SJIF Impact Factor (2026): 8.863| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 11 | Issue: 2 | February 2026 - Peer Reviewed Journal

ANATOMICO-PHYSIOLOGICAL RELEVANCE OF MUTRAVAHA SROTAS

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Article DOI: https://doi.org/10.36713/epra26269
DOI No: 10.36713/epra26269

ABSTRACT
In Ayurveda, the term Srotas has several meanings, but it primarily denotes channels or vessels or any hollow spaces. Srotas means anatomical structures for the transportation of prana, dosha, dhatu and mala. Srotas are the most controversial but very important point, as it is recognized as the structural and functional unit of the body. They are differentiated depending upon their number, perceptibility and sthana bheda. Acharyas have different opinions regarding mulasthana, meaning from where almost all the activities of that particular srotas takes place and also which is affected most during pathological manifestation. Acharya Charaka said mulasthana of mutravaha srotas are basti and vankshana, while Acharya Sushruta considered basti and medra as mulasthana of mutravaha srotas.
Therefore it is the need to study the fundamental aspects of mutravaha srotas.
KEY WORDS: *Srotas, Srotomula, Mutravaha Srotas.*

INTRODUCTION

In Ayurveda, the term *Srotas* has several meanings, but it primarily denotes channels or vessels or hollow space. Acharya Charaka has defined it as *"Sravana Srotamsi",* means the structure through which *Sravan* takes place[1]. Chakrapani has explained that *Sravana* means *Sravan* of *Rasadi dhatus*, *poshya*. The *Srotas* means channels or system in which some tissues are formed, some material is metabolized, secreted or transported[2].

There are 13 kinds of Srotas as described by *Acharya Charak*. Among them three are related with the intake of nutrients from external environment i.e. *prana, anna & udakavaha srotas* . Seven are related with the metabolism, transportation & nutrition of *Sapta dhatu i.e dhatuvaha srotas*, whereas three are related with formation, transport & release of *mala* i.e. *mutra, purisha* & *sweda*[3]. *Mutravaha srotas* is basically *Sthoola* (macroscopic) *srotas* related with formation and transport of urine.

AIMS AND OBJECTIVES

1.Study of *mutravaha srotas* in detail
2.Interpretation of *mulas* of *mutravaha srotas* in detail.

REVIEW OF LITERATURE

MUTRAVAHA SROTAS

It is a channel which is related with the urine formation and transport. It could be understood as urinary system. Since, in view of functional & anatomical aspect, 13 macroscopic channels are closely related with major system of body.

Mutravaha Srotas are two in number; its *mula* is *Basti* (urinary bladder) and *Medra* (penis). *Medra* is considered as urethra and it is common pathway for release of urine and semen in male. That's why *Sushruta* has considered *Medra* as the *mula* of *Mutravaha Srotas* but this *medra* may be considered as *mutraindriya* also[4].

Acharya Charak has also described *Basti & Vankshana (inguinal region)* as *mula* of *Mutravaha Srotas*[3]. According to Dalhan, *Vankshan* is the junction area of the body between inguinal and root of thigh. Few scholars have considered it as *Vrikka* i.e. kidney. However, there is no direct description of *Vankshan* in relationship to urine formation .

Rather, the description of kidney comes under *Koshthanga* and *Sushruta* has described it as site of *Antarvidradhi (internal abscess)* in the chapter *Vidradhi Nidana*[5]. Acharya Chakrapani has mentioned the purpose for description of *mula* of any *Srotas*, is to get the knowledge about the disorders or underlying pathology which have been developed in a particular *Srotas*[3]. The *mula* of any *Srotas* is the site or organ where something is formed or synthesized. Thus, the root of any *Srotas* may be the site of clinical presentation of a disorder & may give knowledge about the pathological condition of the particular organ.

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BASTI (URINARY BLADDER)

In Sushruta Samhita *Basti* is described as *Mutrashaya* and *Maladhara*, meaning the reservoir of urine and waste, and is considered a vital organ associated with *Agni* and *Jala Mahabhuta*[6] Dalhana explains that *Basti* is the seat (*ayatana*) of *Prana* and other vital factors, highlighting its importance in maintaining life and physiological balance.[7] *Basti* is also included among the *Tri-Marma (Shira, Hridaya, and Basti)*, indicating that injury to this organ may lead to severe complications or death due to its vital functional significance.[6]

Anatomically, *Basti* is situated in the pelvic cavity below the *Nabhi (umbilicus)*, posterior to the pubic symphysis, and connected superiorly by structures such as the medial umbilical ligament.[6] It is described as an inverted organ with its opening directed downward, facilitating urine elimination. *Acharya Suśruta* explains its relations with structures such as *Paurusha (prostate), Vrishana (testis), Guda (anus)*, and pelvic bones, indicating its close anatomical association with pelvic organs.[6] During intrauterine life, the testis remains intra-abdominal and later descends, explaining its developmental relation with the bladder.

Structurally, *Basti* has a single opening directed downward and thin walls, and it functions as a reservoir for urine. It is compared in shape to an *Alabu (bottle gourd)* and is surrounded by *Sira* and *Snayu* (vessels and supporting structures), emphasizing its storage and transport function.[6] Acharya Suśruta also states, *"Abhyantaratah katyam mutrashayo bastiḥ"*, confirming that the urinary bladder is located internally in the pelvic region.[8] Thus, *Basti* is a vital pelvic organ responsible for urine storage, regulation, and excretion, and is considered essential for maintaining physiological homeostasis.

BASTI – EMBRYOLOGICAL DEVELOPMENT

Basti is described in the Suśruta Saṁhitā as *alpamamsa-shonita*, meaning it possesses less muscle *(mamsa)* and blood *(shonita)*, indicating a thin and relatively less vascular wall.[8] Suśruta further explains that during embryological development, *Basti* is formed from the refined essence *(prasada)* of *Rakta* and *Kapha,* which is transformed by *Pitta* with the assistance of *Vata dosha*, leading to the formation of organs such as *Antra, Guda, and Basti*.[9]

Clinically and surgically, *Basti* is considered highly significant. Suśruta states that any injury to the bladder—except that caused by *Ashmari* (urinary stone)—is usually fatal. If the bladder is injured on one side, it results in *Mutrasravi vrana* (urinary fistula), whereas bilateral injury leads to death.[8] *Basti* is classified as a *Snayu Marma* and falls under *Sadyopranahara Udar Marma*, meaning injury to this vital organ can cause immediate death.[8] Dalhana clarifies that at the *Basti-mukha* (trigone region) there is absence of *mamsa* and *medas*, explaining the thinness and lesser vascularity of this area.[10]

Thus, classical descriptions highlight *Basti* as a thin-walled, less vascular, embryologically complex, and vitally important pelvic organ with great surgical and pathological significance.

MEDHRA(URETHRA)

Urethra is also called as *Mutra Prasek* or *Mutra Srota* is the channel through which urine is expelled from the bladder and is connected to the *Basti mukha* (bladder outlet). The Suśruta Saṁhitā describes that semen also passes through the same urinary channel in males (*"Mutrasrotah pathat shukram purushasya pravartate"*), indicating that the urethra serves as a common pathway for both urine and semen.[11] Dalhana explains that *Mutra Praseka* is the structure through which urine flows out from the bladder via the urinary passage *"Mutrapraseko nama mutram yena bastimukhashrayena srotasa ksharati"*, confirming its function as the urinary outlet.[12]

Ayurvedic scholars, including Sharangadhara, also mention differences in urethral length between males and females in the context of *Uttar Basti*, a therapeutic procedure involving administration of medicated fluids into the bladder through the urethra using a *Basti Yantra*.[11] The Suśruta Saṁhitā further states that the urethral length is approximately *dasha angula* in males and shorter (*chatur angula*) in females, reflecting anatomical variation important for clinical and therapeutic procedures.[13] Thus, *Mutra Praseka* represents the terminal pathway of *Mutravaha Srotas* and plays a vital role in urine excretion and reproductive function in males.

VAKSHANA

Vankshana (groin region), located at the junction of the abdomen and thigh, in Sushruta Samhita it is described as an important *Snayu Marma*, where injury causes severe pain and functional impairment, as stated: *"Vankshane dve snayu marmani ardhangula pramane, tatra viddhasya shoolam pangutvam cha bhavati."*[14] It is also functionally significant in urinary and reproductive physiology.

Acharya charak identifies *Vankshana* along with *Basti* as the root of *Mutravaha Srotas*, the channel responsible for urine formation and excretion: **"***Bastir mutravahanam mulam vankshanau cha.***"**[15] Additionally, *Vankshana* is described as a root of *Shukravaha Srotas* **"***Vrishanau medhram vankshanau cha shukravahanam mulam***"**[16] highlighting its reproductive relevance. Charaka further

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notes that aggravated *Vata* causes pain in the groin region **"***Katiprishtha trikavankshaneshu vedana vata prakopaja*"[17] demonstrating its clinical importance in disorders involving urinary, reproductive, and neuromuscular systems.

***VRIKKA* (KIDNEY)**

Vrikka are described in the Suśruta Saṁhitā as structures formed from the *prasada*(refined essence) of *Rakta* and *Meda* under the influence of *Pitta dosha* during embryonic development, indicating their role in metabolic and excretory functions.[18] Dalhana explains that *Vrikka* are two rounded, fleshy masses (*mamsa-pinda*) located in the abdominal region, one on each side, confirming their bilateral anatomical position.[19] Suśruta also states, *"Medovaha dve, tayormulam kati vrikkau cha"* identifying *Vrikka* as the *Mula* of *Medovaha Srotas*, showing their role in fat metabolism and regulation.[18]

According to the Śārṅgadhara Saṁhitā, *Vrikka* are two muscular structures situated on the left and right sides of the abdomen and are responsible for the nourishment and maintenance of *Medo dhatu*.[20] This correlates with modern physiology, where adrenal glands located above the kidneys secrete corticosteroid hormones involved in fat metabolism. Thus, classical Ayurvedic texts recognize *Vrikka* as important organs involved in metabolic regulation, particularly in relation to Medo dhatu and excretory physiology.

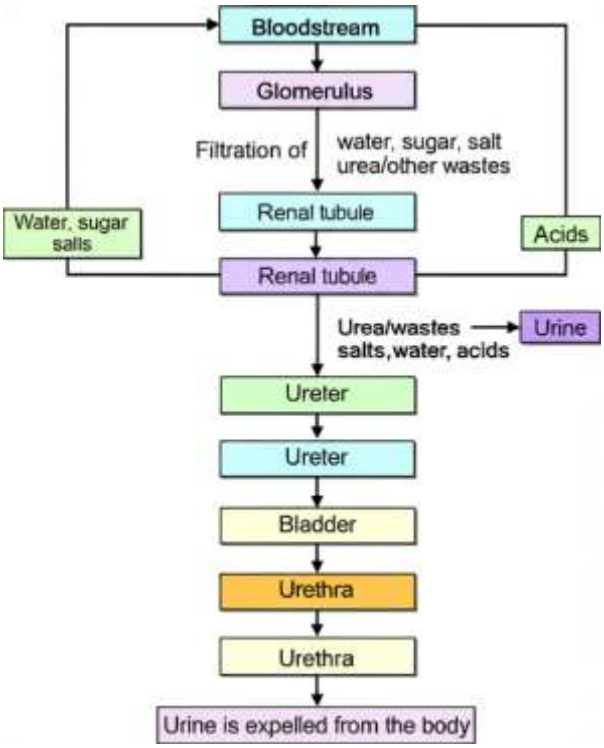
BODY ORGANS RELATED TO URINE FORMATION AND TRANSPORT

The main structures *Basti*, *Vrikka*, and *Vankshana* (inguinal region)**,** are responsible for the formation, storage, and excretion of *Mutra* (urine). The Suśruta Saṁhitā states, *"Mutravaha dve, tayormulam basti medhram cha"* meaning the roots of *Mutravaha Srotas* are *Basti* and *Medhra*, indicating the urinary bladder and urethra as key organs of urine storage and elimination.[3] Similarly, the Charaka Saṁhitā mentions, *"Mutravahanam srotasam bastirmulam vankshanau cha"* identifying *Basti* and *Vankshana* as the root, showing their role in urine formation, transport and regulation.[2] Dalhana explains that *"Vankshana urumulashraya"*, meaning *Vankshana* is the region at the root of the thigh (inguinal region), an important anatomical area related to urinary pathways.[5] Thus, *Basti* stores urine, *Vrikka* helps in formation of urine, and *Medhra* or *Vankshana* serve as the pathway for urine excretion.

URINE FORMATION AS PER AYURVEDA

Mutra (urine) is considered one of the principal *Malas* formed during the digestion and metabolism of *Ahara* and *Dhatus*, arising from excess *Kleda* (fluid waste) in the body. The Charaka Saṁhita states that *Mutra* is the *Mala* of *Kleda*, produced when the nutritive portion of digested food nourishes the *Dhatus* and the waste portion separates as *Mutra*[21]. According to the Susruta Saṁhita, the *Vṛkka* are responsible for separating and channeling *Mutra*, which is then stored in the *Basti*[22]. The *Aṣṭanga Hṛdaya* further explains that *Mutra* formed from *Kleda* is transported to the *Basti* and excreted under the regulation of *Apana Vayu*, which governs urinary elimination[23]. Thus, *Mutra Nirmaṇa* involves formation from metabolic fluid waste, filtration through *Vṛkka*, storage in *Basti*, and elimination through *Mutravaha Srotas*, maintaining fluid balance and physiological homeostasis.

URINE FORMATION AND EXCRETION IN MODERN [24]:



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DISCUSSION

- *Mūla (Root organs):*

The Charaka Saṁhita mentions *Basti* and *vakshana* as the *Mula* of *Mutravaha Srotas*, while the Suśruta Saṁhitā identifies *medhra* and *Basti* as their root, considering their role in urine storage, regulation and excretion. Though kidneys are involved in urine formation but considering their major role in fat metabolism, they are considered as *mula* of *medovaha srotas* rather than *mula* of *mutravaha srotas*.

- *Formation of Mutra:*

Mutra is formed from *Kleda* (metabolic fluid waste) during digestion and *Dhatu* metabolism; *Vṛikka* separates this waste fluid from the nutritive portion, comparable to renal filtration.

- *Transportation and Storage:*

Mutra passes through *Mutravaha Srotas* from *Vṛikka* to *Basti*, where it is stored until voided. *Basti* plays an important role in storage of urine

- *Excretion and Regulation:*

According to the Aṣṭāṅga Hṛdaya, *Mutra* is expelled *medhra* through under the control of *Apana Vayu*, maintaining fluid balance and excretory homeostasis.

CONCLUSION

Mutravaha Srotas represents the structural and functional urinary system responsible for urine formation, transport, storage, and excretion. Anatomically, it comprises *Vrikka* for filtration, *Mutravahini* channels for conduction, *Basti* for storage, and *Mutrapraseka* for elimination. Classical texts such as Charaka Samhita and Sushruta Samhita identify *Basti* and *Vankshana* as the *mula* (root) of this system, highlighting their structural and clinical importance.

Physiologically, *Mutravaha Srotas* maintains fluid balance by separating liquid waste *(mutra)* from circulating *dhatus* and eliminating metabolic by-products. *Vrikka* performs filtration and regulation, *Basti* ensures storage and controlled voiding, and *Vata* governs urine expulsion, supported by *Pitta* (metabolic processing) and *Kapha* (structural stability). Disturbance of this system results in conditions such as *Mutrakricchra, Mutraghata, Ashmari, and Prameha*. Thus, *Mutravaha Srotas* is an integrated anatomico-physiological unit essential for excretion, metabolic balance, and homeostasis.

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