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THE URINARY SYSTEM IN AYURVEDA: AN ANATOMICAL AND PHYSIOLOGICAL PERSPECTIVE

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ABSTRACT

The urinary system is concerned with the formation, transportation, storage and elimination of urine. Ayurveda explains these functions through the concepts of Vrukka, Mutravaha Srotas, Mutravaha Dhamani, Mutravaha Sira, Mutravaha Nadi, Gavini, Basti and Mutra Praseka. Vrukka is described as a paired Koshthanga, Matruja Avayava and Moola of Medovaha Srotas and is functionally correlated with the kidney. Gavini is associated with transport of urine towards Basti, while Basti acts as the reservoir for urine. Mutra Utpatti is understood in relation to digestion, Sara-Kitta Vibhajana, Kleda, Dosha and Apana Vata. The Ayurvedic description is predominantly functional and should not be considered an exact one-to-one anatomical equivalent of modern structures. The submitted review provides a conceptual correlation between Ayurvedic urinary physiology and modern renal physiology.

KEYWORDS: *Vrukka, Mutravaha Srotas, Mutra Utpatti, Basti, Gavini, Apana Vata, urinary system.*

1. INTRODUCTION

Ayurveda describes urinary anatomy and physiology through a group of structures and functional pathways rather than through a single organ. The important concepts are *Vrukka*,[1] *Mutravaha Srotas*, *Gavini*, *Basti*, *Mutravaha Dhamani*, *Mutravaha Sira*, *Mutravaha Nadi* and *Mutra Praseka*.

The concept of *Mutravaha Srotas*[2] includes the formation, transportation, storage and elimination of *Mutra*. Thus, Ayurvedic urinary physiology represents an integrated relationship between digestion, metabolism, fluid regulation and excretion.

2. MATERIALS AND METHODS

The article is based exclusively on the submitted literature review. Relevant descriptions of *Vrukka*, *Mutravaha Srotas*, *Gavini*, *Basti*, *Mutravaha Nadi*, *Mutra Utpatti* and their modern conceptual correlations were compiled and presented in concise IMRAD format.

3. RESULTS

3.1 Vrukka[1]

Vrukka is described as a paired *Koshthanga* and *Matruja Avayava*. Charaka mentions it among the *Koshthanga* and associates it with *Medovaha Srotas*. Sushruta describes its relation to the *Parshwa* region and its origin from the *Prasada Bhaga* of *Rakta* and *Meda*.[9] It is also described as the *Moola* of *Medovaha Srotas*.[3]

Because of its paired nature, location and association with *Mutra Utpatti*, *Vrukka* is conceptually correlated with the modern kidney

3.2 Mutravaha Srotas[2]

Mutravaha Srotas represents the functional pathway involved in urine formation and elimination.

Acharya	Moola of Mutravaha Srotas
Charaka	*Basti* and *Vankshana*
Vagbhata	*Basti* and *Vankshana*
Sushruta	*Basti* and *Medhra*

The concept is functional and therefore cannot be restricted to one anatomical structure.

3.3 Mutravaha Dhamani, Sira and Nadi [4,5,6]

Mutravaha Dhamani are described in relation to transportation and regulation of urine.

Mutravaha Sira is associated with transportation of the fluid waste component following digestion.

Sushruta describes *Mutravaha Nadi* as channels extending between *Pakwashaya* and *Basti* and continuously filling *Basti* with urine. Dalhana describes their numerous branches around *Basti*.[7]

Conceptually, these descriptions may be related to the extensive vascular and tubular network involved in urine formation, but they should not be regarded as exact anatomical equivalents.

3.4 Gavini[8]

Gavini is described as a pair of tubular structures carrying *Mutra* towards *Basti*.

Ayurvedic functional sequence:

Vrukka → *Gavini* → *Basti*

Modern conceptual correlation:

Kidney → Ureter → Urinary bladder

3.5 Basti[9,10,11]

Basti is the principal reservoir of *Mutra*. It performs *Mutra Dharana* and participates in urine expulsion.

Its functions may be summarized as:

- Storage of urine
- Maintenance of urinary reservoir
- Regulation of urine expulsion
- Participation in *Mutra Nishkramana*

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It is therefore functionally correlated with the urinary bladder.

3.6 Mutra Praseka / Mutra Marga [12]

Mutra Praseka or *Mutra Marga* represents the pathway through which urine is eliminated from the body and is functionally correlated with the urethra.

Thus:

Vrukka → Gavini → Basti → Mutra Praseka
Kidney → Ureter → Urinary bladder → Urethra

3.7 Mutra Utpatti[13]

Ayurveda explains urine formation as a consequence of digestion and separation of useful and waste components.

Flowchart

Ahara
↓
Pachana by Agni
↓
Sara–Kitta Vibhajana
↓
Kleda/Drava Bhaga
↓
Mutra Utpatti
↓
Mutravaha Srotas
↓
Basti
↓
Apana Vata
↓
Mutra Nishkramana

Pachaka Pitta participates in digestion and transformation, *Samana Vata* in digestion and absorption, while *Kleda* contributes to fluid handling.

3.8 Modern renal physiological correlation

The modern processes described in the review are:

Renal blood flow
↓
Glomerular filtration
↓
Tubular reabsorption
↓
Tubular secretion
↓
Final urine
↓
Collecting ducts → Renal pelvis → Ureter → Bladder → Urethra

Thus, the Ayurvedic concepts provide a functional framework that can be compared conceptually with modern renal physiology.

3.9 Role of Apana Vata in micturition[14]

Apana Vata is responsible for downward movement and elimination. After filling of *Basti*, bladder distension produces the urge to void, followed by *Mutra Nishkramana*.

Basti Purana → Urge → Apana Vata → Mutra Nishkramana

The submitted review also provides a conceptual correlation with the modern micturition reflex.

3.10 Mutravaha Srotodushti[15]

The important manifestations described are:

Ayurvedic Manifestation	Functional Correlation
Atisrushta Mutra	Polyuria
Alpa Mutra	Oliguria
Atibaddha Mutra	Retention
Abhikshna Mutra	Frequency
Sashula Mutra	Dysuria
Bahala Mutra	Turbid urine
Mutra Nirodha	Obstruction
Anaddha Basti	Bladder distension

4. DISCUSSION

Ayurvedic urinary anatomy is primarily functional. *Vrukka* provides the major conceptual basis for the kidney, while *Mutravaha Srotas* represents the wider functional system.

The relationship may be summarized as:

Vrukka → Mutra Utpatti → Mutravaha Srotas → Gavini → Basti → Mutra Praseka

The physiological process is integrated with *Agni*, *Dosha*, *Kleda* and *Apana Vata*. Therefore, urinary physiology is not considered independently from digestion and systemic metabolism.

The modern concepts of filtration, reabsorption and secretion can be used as functional parallels, but the classical structures should not be considered direct anatomical equivalents.

5. CONCLUSION

Ayurveda provides an integrated functional understanding of the urinary system through *Vrukka*, *Mutravaha Srotas*, *Gavini*, *Basti*, *Mutravaha Nadi* and *Mutra Praseka*. *Vrukka* is conceptually correlated with the kidney, *Gavini* with the ureter, *Basti* with the urinary bladder and *Mutra Praseka* with the urethral pathway.

Mutra Utpatti involves digestion, *Sara-Kitta Vibhajana*, *Kleda*, *Dosha* and *Apana Vata*. Thus, Ayurvedic urinary physiology represents an integrated process of formation, transportation, storage and elimination of urine.

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