic Urinary tract infection.
5. **Abhighatata Mutrakricchra** i.e. Traumatic or Surgical Dysureas.
6. **Sakrataja Mutrakricchra** i.e. Constipational Dysurea.
7. **Ashmaraja Mutrakricchra** i.e. Calculus Dysurea.
8. **Shukraka Mutrakricchra** i.e. Dysurea due to seminal stagnation.

2. **Asmari or Urolithiasis (4 types)** - On the basis of clinical features, analysis of chemical and morphological properties of stones and variation in the nature of curability of the condition, the Ashmaris are grouped into four kinds, simulating as below:

   1. **Vataja** i.e. uric acid stones.
   2. **Pittaja** i.e. calcium oxalate, uric acid and cystine stones.
   3. **Kaphaja** i.e. Calcium phosphate stones.
   4. **Shukraka** i.e. seminal stagnation also contributes in formation of urinary stones.

3. **Mutraghata i.e. Suppression and Retention of urine (13 types)**

   **(A) Retention of Urine**
   1. **Vatukundalika** i.e. Neurogenic bladder.
   2. **Vatavasti** similar to the above.
   3. **Mutrotsanga** i.e. Stricture of urethra.
   4. **Mutrajathara** i.e. Atonia of urinary bladder.
   5. **Vastikundala** i.e. Atonia of urinary bladder.
   6. **Ashmaraja Mutrakricchra** i.e. Calculus Dysurea.

   **(B) Suppression of Urine**
   12. **Mutra sada** i.e. Oliguric Renal Failure.
   13. **Mutra kshaya** i.e. Anuric Renal Failure.

4. **Miscellaneous**

   1. Tuni
   2. Pratituni
   3. Mutraavritta vata
   4. Pratyashthila
   5. Basti shoola
   6. Mutra udavarta
   7. Mutra Viddha
   8. Parivartika
   9. Niruddha Prakash

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2. Sushruta Samhita –Utar tantra chapter 58
3. Ashtang Hridaya – Nidana sthana chapter 9
4. Ashtang Hridaya – Chikitsa sthana chapter 11
5. Madhav Nidana – Mootraghata nidana

**Treatment- chikitsa**

1. **Snemha-svedana** followed by snigdha virechana in case of mutraghata.
2. **Asthapana basti, anusvasana basti and uttar basti** are helpful.
3. **Nidana parivarjyana.**
4. **Vatamolmana, udavarta hara and mutrala medicines.**
5. In vataj mutraghata, oleation of bala taila and narayana taila, pinda sweda below the umbilical region and tub bath (avgahana) in lake warm decoction of vatahara aushadih.
6. In pittaj mutraghata, cold pitthara decoction tub bath (avgahana), application of cold substances on umbilical region is recommended.
7. In kaphaja mutraghata, Vaman karma and swedana is good. Use of tikshna, ushna and katu food is also helpful.
8. Powder or decoction of mutravirechaniya, mutrashodhanya and mutraviranjanya is recommended in all types of mutraghata.
9. **Varunadi kwath, trinapanchmula kwath or punarnavashtaka kwath is used**
10. **Shatavaryadi yoga (Yog ratnakar), Vratarvadi kwath, ushnavatari chhurna** is helpful.
11. **Ushirasava, Chandanasava, sarivadyasava** is also given.
12. **Gokshuradi guggulu, Chandra prabha vati**

**DISCUSSION AND CONCLUSION**

In few words, it can be summarized that urinary diseases, which are considered as a morbid condition, are treatable with ayurveda. Our predecessors not only had a good knowledge about these diseases, but also they were aware of its clinical manifestations, pathogenesis and management modalities. The detailed anatomical and physiological vision of ayurveda in this regard is important, without which the better understanding about the treatment part can’t be develop. The huge knowledge of urinary medicines and surgical procedures, present in Ayurveda can definitely bring out a revolutionary change in modern discipline of medical science.

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