

Understanding Mutra Utpatti through Ayurvedic Samhitas: A Conceptual Analysis

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I. INTRODUCTION

Mala are the substances or waste matters that are excreted out of the body. Mala are counted in two categories: Annamalani and Dhatumalani. Annamala is Purisa, Mutra and Vayu,[1] also Sweda described by As-tanga Hridayakara.[2] Dhatumala is eight in number as suggested by Charaka,[3] seven in number as in Sharangdhara Samhita.[4] Purisa & Mutra are the important excretions from the human body. Mutra is a liquid waste product of the body secreted by the kidneys through a phenomenon of filtration from blood

In Ayurveda Mutra is formed in Mutravaha strotas. Main organs of Mutravaha strotas are basthi and vangshana according to Susruta

Ayurveda advocated that urine is formed from large intestines & not from kidneys. The first stage of urine formation begins in the large intestines where fluids are absorbed into the urinary system. While modern science described urinary bladder, nephrons, kidney, ureters and urethra, etc. vital parts of urine formations. urine is formed by filtration and reabsorption.

II. AIM & OBJECTIVE

The main aim of this article is to review of Mutra Utpatti from various Ayurvedic texts

III. MATERIAL & METHODS

Information regarding Mutra Utpatti is collected from various Ayurvedic Samhitas.

3.1 Definition of Mutra

“Aharasya Rasa Sara Sarheeno Maladrava”

According to Acharya Sharangdhar – The essence of diet is Rasa which is responsible for supplying

nutrition to all the dhatus and the wastage part of diet became mala & mutra.

3.2 Role of various parts in urine formations

Basti (Urinary bladder): - The detailed description of Basti (Bladder) is present in all Ayurvedic texts. There is no doubt that the structure of the Basti (Bladder) and urinary bladder is the same. Basthi is considered as one of Kothangas amongst many inside the body. Susruta Basti is surrounded by Nabhi, Kati, Mushka, Vakshanas, Shepha and Guda. It stores and evacuates urine thus play important role in the process of urinary excretion. Basthi word, the root "Vas" is used as "Vas Acchadane"[5]. Its different meanings are, to cover, base, storehouse, and reservoir. In Ayurvedic texts, though no clear-cut definition of Basti (Bladder) has been given, from the grammatical derivations, it can be defined as a storehouse that acts as a reservoir of urine.

Vrikka

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. Vrikka (kidney) are two in numbers and are situated in the lumbar region on either side in the posterior abdominal wall in the Kosta (abdominal cavity).[6]

The major process of urine formation and blood filtration takes place in Vrikka thus it is considered as the main organ of the urinary system.

Gavini (Ureters):

They are two in number, situated one on each side of Basti (Bladder), receiving Mutra (Urine) from the Antras (Alimentary canal) and send-Ing it further to the Mutrashaya (Urinary bladder). [7]

Mutraprasek

This refers to the urethra, specifically its penile segment. It is also known as Mutraputak, Mutramarga, and Mutrasrotas. It serves as the outlet for the Basti, measuring two angula in females and twelve angula in males. In males, it transports both Mutra and Shukra, whereas in females, it is responsible only for the passage of Mutra. Ureter is the vessel through which urine passes after leaving in bladder.

MutravahNadi

Acharya Sushruta describes the Mutravaha Naadi as being located between the Amashaya, Pakwashaya, and Basti.[8] These channels contain thousands of minute openings that are difficult to see. Their primary function is urine filtration, known as Mutra nishyandan continuously draining urine into the Basti, and ensuring it remains moist or filled, much like rivers that flow into the ocean.[9]

Mutravaha Dhaminis (Arteries of Urinary System):

Sushruta while describing the Dhaminis (arteries which moves downwards) which are meant for Sara-Kitta Vibhajana (division between essence and fecal matter of food) and to transport Mutra (urine), Purisha (feces), Shukra (semen), Artava (ova/menses), Apana Vata (flatulence) etc. downwards.[10] Adhogami Dhamini (ten in numbers) are further subdivided into three parts, thus total number becomes 30.[11] These same Dhaminis (arteries) taking part in the Sara-Kitta Vibhajana (division between essence and fecal matter of food) process, out of which two are said to be the Mutravaha Dhaminis (arteries of urinary bladder) going to Mutrabasti (urinary bladder), the functions of which stated are Dharana (holding) and Yapan(nourishing) of Mutra (urine) and Basti (bladder).[12] Dalhan further says that these are further divided into countless branches.[13]

Mutravaha Siras

Ashtanga Hridaya has first time described concept of Mutravaha Sira.[14] Mutravaha Siras are regarded as minute channels carrying Mutra (urine) to Basti (bladder). These are considered as veins of the urinary system carrying Mutra to Basti since they open in a lateral side of Basti and helps in process of Nishyandana. Sa-rangdhara describes that the Maladrava (Liquid part of stool) of digested food i.e. Mutra (Urine) is transported to Basti (Bladder) by Siras (Veins).[15]

IV. URINE FORMATION AS PER MODERN SCIENCE [16]

Urine is considered as waste product of body containing urea, uric acid, water, salt and other waste products. The major process occurs inside the kidney in three major stages; Glomerular Filtration, Tubular Reabsorption and Tubular Secretion.

4.1 Glomerular Filtration

The process mainly occurs through glomerular capillaries in which blood filtered out to form urine. The high pressure of blood into these capillaries facilitates process of filtration. The protein and blood cells are retained while most of other materials coming with blood circulation reached to Bowman's capsule to form ultrafiltrate with the rate of 125ml/min.

4.2 Tubular Reabsorption

Some essential substances (potassium, sodium chloride, amino acids, bicarbonate and water) are reabsorbed at tubular part of nephron through passive and active transport. The process of others co-transport also facilitates tubular reabsorption.

4.3 Tubular Secretion

Peritubular capillaries help to secrete ions, substances which not filtered through glomerular filtration like some drugs secreted into the filtrate by process of tubular secretion. The ion exchange also facilitates process of tubular secretion.

The nephron mainly involves in the formation of urine and each nephron is made by renal corpuscle and renal tubule. The renal corpuscle further divided into glomerular capillaries and Bowman's capsule; these organs mainly perform filtration of blood to form urinary fluid. Afferent arteriole brings blood into the glomerulus while efferent arteriole takes blood away from the glomerulus.

The renal tubular parts also divided into various parts; Proximal Convulated Tubule, Loop of Henle and Distal Convulated Tubule. The Proximal Convulated Tubule reabsorbed substances, ions and water. Loop of Henle performs reabsorption and secretion of water while Distal Convulated Tubule helps in restoration of ions and water.

V. AYURVEDIC PHYSIOLOGY OF URINE FORMATION

Formation of urine in Ayurveda is related to Ahara (food).[17] when food gets completely digested, Ahara is divided into two parts which are Sara and Kitta.[18] Sara is nothing but nutritious part of food and Kitta is Mala. The Kitta Bhaga is divided into two parts- one is water content (Mutra) [19] and other part is solid content (stool). The water content of Kitta after absorption from Pakvashaya (large intestine) is further described as Mutra bhaga (urine),[20] that urine after absorption and filtration reach into Mutravahi Dhamini in three groups on the basis of their direction. Out of which Adhogami Dhamnies are further subdivided into subgroups according to their functions becomes thirty in number in which ten- two for Vata, Pitta, Kapha, Shonita and Rasa, like that two for each Shukra, Purish, Artava and two Dhaminis for transportation of Mutra. The two Mutravadi Dhamini is designated for function of transportation of urine.

VI. CONCLUSION

Ayurveda mentioned detailed description related to Mutravaha Samsthana (urinary system) which involved in the formation and excretion of Mutra. Urine formation is one of the important physiological activities of human body that removes waste and maintains process of detoxification. The Aahar Rasa forms urine after process of digestion and metabolism, the most of the waste fluid excreted through urinary system and improper functioning of this system can cause many health ailments. Basti, Mutravaha Srotansi, Vrikka, Mutravaha Nadies, Mutravaha Dhamanis and Mutravaha Sira, etc. are major body parts which involved in physiological process of urine formations. As per modern science kidney, nephrons, urinary bladder and urethra, etc. are parts which contribute towards the process of urine formations. The knowledge of this process helps physician to understand the pathogenesis of diseases related to urinary system

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