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LABORATORY INVESTIGATIONS IN KIDNEY DISEASES: AN AYURVEDIC INTERPRETATION OF MALA, KLEDA, VATA, AND DHATU DERANGEMENTS

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ABSTRACT

Background: Kidneys are essential organs responsible for maintaining fluid-electrolyte balance, excretion of metabolic waste products, regulation of acid-base homeostasis, endocrine functions, and preservation of bone metabolism. Laboratory investigations such as serum creatinine, blood urea nitrogen (BUN), serum urea, sodium, potassium, chloride, calcium, and phosphorus are routinely used to assess renal function and disease progression. Although these parameters are interpreted biomedically as indicators of renal physiology, their Ayurvedic significance remains inadequately explored. Hence this is a humble attempt to analyze commonly employed renal laboratory investigations through Ayurvedic principles and establish their relationship with Dosha, Dhatu, Mala, Kleda, Mutravaha Srotas, Mutrakrichra, Mutraghata, and Ashmari. **Materials and Methods:** A conceptual review was undertaken using classical Ayurvedic texts including Charaka Samhita,

Sushruta Samhita, Ashtanga Hridaya, and Madhava Nidana along with contemporary nephrology literature. Individual laboratory parameters were analyzed based on their physiological origin and pathological implications. **Results:** Creatinine and urea predominantly represent Mala accumulation, sodium and chloride reflect Kleda dysregulation, potassium indicates Vata dysfunction, while calcium and phosphorus signify Asthi Dhatu involvement and Dhatvagni disturbances. Progressive renal disease may be understood as a continuum beginning with Agnimandya and culminating in Dhatu Kshaya. **Conclusion:** Renal laboratory abnormalities should not be interpreted solely as retained wastes. Each parameter represents a distinct level of Ayurvedic physiological dysfunction. Understanding these distinctions provides a rational framework for individualized Ayurvedic assessment and treatment planning in renal disorders.

KEYWORDS: Kidney disease, Mutravaha Srotas, Creatinine, Urea, Kleda, Asthi Dhatu, Mutraghata, Ayurveda.

INTRODUCTION

Kidneys play a crucial role in maintaining fluid-electrolyte balance, acid-base homeostasis, endocrine regulation, and elimination of metabolic waste products. Renal dysfunction results in accumulation of metabolic wastes, disturbances in fluid regulation, electrolyte abnormalities, and mineral bone disorders. Laboratory investigations such as serum creatinine, blood urea nitrogen (BUN), serum urea, sodium, potassium, chloride, calcium, and phosphorus are routinely used to assess renal function and monitor disease progression.[1]

In Ayurveda, health is defined as.

"समदोषः समाग्निश्च समधातु मलक्रियाः ।

प्रसन्नात्मेन्द्रियमनाः स्वस्थ इत्यभिधीयते ॥" (Sushruta Sutra Sthana 15/48)

This definition highlights the importance of balanced Doshas, proper Agni, normal Dhatu status, and effective Mala elimination.[2] Renal physiology can therefore be interpreted through the integrated functioning of Agni, Kleda regulation, Mutravaha Srotas, Apana Vata, and Mala Nirharana.[3-5]

Modern renal investigations measure various biochemical substances retained or dysregulated during kidney dysfunction. However, these substances differ significantly in their

physiological origin and pathological significance. Consequently, their Ayurvedic interpretation should also differ. The present review explores these distinctions and attempts to correlate renal laboratory parameters with classical Ayurvedic concepts.

MATERIALS AND METHODS

The present study is a conceptual narrative review based on information obtained from standard nephrology literature and classical Ayurvedic texts, including Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, and Madhava Nidana. Commonly employed renal laboratory parameters were analyzed with respect to their physiological origin, clinical significance, and probable Ayurvedic correlations involving Dosha, Dhatu, Mala, Kleda, and Mutravaha Srotas. The findings were interpreted to establish an integrative understanding of renal laboratory abnormalities through Ayurvedic principles.

RESULTS

Table 1: Clinical Significance, Ayurvedic Correlation and Therapeutic Implications of Renal Laboratory Parameters.

Parameter	Normal Range	Clinical Interpretation	Ayurvedic Correlation	Treatment Implications
Serum Creatinine ↑	Male: 0.6–1.2 mg/dL Female: 0.5–1.1 mg/dL	Reduced GFR	Mutravaha Srotodushti, Mamsa Dhatu Mala retention	Ama Pachana, Srotoshodhana, Mutrala Chikitsa
Blood Urea Nitrogen ↑	10–20 mg/dL	Nitrogenous waste retention	Dhatvagni Mala accumulation, Ama	Deepana-Pachana, Kledahara treatment
Serum Urea ↑	15–40 mg/dL	Impaired excretion and metabolism	Pachyamana Ahara Mala retention	Agni Deepana and Mutrala Drugs
Serum Sodium ↓	135–145 mEq/L	Fluid overload	Kleda Vriddhi, Kapha predominance	Kledahara and Kapha Shamaka therapy
Serum Sodium ↑	3.5–5.0 mEq/L	Dehydration	Vata aggravation and Rukshata	Brimhana and fluid restoration
Serum Potassium ↑	96–106 mEq/L	Severe renal dysfunction	Vata functional impairment	Correction of Mutravaha Srotodushti
Serum Chloride Abnormality	8.5–10.5 mg/dL	Acid-base imbalance	Agni-Kleda derangement	Agni Deepana, Kledahara Chikitsa
Serum Calcium ↓	2.5–4.5 mg/dL	Renal osteodystrophy	Asthi Dhatu Kshaya	Asthi-poshaka and Rasayana therapy
Serum Phosphorus ↑		CKD-MBD	Asthi Dhatu Dushti and Dhatvagni Mala accumulation	Dhatu support and metabolic correction

Table 2: Correlation with Mutrakrichra, Mutraghata and Ashmari.

Laboratory Finding	Probable Ayurvedic Correlation	Justification
Elevated Creatinine	Mutrotsanga Mutraghata	Impaired urinary elimination
Elevated Creatinine with Oliguria	Bastikundalika Mutraghata	Severe urinary retention
Elevated Urea/BUN	Mutraghata with Ama predominance	Accumulation of metabolic wastes
Hyponatremia with Edema	Kaphaja Mutrakrichra	Excess Kleda and fluid retention
Hypernatremia	Vataja Mutrakrichra	Dehydration and Rukshata
Hyperkalemia	Advanced Mutraghata	Severe excretory dysfunction
Renal Calculi with Elevated Creatinine	Ashmari leading to Mutraghata	Mechanical obstruction of urine flow
Chronic Kidney Disease	Sarvaja Mutraghata	Progressive Tridoshaja involvement

DISCUSSION

Kidney diseases are often interpreted as disorders of waste accumulation. While this concept is partially correct, it fails to explain why different laboratory parameters provide distinct clinical information. From an Ayurvedic perspective, each biochemical marker reflects a different level of physiological dysfunction involving Mala, Kleda, Dosha, or Dhatu.

Serum creatinine primarily originates from muscular energy metabolism and represents the metabolic residue of Mamsa Dhatu. Its elevation indicates failure of the kidneys to eliminate Mamsa Dhatu Mala through Mutravaha Srotas. Since creatinine production remains relatively constant and is minimally affected by short-term metabolic changes, it serves as a specific marker of excretory dysfunction. Therefore, elevated creatinine primarily reflects Mutravaha Srotodushti associated with Kapha-induced Srotorodha and Apana Vata dysfunction. This explains its close resemblance to Mutraghata states characterized by impaired urinary elimination.[6,7]

Blood urea nitrogen and serum urea differ from creatinine in that they reflect both metabolic processing and excretion. Urea is generated through protein metabolism and therefore represents a form of Dhatvagni-generated Mala. Elevated urea may thus indicate both Agnimandya and impaired elimination through Mutravaha Srotas. The concept of Ama,

described as improperly processed metabolic material resulting from defective Agni, provides an important explanatory model for such abnormalities.[8,9]

Sodium abnormalities represent a different pathological domain. Sodium is not a waste product but a regulator of extracellular fluid volume and osmotic balance. Consequently, sodium disturbances are best interpreted through the concept of Kleda rather than Mala. Hyponatremia commonly observed in renal failure corresponds to Kleda Vriddhi and Kapha predominance resulting from excessive fluid retention. Hypernatremia, on the other hand, reflects dehydration, Rukshata, and Vata aggravation. Sodium therefore serves as a biochemical marker of Udakavaha Srotas dysfunction.[10,11]

Potassium abnormalities predominantly affect neuromuscular and cardiac physiology. Hyperkalemia causes muscle weakness, paralysis, arrhythmias, and cardiac arrest, all of which resemble severe disturbances in Vata-governed functions. Consequently, potassium may be interpreted as a marker of Vata integrity. Elevated potassium levels in advanced renal disease signify not only retention of a biochemical substance but also failure of the body to maintain Vata-mediated physiological functions.

Chloride abnormalities are generally associated with acid-base disturbances and fluid imbalance. Since chloride participates in maintaining the equilibrium between metabolic transformation and fluid regulation, it may be viewed as an indicator of Agni-Kleda interaction. Disturbances in chloride therefore represent Tridoshaja involvement affecting both metabolic and fluid homeostasis.

Calcium and phosphorus abnormalities indicate progression beyond simple waste retention and reflect involvement of Dhatu metabolism. Calcium is intimately related to Asthi Dhatu, and hypocalcemia seen in chronic kidney disease signifies Asthi Dhatu Kshaya. Phosphorus, meanwhile, represents both Asthi metabolism and accumulation of Dhatvagni-derived metabolic residues. Persistent hyperphosphatemia therefore indicates advanced disease involving Dhatu Dushti and chronicity.

These observations suggest that renal dysfunction progresses through multiple Ayurvedic stages. Initially, Agnimandya leads to Ama formation and Kleda accumulation. Progressive Srotorodha then impairs the functioning of Mutravaha Srotas, resulting in retention of metabolic wastes such as creatinine and urea. Continued deterioration leads to Vata

dysfunction, reflected by potassium abnormalities, and eventually culminates in Dhatu involvement manifested as calcium and phosphorus derangements.

The sequence may therefore be represented as.

Agnimandya → Ama Formation → Kleda Vriddhi → Srotorodha → Mutravaha Srotodushti → Mala Sanchaya → Vata Vaigunya → Dhatu Dushti → Asthi Dhatu Kshaya

This framework demonstrates that renal laboratory parameters should not be interpreted merely as markers of retained waste products. Instead, they represent different dimensions of Ayurvedic pathophysiology involving Mala, Kleda, Dosha, and Dhatu.

CONCLUSION

Renal laboratory investigations provide objective information regarding the functional status of the kidneys. However, their Ayurvedic significance extends beyond simple waste accumulation. Serum creatinine and urea predominantly represent disturbances at the level of Mala. Sodium and chloride reflect abnormalities in Kleda regulation and Udakavaha Srotas. Potassium serves as a marker of Vata dysfunction, whereas calcium and phosphorus indicate Dhatu-level pathology, particularly involving Asthi Dhatu.

Understanding renal laboratory parameters through this multidimensional Ayurvedic framework provides a more comprehensive interpretation of renal disease and establishes a rational basis for individualized therapeutic planning. Such an approach may facilitate meaningful integration of contemporary diagnostic methods with classical Ayurvedic principles.

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