

PORTRAYAL OF URINARY SYSTEM BY AYURVEDIC MASTER'S OF INDIA

Chaturvedi Abhishek Kumar^{*1}, Chaturvedi Mridula² and Singh B.M.³¹Medical Officer, Central Government Health Scheme, Ministry of Health & Family Welfare, New Delhi-110001.²Master of Science, Department of Biotechnology, V.B.S. Purvanchal University, Jaunpur, Uttar Pradesh-222002.³Professor, Department of Kaumarbhritya/Bal Roga, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh-221005.

Corresponding Author: Dr. Chaturvedi Abhishek Kumar

Medical Officer, Central Government Health Scheme, Ministry of Health & Family Welfare, New Delhi-110001.

Article Received on 24/10/2016

Article Revised on 14/11/2016

Article Accepted on 04/12/2016

ABSTRACT

Background: *Ayurveda* is the science of life and an *Upanga* (Branch) of *Atharvaveda*. The *Ayurvedic* master's have described in details 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* (Urine) and in unfavorable conditions, developed many ailment related to *Basti* (Bladder). **Objective:** There are many diseases described in *Ayurvedic* classics which have the presentation similar to that of urinary disorders but these are not related with urinary system and have different pathology. *Mutra Roga* (Urinary disorders) which includes *Mutraghaat* (Obstruction), *Mutrakricchra* (Urinary tract infection), *Ashmari* (Urolithiasis) and *Prameha Roga* (Diabetes insipidus). Thus the Objective of this article is the description of, anatomy, embryological development and physiology of *Mutravaha Samasthan* (Urinary system) by *Ayurvedic* master's of India. **Material and methods:** The *Mutra Rogas* (Urinary diseases) are prevalent since the *Vedic* period. Our ancient *Ayurvedic* master's had detail knowledge about their etiopathogenesis and management. The description about the urinary system is collected from the various ancient text books including *Veda* (*Atharvaveda*), *Purana*, *Samhita* (*Charak*, *Susruta*, *Vagbhata*) and *Samgraha* (*Madahva*, *Chakradatta*, *Sarangdhar*, *Bhav Prakash*) etc. **Conclusion:** The present work is organised systematically, initiated with the review of literature of ancient science for anatomical concept, which helpful in the understanding of urinary system mentioned in *Ayurveda* and their related diseases. The references is used as a back bone of this study included in the last of the article.

KEYWORDS: *Mutra Roga*, *Ayurveda*, *Basti*, Urinary system etc.

INTRODUCTION: *Ayurvedic Samhita*'s, a treatise's on principles of *Ayurveda*, is one of the traditional books present in India. *Ayurveda* texts are composed following organs related to urinary system mentioned in this classical text books in Sanskrit, which is brilliantly described and very closely to the organs mentioned in modern medicine. *Basti* (Bladder) is a *Marma*.^[1] *Anga* (Vital organ) mentioned in various ancient text book which shows their importance in the proper functioning of the body.

Anatomy of urinary system in Ayurveda: The following is the description of *Mutravaha Samasthan* (Urinary system) given in ancient classics:-

- | | |
|--------------------------------------|--|
| 1. <i>Basti</i>
(Urinary bladder) | 5. <i>Mutravaha Srotansi</i>
(Nephrons) |
| 2. <i>Vrikka</i>
(Kidney) | 6. <i>Mutravaha Nadies</i>
(Nerves of urinary system) |
| 3. <i>Gavini</i>
(Ureters) | 7. <i>Mutravaha Dhamanis</i>
(Arteries of urinary system) |
| 4. <i>Mutrapraseka</i>
(Urethra) | 8. <i>Mutravaha Sira</i>
(Veins of urinary system) |

1. Basti (Urinary bladder): - The detail description about *Basti* (Bladder) is present in all *Ayurvedic* texts. There is no doubt that structure *Basti* (Bladder) and urinary bladder is one and the same. According to *Shabdakosha*.^[2] the root "*Vas*" is used as "*Vas Acchadane*". Its different meanings are, to cover, base, store house and reservoir.

In *Ayurvedic* texts though no clear cut definition of *Basti* (Bladder) has been given, but from the grammatical derivations, it can be defined as a store house which acts as a reservoir of urine.

Embryological development: According to the fundamental principles of *Ayurveda* the human body is constituted on the basis of the *Panchbhautika* (Five elements) and the *Tridosha* (Three Bio-elements) at the time of combination of *Shukra* (Sperm) and *Shonita*.^[3] (Ova). These eight factors are responsible for the production of each and every organ during the fetal life. The *Basti* (Bladder) is a hollow structure made by the *Vayu* (Airy bio-element) entering in the combination of

essence of *Rakta* (Blood), *Kapha* (Watery bio-element) and *Pitta*.^[4] (fiery bio-element). It has been said by all the *Acharyas* (Saints) that *Basti* (Bladder) is derived from *Matrija Bhava*- the maternal constituents.^[5]

Site: *Basti* (Bladder) has been accepted one among the *Kosthangas* (Organs of the hollow cavity) by all the *Acharyas* (Saints).^[6] *Susruta* states that *Basti* (Bladder) is surrounded by *Nabhi* (Umbilicus), *Kati* (Waist), *Mushka* (Scrotum), *Guda* (Rectum), *Vakshanas* (Inguinal region) and *Sepha* (Penis/Vagina).^[7] It is of the *Snayu Marmas* (A type of vital point) type with area of four fingers.^[8]

2. Vrikka (Kidney): It is derived from the root "*Vikkadane*" means to take. The detail *Ayurvedic* anatomy of *Vrikka* (Kidney) is present in all *Ayurvedic* texts. The position, development and its functions are well described all over but no direct reference of *Vrikka's* (Kidney's) relation to urine formation or blood purification is found in either of the *Ayurvedic* classics. *Vrikka* (Kidney) are two in numbers and are situated in the lumbar regions on either side in the posterior abdominal wall in *Koshtha* (Abdominal cavity).^[9] The *Ayurvedic* scholars in 20th century described *Vrikka* (Kidney) which closely resembles with kidney, but from references available in *Samhita* and their commentaries it cannot be interpreted that *Vrikka* is kidney.

3. Gavini (Ureters): They are two in number, situated one on each side of *Basti* (Bladder), receiving *Mutra* (Urine) from the *Antras* (Alimentary canal) and sending it further to the *Mutrashaya* (Urinary bladder).^[10]

4. Mutrapraseka (Urethra): It is one among the eight important organs, which are to be protected from any injury at the time of performing surgery for *Mutrashmari* (Bladder calculus).^[11] It is the outlet of the *Basti* (Bladder), Which is two *Angulas* (A type of length measurement) in females and Twelve *Angulas* in males.^[12] In male it carries both *Mutra* (Urine) and *Shukra* (Semen), while in female only *Mutra* (Urine).^[13]

5. Mutravaha Srotas (Nephrons): According to *Charaka*, the definition of the word *Srotas* (Body channels) is '*Sravanat Srotamsi*.^[14] which means, where from something oozes out. On this way the channels which carry *Mutra* (Urine) can be considered as *Mutravaha Srotas* (Nephrons). He says that *Mutravaha Srotas* (Nephrons) has its origin from *Basti* (Bladder) and two *Vankshanas* (Inguinal region).^[15] Whereas *Susruta* believes *Basti* (Bladder) and *Medhra* (Penis) as the roots of *Mutravaha Srotas* (Nephrons)^[16] & any trauma to this *Mutravaha Srotas* (Nephrons), leads to acute retention of urine, distension of urinary bladder and painful erection of the penis, ultimately leading to death of the patients.^[17]

6. Mutravaha Nadis (Nerves of urinary system): *Mutravaha Nadis* are thousand in number and are

situated in between *Pakvashaya* (Large intestine) and *Basti* (Bladder).^[18] The functions of these *Nadis* (Nerves) are *Mutra Nishyandana* (Filtration of urine) whether in state of awakening or sleep, and carrying the *Mutra* (Urine) from *Pakvashaya* (Large intestine) to *Basti* (Bladder), like the rivers fill the ocean with water.^[19]

7. Mutravaha Dhamanis (Arteries of urinary system) *Susruta* while describing the *Dhamanis* (Arteries) has narrated one variety of *Dhamani*, termed as '*Adhogami Dhamani* (Arteries which move downwards)' which are meant for *Sara-Kitta Vibhajana* (Dividation between essence and fecal matter of food) and to transport *Mutra* (Urine), *Purisha* (Feaces), *Shukra* (Semen), *Artava* (Ova/Menses), *Apana Vata* (Flatulence) etc. downwards.^[20] *Adhogami Dhamani* (ten in numbers) are further subdivided into three parts, thus total number becomes 30.^[21] These same *Dhamanis* (Arteries) taking part in the *Sara-Kitta Vibhajana* (Dividation between essence and fecal matter of food) process, out of which two are said to be the *Mutravaha Dhamanis* (Arteries of urinary system) going to the *Mutrabasti* (Urinary bladder), the functions of which stated are *Dharana* (Holding) and *Yapan* (Nourishing) of *Mutra* (Urine) and *Basti* (Bladder).^[22] *Dalhan* further says that these are further divided into countless branches.^[23]

8. Mutravaha Siras (Veins of urinary system): In *Charaka* and *Susruta Samhita*, description about *Mutravaha Sira* (Veins of urinary system) is not available. *Ashtanga Hridaya* has first time described concept of *Mutravaha Sira*.^[24] *Mutravaha Sira's* are regarded as minute channels carrying *Mutra* (Urine) to *Basti* (Bladder). This *Mutravahi Sira* opens in the lateral side of *Basti* (Bladder) and fills the *Basti* (Bladder) with *Mutra* (Urine) continuously by the process of *Nishyandana* (Filtration).^[25]

Sarangdhara describes that the *Maladrava* (Liquid part of stool) of digested food i.e. *Mutra* (Urine) is transported to *Basti* (Bladder) by *Siras* (Veins).^[26] *Adhamalla* in his commentary on *Sarangdhara* says that the *Siras* (Veins) are concerned with *Aharajala* (Liquid part of food) transported to *Basti* (Bladder) through *Mutravaha Siras* ((Veins of urinary system).^[27]

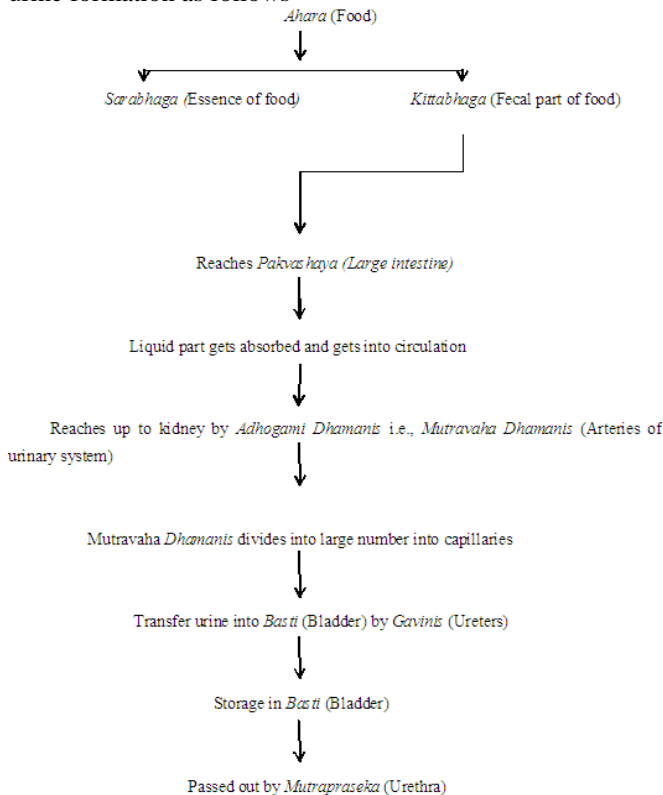
So we find that *Nadis* (Nerves), *Dhamani* (Arteries) and *Siras* (Veins) of *Mutravaha* have close relation with the urinary system.

Physiology of *Mutrotпати* (urine formation) in *Ayurveda*

There are evidences which prove that concept of formation of urine is known since Vedic period. First description about formation of urine is present in '*Atharvaveda*'. In *Atharvaveda* it is clearly mentioned that, *Mutra Nirman* (Urine formation) takes place in *Antras* (Alimentary canal) and it is transferred through *Gavini* (Ureters) and reaches *Basti* (Bladder).^[28]

Formation of urine in *Ayurveda* is related to 'Ahara (Food)'. When food gets completely digested liquid portion enters into *Pakvashaya (Large intestine)*. Liquid portion absorbed from *Pakvashaya (Large intestine)* is transported to *Basti* (Bladder) by help of two *Nadi's* (Nerves).^[29]

Considering all the facts about anatomy and physiology of urine formation we can summarize the process of urine formation as follows-



CONCLUSION^[30]: On the basis of anatomical position, shape, surrounding structures and its relations, it is clear that *Basti* is urinary bladder. From the various references mentioned regarding anatomy and physiology of urine, some concepts can be accepted while some can be purely considered as hypothesis. The following ideas related to urine formation in *Ayurveda* are valid till now:

- *Basti* (Bladder) is reservoir of urine.
- Division of food into stool & urine occurs at the level of alimentary canal.
- Stool is propelled further through anal canal.

Due to lack of advanced techniques, they could not find out what happens to liquid part absorbed through alimentary canal. They thought that there must be inter-linking system between alimentary canal and urinary bladder. They were unable to find any gross interlinking anatomical organ so they concluded that there might be numerous, invisible structures which are carrying urine directly from alimentary canal to bladder and they named these structures as "*Mutravaha Nadis* (Nephrons)". Fact has been proven on scientific grounds today that absorption occurs mainly at the level

of alimentary canal and absorbed products are transported to bladder via kidney. The only reason why *Ayurvedic* scholars have not described kidney as an important organ of urine formation can be attributed to lack of technical advancements.

Some recent scholars have correlated *Mutravaha Srotas* as Nephrons when used in plural form. This interpretation can't be accepted as no reference is present which suggests that knowledge about role of kidney was known to ancient *Ayurvedic* scholars.

Further, on the basis of anatomy we can say *Vrikka* as kidney but based on physiological consideration we can't say *Vrikka* is kidney. Like *Basti*, *Vrikka* is also a maternal contribution derived from essence of *Rakta* (Blood) and *Meda* (Fat).^[31] So far as the function is concerned, *Sarangdhara* has considered the *Vrikka's* as the nourishers of the abdominal fats.^[32]

In the concept of *Gavini*, during making of *Basti Yantra* (An instrument for giving enema) there is some clue about two opening in bladder which should be ligated during procedure of *Basti* therapy? So hypothetically *Gavinis* may be correlated with Ureters.

There are lots of controversies about *Mutraprashaka*. It has various synonyms some of which resembles penis. But considering its course, its length and functional aspects it can be correlated with urethra.

According to the above mentioned materials, it can be concluded that above stated organs take an active part in the transportation of urine in one or the other way.

FINANCIAL SUPPORT AND SPONSORSHIP: Nil.

CONFLICTS OF INTEREST: There are no conflicts of interest.

ACKNOWLEDGMENT

I am thankful to my wife for their kind cooperation and helping me in the preparation of the manuscript

REFERENCES

1. Susruta Samhita by Sharma .P.V., Sharir Sthan, 6/7, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
2. Shabdakosha, first chapter 1/3/9.
3. Susruta Samhita by Sharma. P.V., Sharir Sthan, 5/10, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
4. Susruta Samhita by Sharma .P.V., Sharir Sthan, 4/24, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
5. Susruta Samhita by Sharma .P.V., Sharir Sthan, 4/26, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
6. Charaka Samhita Vimana Sthana 5/34 with English translation by Dr. Ram Karan Sharma and Vaidya

- Bhagvan Dash Vol-IV, Chaukhambha Sanskrit series office, Varanasi (India), (1997).
7. Susruta Samhita by Sharma .P.V., Nidana Sthan 3/18, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 8. Susruta Samhita by Sharma .P.V., Sharir Sthan, 6/7, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 9. Dalhana commentary on Susruta Samhita by Sharma. P.V., Nidana Sthan, 9/18, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 10. Atharvaveda 1/3/6.
 11. Susruta Samhita by Sharma. P.V., Chikitsa Sthan, 7/38, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 12. Susruta Samhita by Sharma. P.V., Sharir Sthan, 4/21, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 13. Susruta Samhita by Sharma. P.V., Sharir Sthan, 4/22, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 14. Susruta Samhita by Sharma. P.V., Sharir Sthan, 4/23, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 15. Charaka Samhita Vimana Sthana 5/36 with English translation by Dr. Ram Karan Sharma and Vaidya Bhagvan Dash Vol-IV, Chaukhambha Sanskrit series office, Varanasi (India), (1997).
 16. Charaka Samhita Vimana Sthana 5/32 with English translation by Dr. Ram Karan Sharma and Vaidya Bhagvan Dash Vol-IV, Chaukhambha Sanskrit series office, Varanasi (India), (1997).
 17. Susruta Samhita by Sharma .P.V., Sharir Sthan 9/11, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 18. Susruta Samhita by Sharma. P.V., Sharir Sthan 9/12, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 19. Susruta Samhita by Sharma. P.V., Nidana Sthan 3/24, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 20. Susruta Samhita by Sharma. P.V., Nidana Sthan 3/21, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 21. Susruta Samhita by Sharma. P.V., Nidana Sthan 3/22, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 22. Susruta Samhita by Sharma. P.V., Nidana Sthan 3/22, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 23. Dalhana commentary on Susruta Samhita by Sharma .P.V., Nidana Sthan 3/22, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 24. Kunte AM, editor. Vagbhata, Ashtanga Hridaya, with Arundatta. In: Sarvangasundari, Commentary. Nidana Sthana 9/1. Reprint Edition. Varanasi: Choukhambha Orientalia; 2011.
 25. Kunte AM, editor. Vagbhata, Ashtanga Hridaya, with Arundatta. In: Sarvangasundari, Commentary. Nidana Sthana 9/2. Reprint Edition. Varanasi: Choukhambha Orientalia; 2011.
 26. Sarangdhara Samhita, Purva Khanda 5/23, by Himasagara. P., Murthy Chandra, Choukhambha Sanskrit Series Office, Varanasi. Edition I, (2001).
 27. Adhamalla commentary on Sarangdhara Samhita, Purva Khanda 2/2, by Himasagara. P., Murthy Chandra, Choukhambha Sanskrit Series Office, Varanasi. Edition I, (2001).
 28. Atharvaveda 1/3/6.
 29. Susruta Samhita by Sharma. P.V., Nidana Sthan 3/23, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 30. Ranjeet Kumar et al. Clinical study of Syrup Haritaki in childhood Mutrakricchra thesis submitted in Banaras Hindu University, Varanasi (2012).
 31. Susruta Samhita by Sharma .P.V., Sharir Sthan 4/30, Choukhambha Vishvabharti, Varanasi, Reprint Year (2010).
 32. Sarangdhara Samhita, Purva Khanda 6/49, by Himasagara. P., Murthy Chandra, Choukhambha Sanskrit Series Office, Varanasi. Edition I, (2001).