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Urine Formation in Ayurveda – A Conceptual Study

Manjusha Sonpipre^{1*} and Vandana Fating²

¹KriyaSharir Deptt., Rajiv Lochan Ayurved Medical College, Chandkhuri, Durg, C.G., India

²Kayachikitsa Deptt., Rajiv Lochan Ayurved Medical College, Chandkhuri, Durg, C.G., India

ABSTRACT

Ayurveda science is more observed than investigated and it is based on clinical findings. *Ayurveda KriyaSharir* is mainly based on *Dosh, dhatu and Mala*. Functions of the body performed by *Doshas*. *Dhatu*s sustain the body. *Malas* are waste products formed by digestion (*Purisa, Mutra*) & Metabolism of *Dhatu*s (*Dhatumala*). Formation of *Malas* occurs in their *Strotas*. *Mutra* (Urine) is very important entity in maintaining homeostasis of the body. Urine formation occurs in *Mutravaha strotas*. Main organs of *Mutravaha strotas* are Urinary bladder & Urethra 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. In urinary system urine is formed by filtration & reabsorption. This article tries to review the formation of urine according to *Ayurveda*.

KEYWORDS

Formation of urine, Principle organs of Mutravaha strotas, Comparison with Modern aspect



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INTRODUCTION

Mala are the substances or waste matters that are excreted out of the body. They are actually by-products formed as a result of various physiological activities happening inside the body. *Purisa*, *Mutra* and *Sweda* are considered as main excretory product of the body & called as *Mala* due to their principle property of *malinikarani*, i.e., toxication¹. *Mala* entities are originated separately. They also have their own purpose for their creation and once created, functioned, they have to be discarded. *Mala* are excreted after their function is over. If body fails to discard them, they became painful for body. *Mala* are counted in two categories: *Annamalani* and *Dhatumalani*. *Annamala* are *Purisa*, *Mutra* and *Vayu*,² also *Sweda* described by *Astang Hridayakar*³. *Dhatumala* are formed by *dhatupaka* (during formation of *dhatu* by *dhatwagni*). They are eight in number as suggested by *Charak*⁴, seven in number as in *Sharangdhara Samhita*⁵. Formation of malas is carried out in intestines. *Jatharagni* acts on food & digest it into *Sara* and *Kitta*. Absorbable part is *Sara* which is used for the formation of *Dhatu*. Unabsorbable part is *Kitta*. Solid part of this *kitta* is *purisa*, which stored and expelled out from *purisavaha strotas*. Liquid part goes to

mutravaha strotas, where it is called as *mutra*. This concept of formation of *Sara* & *Kitta* from digested food after action of *Agni*, also applies in *dhatupak*⁶.

Purisa & *Mutra* are the important excretions from 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*.

REVIEW OF LITERATURE

Organs forming urine in *Mutravaha Strotas* are:

In *Charak Samhita* principle organs of *Mutravahastrotas* are denoted as *Basti* (urinary bladder) and *Vankshana*⁷. *Susruta* also noted *Basti* and urethra as principle organs of *Mutravahastrotas*⁸. *Susruta* described formation of urine in the description of *Pitta dosh*. Where it is mention that after digestion of food *Dosh*, *Ahar rasa*, *Purisa* and *Mutra* are formed. This formation occurs in *Pittadharakala*⁹. *Acharya Sarangdhara* also describes formation of urine in as that part of digest food, which is absorbed, is known as *Rasa* and unabsorbed (waste) part is *Mala*. Fluid part of this waste part goes to *Basti* by vessels (*MutravahaSira*) where it is called as *Mutra*¹⁰.



Acharya Susruta describes urine formation beautifully by giving example of sea and river. River fills sea with their water, just as ureters fill bladder with urine. This process is carried continuously day and night.

Urine formation according to Susruta Samhita is as below:

Vessels arising from large intestines, called *Mutravahanadya*, fill the urinary bladder like river feed water to ocean on earth. They are so minute that they are not be perceived. These vessels arise from *Amasaya* and convey fluid to bladder day and night. Thousands of these vessels provide water which exudes from vessels to inside of bladder posteriorly¹¹.

This thought of conveying urine from *Pakwasaya* to *Basti* is also described in *Vedic* era.

Arrangement for conveying urine from intestines to urinary bladder is made by two vessels called '*Gavini*'¹². They are situated at posterior side of bladder.

Organ which stores urine is called *basti*¹³. It has only one opening & it has very fine membranous wall. It is upside down as *Alabu* having *sira* and *snayu*. Urinary bladder is one of the *pranayatanam*¹⁴, i.e., it is a vital organ. Urinary bladder is filled with urine¹⁵, so called as *Mutrasaya*. Mechanism

by which urine is filled are filtration and exudation.

Through *mutravaha strotas* urine is expelled from opening of urinary bladder, the channel through which this is done is named as *Mutrapraseka*¹⁶. Dimensions of urethra are 10 *angul*. Commentator *Dalhana* opines in breadth & of size in circumference of opening of urethra¹⁷.

The length of female urethra is 4 *angul*¹⁷.

By reviewing literatures of *Ayurveda* it is clear that urine is formed from intestines & not from kidneys.

In *Ayurveda* kidneys are considered as principle organ of *Medovaha strotas* and did not connect kidneys in urine formation.

Also, references clearly indicate that whatever fluid is absorbed from large intestines after complete digestion of food, should not be considered as urine. From large intestines absorbed fluid is drawn by *Mutravaha nadya* in urinary bladder, where it is formed as urine by filtration & reabsorption. Hence urinary bladder is called as a principle organ of *Mutravaha strotas*. Urine is expelled through urethra. Also urethra is called as a principle organ of *Mutravaha strotas*¹⁸.

Another reference in *Ayurveda* shows that genesis of Intestines, Anus and Urinary bladder have same embryological



origin¹⁹. And according to References kidney genesis is different²⁰.

However, researchers today have tried to hypothesize that kidney has thousands of microscopic tubules, which could be interrupted to those vessels arising from intestines.

Charak described principle organs of *Mutravaha strotas* as Urinary bladder & *Vanksanou*²¹. In urinary system urinary bladder lies below in pelvic region (*Vanksan*) & kidneys lies above in lumbar region.

Adhyamal, commentator of *Sharangdhara Samhita*, described kidneys as '*Tilvrukkou*' in *dvivachan*, as they look like black as *Krishnatil*. He also mention that these *Tilvrukka* are the base of liquid part of *Ahar-rasa*²².

Formation of urine occurs in kidneys. But due to lack of enough space to store urine, there is no evidence of it.

Comparison between Ayurved & Modern aspects of urine formation

Nephron is a structural & functional unit of kidneys where urine formation occurs by filtration & re-absorption. They are millions in number. Each nephron is divided into two parts:

Bowman's capsule & Renal tubules.

Bowman's capsule is cup shaped & lies in renal cortex. Efferent arteriole enters into this capsule & forms capillary network called **Glomerulus**. Blood carries out from glomerulus by afferent arteriole. In this Glomerulus ultra-filtration occurs which can be considered as *nisyandankriya*, in urine formation as described by *Susruta*. This filtration occurs due to difference between the pressures, as empty new vessel of sand filled by water when kept in water upside down. Pressure outside vessel fills water from sides through its micro pores by filtration. This first stage of ultrafiltration in urine formation is involuntary as described by *Susruta* that *nisyandana* occurs day & night²³.

Filtrate comes in renal tubules where selective re-absorption of substances takes place. This is the second stage of urine formation. Remaining fluid collected in collecting tubules where some substances secreted. This is the third stage of urine formation. Fluid from collecting tubules pour in the calyces & then into renal pelvis²⁴.

The net filtrate is known as urine which comes into the urinary bladder through ureters drop by drop & collected there. Both ureters opens in the posterior part of urinary bladder²⁵.



DISCUSSION

Ayurveda science is more observed than investigated. References in *Ayurvedic* literature shows that first stage of urine formation starts from large intestines where digested food is divided into *Sara* and *Kitta*. From the *Kitta* part *malas* are formed. Solid part of *Kitta* converted into *purisa* and liquid part goes to *Mutravaha strotas* converted into *mutra*. Organs of *Mutravaha strotas* are Urinary bladder and Urethra. Urine is expelled through urethra. Hence, urethra is suggested as principle organ for *Mutravaha strotas*. In disorder of urinary bladder, expulsion of urine is difficult. So, bladder is also a principal organ of *Mutravaha strotas*. All *Ayurvedic* opinions seem logical enough to stand in today's era. Except that ureters are seen to be arising from kidneys by today's situation. *Ayurved* physicians mainly thought of kidneys as principle organ of *Medovaha strotas* & did not connect kidneys in urine formation. Also, references shows that *Ayurveda* did not mean to say that fluid from large intestines fills bladder by micro vessels. References in *Susruta Sharirasthan* and in *Dalhana* clearly indicates that whatever fluid is absorbed from large intestines after complete digestion of food, should not be considered that this absorbed fluid, once reaches urinary bladder is called

urine. Other references in genesis of organs in intra-uterine life in viewpoint of *Ayurveda* postulates that intestines, anus & urinary bladder are of same embryological origin. However, researchers today have tried to hypothesize that kidney has thousands of microscopic tubules, which could be interpreted to those vessels arising from intestines.

CONCLUSION

The discussion reveals that both modern science and *Ayurveda* have described the formation of urine by their own principles. Following points can be summarised as follows.

- *Mutra* is the main excretory product of body.
- In *Ayurveda* urine formation begins in the large intestines where fluid is absorbed into the *Mutravaha strotas*.
- Kidneys are the main organ of *MedovahStrotas* instead of *Mutravaha strotas*.
- Principal organs of *Mutravaha strotas* are urinary bladder & urethra as they store urine & expelled urine.
- Genesis of organs in intra-uterine life in viewpoint of *Ayurveda* postulates that intestines, anus & urinary bladder are of

same embryological origin and kidneys genesis is different than these organs.

- Modern science defines, urine formation occurs in kidneys & then carried by ureters to urinary bladder and expelled by urethra.



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