IJCSPUB.ORG ISSN : 2250-1770
INTERNATIONAL JOURNAL OF CURRENT SCIENCE (IJCSPUB)
IJCS PUBLICATION (IJCSPUB.ORG) An International Open Access, Peer-reviewed, Refereed Journal

Kidney Diseases: The Silent Killers – A Physiological And Clinical Review

Author: Dr Urvashi Sharma, Dr Kamlesh Devanda

Affiliation: Department of Physiology, Lecturer [Kala Ashram Ayurved Medical College, Udaipur]

Affiliation : MBBS, Resident doctor [BSA ROHINI , Delhi]

1. Abstract

Chronic kidney disease (CKD) is a serious health condition that affects a significant number of individuals globally. It manifests gradually and often goes unnoticed until it has progressed to a severe stage, earning it the moniker "the silent killer."

This review aims to provide an in-depth understanding of the kidneys 'functions and the mechanisms underlying their damage. We will explore the various pathways through which CKD develops and elucidate its inherent dangers.

Furthermore, we will emphasise the paramount importance of early detection and prevention measures. Timely intervention can significantly impact the management of CKD and contribute to the preservation of kidney health.

Therefore, we embark on a comprehensive exploration of kidney disease, equipping you with knowledge on how to safeguard your precious kidneys.

Key words - CKD , *medovaha srotas, mutravaha srotas, rasayana, panchkarma,* asymptomatic

2. Aims and Objectives:

- **Awareness Promotion:** To raise awareness about *Ayurveda's* treatment modalities and elucidate their limitations.
- **Dietary Recommendations:** To outline *Ayurvedic* dietary guidelines for prevention and support during treatment.
- **Research Evaluation:** To reference pertinent research papers to assess the efficacy of *Ayurveda's* treatments.

3. Introduction:

Chronic kidney disease (CKD) frequently presents with asymptomatic manifestations in its early stages, leading to delayed diagnosis and restricted therapeutic windows. Globally, CKD ranks among the leading causes of mortality, with millions of individuals remaining undiagnosed. Despite their compact size, the kidneys perform intricate regulatory functions, including fluid balance, electrolyte homeostasis, erythropoiesis, and acid-base equilibrium. The disruption of these functions, even subtly, can engender systemic consequences long before the manifestation of clinical signs. [1]

Chronic Kidney Disease of Uncertain Aetiology (CKDu) is a severe form of chronic kidney disease (CKD) that significantly impacts the global healthcare system. Over 200 scientific publications revealed the causes of CKDu, which causes over 30,000 annual deaths. Unlike CKD, CKDu is a non-communicable occupational disease that causes progressive kidney deterioration without established risk factors like hypertension, diabetes, or glomerulonephritis. Diagnosis is usually made when kidney function has severely declined. [2]

Chronic Kidney Disease (CKD) is increasingly acknowledged in *Ayurvedic* medicine as a condition with distinct pathophysiological interpretations. Although modern medicine categorises Chronic Kidney Disease (CKD) as a progressive deterioration of renal function, *Ayurveda* posits it as a consequence of *Dosha* imbalance, *Srotorodha*, and *Dhatu Kshaya.* This integrative review delves into the *Ayurvedic* correlates, pathogenesis, and treatment modalities associated with CKD.

4. Literary review

Physiological Roles of the Kidney

In *Ayurveda*, the kidneys are functionally integrated into the concept of *medovaha sortas* which has *srotomoola vrikka* (kidneys) and *vapavahana*(omentum) and *Mutravaha Srotas* and its *moola* are *basti* (urinary bladder) and *vankshan* (pelvic region). [3] Though not explicitly named, organs like *Vrikka* are involved in the formation of urine and water metabolism. *Vrikka* word is derived from word *vrikkadhan* means to take. *Vrikka* is developed from essence of rakta and meda. [4] *Apana Vata* governs the downward flow of urine, while the proper function of *Meda*, *Rakta*, and *Kleda* ensures balance in fluid and waste elimination. According to *acharya Sushruta mutravaha Nadi* are situated between the *amashaya* , *pakvashaya*, and *basti* and their function is to continuously drain sutra into baste via process called *nisyandana* (urine formation).[5]

The kidneys, ureters, bladder, and urethra are collectively known as the modern scientific excretory system.

The Kidney

The nephron, the structural and functional unit of the kidney, orchestrates processes like glomerular filtration, tubular reabsorption/secretion, and hormone synthesis. Daily, ~180 litres of plasma is filtered; most is reabsorbed, leaving ~1.5 litres of urine. [6]

- Glomerular Function: Maintains filtration via Starling forces and the glomerular basement membrane.
- Tubular Function: Facilitates reabsorption of sodium, water, glucose, amino acids; secretion of hydrogen and potassium ions.
- Endocrine Role: Secretes erythropoietin (stimulates red blood cell production), renin (initiates RAAS), and activates vitamin D.

Ayurvedic Correlates of CKD

- CKD can be correlated with conditions such as:
- *Mutrakshaya* (deficiency of urine output)
- *Prameha* (a broad term encompassing diabetes and metabolic disorders)
- *Mutraghata* (urinary retention or obstruction)
- *Srotorodha* (blockage of channels)
- *Ojakshaya* (loss of vitality and immunity)

CKD is viewed as a *Tridoshic* disorder, primarily dominated by *Kapha* (accumulation), *Vata* (degeneration), and *Pitta* (inflammation).

Pathophysiology of Chronic Kidney Disease

Risk factors of CKD

As per Ayurvedic review, these are the cause factors of *medovaha srotodushti*; these are - lack of exercise , sedentary lifestyle, daytime sleeping, excessive fatty food, *Varuni* (a type of alcohol) overconsumption. [7] Causative factors of *mutravaha srotodushti* are ; extremely underweight, injury, suppressing natural urges (13 *Vega* which are explained in *Charka Samhita* mainly urine and faces), unhealthy eating habits like *atyashana*(excessive food intake), *ajeernashan*(food intake before digestion of previous meal) may cause build-up of Ama dosa, *adhyashana* (frequent snacking) all these unhealthy eating habits may cause metabolic disorders and build-up of *Ama dosha* in the body.

As per modern science - old age, hypertension, diabetes mellitus, smoking, systemic inflammatory conditions, reno-vascular disease, idiopathic causes and hereditary kidney conditions. [8]

Symptoms of *medovaha srotodushti* are - decreasing life span, lethargy, lack of functioning of the body, weakness, increased thirst and appetite, increased sweating. [9]

Symptoms of *mutravaha srotodushti* are - excessive or less urine output, oliguria, turbid urine, dysuria. [10] In decreased urine output signs and symptoms are discolouration of urine, polydipsia, dry mouth, pain in the bladder, haematuria. And when urine output increases signs and symptoms appear are increased frequency of urine, painful bladder, bloating , desire to urinate even when urinating. [11]

Causative factors can be summarised as below :

According to ayurveda	According to modern review
Lack of physical activities may cause metabolic disorders	Diabetes mellitus, hypertension
Sleep in daytime may cause srotorodha, suppress natural urge to urinate	Old age
Cachexia, injury	Inflammatory condition
Fatty food, excessive food intake, having meal in condition of indigestion, frequent snacking	Excessive Protein and fatty diet
Alcohol consumption	Smoking

Signs and symptoms can be summarised as below :

According to ayurveda science	According to modern science
Urine output is increased or decreased Intermissive urination Turbid urine Dysuria	Reduced GFR High BP Ischemic injury of nephrons
Oliguria , urine discolouration , hematuria	Glomerular hyperfilteration Increased GFR in early stage of disease
Polydypsia, polyphagia, emaciation, excessive sweating, lethargy, infertility	Glomerulonecrosis in overtime Excretory function loss Non excretory function loss
Pain in urinary bladder	Excretory function loss are - decreased urine output, uraemia, reduced GFR, KFT decreased Non excretory function loss are - anxiety, hypocalcemia, anaemia, pallor, fatigue, loss of libido, infertility, infection, delayed wound healing, erratic blood glucose, lipid production increases causes advanced atherosclerosis.

Mandagni (Poor digestion) results in formation of *Ama dosha* which circulates and deposits in *mutravaha sortas* which causes blockage or *srotorodha* results in impaired kidney functions and leads to accumulation of metabolic wastes.

Approach	Pathogenesis/Pathophysiology
Ayurveda	*Ama* formation due to *Agnimandya* (poor digestion), *Srotorodha* (impaired fluid and waste transport), Vitiation of *Rasa*, *Rakta*, and *Meda Dhatus*, Progressive *Ojas* depletion and systemic involvement
Modern Science	GFR <60 mL/min/1.73 m2 for >3 months or renal damage (e.g., proteinuria), Glomerulosclerosis (fibrosis and scarring reduce filtration surface area), Tubulointerstitial Inflammation (ischemic and immune-mediated injury to tubules), RAAS Overactivity (increases intraglomerular pressure), Uremic Toxins (accumulate due to reduced clearance, affecting cardiovascular and neurological systems)

Chart: Kidney Diseases as "Silent Killers"

Asymptomatic Nature

Most patients in CKD stages 1–3 exhibit no overt symptoms due to the kidneys' compensatory ability.

Nonspecific Symptoms

Initial signs such as fatigue, mild anaemia, or nocturia are often overlooked, leading to late diagnosis with significant nephron loss.

Cardiovascular Risk

High cardiovascular mortality is common, with CKD contributing to endothelial dysfunction, vascular calcification, and left ventricular hypertrophy. [12]

Clinical Progression and Complications [13]

• **Stage**	• **Description**	• **Description**
• 1	• Normal or high GFR > 90ml with structural damage	• Asymptomatic
• 2	• Kidney damage and Moderate decrease in GFR 60 - 89 ml	• Asymptomatic
• 3A • 3B	• GFR 45 - 59 • GFR 30 - 44	• Usually asymptomatic • Anemia in some. Most are non - progressive
4	GFR 15 -29	Electrolyte imbalance symptoms
5	GFR < 15	Significant symptoms Dialysis when GFR < 10 ml

Public Health Perspective

Late-stage CKD is resource-intensive and associated with poor outcomes. Early detection via estimated GFR (eGFR) and albumin-to-creatinine ratio (ACR) is essential, especially in diabetics and hypertensives. However, lack of awareness and routine screening often delay diagnosis. [14]

Ayurvedic Management of CKD

A. General Principles

- *Shodhana* (detoxification therapy): Mild *Panchakarma* therapies like *Virechana* and *Basti* in early stages
- *Shamana* (pacification): pacification of dosa with use of herbs and *Rasayana*(rejuvenation therapy) (e.g. *gukshura*, *punarnava*, *varun*)
- *Pathya-Apathya*: Strict dietary and lifestyle modifications.

B. Common Herbs Used:

- *Punarnava* (Boerhavia diffusa): Diuretic and nephroprotective
- *Gokshura* (Tribulus terrestris): Mutrala and Rasayana
- *Varuna* (Crataeva nurvala): Relieves Mutrakrichra
- *Chandraprabha Vati*: Diuretic, anti-inflammatory

- *Guduchi* (Tinospora cordifolia) and *Amalaki* (Emblica officinalis) : Immunomodulator (rasayana therapy)

C. Dietary Recommendations:
- Avoid heavy, oily, salty, and obstructive foods
- Emphasize warm, light meals with digestive spices like jeera and ajwain
- Maintain a low-protein, low-salt vegetarian diet

D. Lifestyle Guidelines:
- Avoid daytime sleeping and late-night wakefulness
- Encourage gentle exercise and stress reduction
- Avoid tobacco, alcohol, and overuse of medications

- Low-salt diet, physical activity, smoking cessation
- Surveillance: Annual renal function tests in high-risk populations.

Evidence-Based Ayurvedic Support

- Boerhavia diffusa has demonstrated nephroprotective activity in preclinical studies.
  - Clinical use of *Punarnavadi Mandura* and *Chandraprabha Vati* has shown improvement in creatinine levels and urinary output in early-stage CKD.
  - Tinospora cordifolia supports immunity and reduces inflammation.

- Potential benefits of Ayurvedic interventions suggest that [10]

  - condition improvement without dialysis because *Panchakarma* helped in dialysis withdrawal.
  - Dropping serum creatinine levels, blood urea levels, and improving haemoglobin levels.
  - Studies suggest that Ayurvedic interventions may help alleviate symptoms associated with CKD.

5. Conclusion

Kidney diseases progress silently but cause significant morbidity and mortality. Comprehending renal physiology and early indicators is crucial for clinicians and healthcare systems. Routine screening, public awareness, and primary prevention must be prioritised to mitigate the burden of these “silent killers.”

Ayurvedic therapies are most beneficial in early to moderate stages of chronic kidney disease (CKD) and should be administered under expert supervision. Advanced CKD necessitates modern interventions such as dialysis or transplantation. Integrating Ayurvedic principles with nephrology practice can support patient outcomes and enhance quality of life.

Ayurveda provides a holistic understanding of CKD, rooted in the balance of *Doshas*, the integrity of *Dhatus*, and the proper functioning of *Srotas*. Herbal treatments, lifestyle modifications, and *Panchakarma* therapies can contribute to renal health. Interdisciplinary approaches combining Ayurveda with modern nephrology can optimise care and slow disease progression accompanied by continued nephrologist supervision to prevent complications.

References

1. Bikbov, B., Purcell, C. A., Levey, A. S., Smith, M., Abdoli, A., Abebe, M., ... & Murray, C. J. L. (2020). Global, regional, and national burden of chronic kidney disease, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. The Lancet, 395(10225), 709–733.

2. Priyadarshani WVD, de Namor AFD, Silva SRP. Rising of a global silent killer: critical analysis of chronic kidney disease of uncertain aetiology (CKDu) worldwide and mitigation steps. Environ Geochem Health. 2023 Jun;45(6):2647-2662. doi: 10.1007/s10653-022-01373-y. Epub 2022 Sep 12. PMID: 36094692; PMCID: PMC10232572.

3. Charka Samhita , vidhyotani commentry by Kashinath Shastri and Gorakhnath Chaturvedi , Vimana Sthana 5/8
4. Sushruta Samhita, Ayurvedatatvasandeepika commentary by dr. Ambika dutta Shastri,sharir *sthan,* 4/ 30
5. Sushruta samhita , ayurvedatatvasandeepika commentry by Dr Ambikadutta Shastri, Nidaan *sthan,* 3/ 23
6. Hall, J. E. (2015). Guyton and hall textbook of medical physiology (13th ed.). W B Saunders.
7. Charka Samhita , vidhyotani commentry by Kashinath Shastri and Gorakhnath Chaturvedi , Vimana Sthana , 5/16
8. Davidson book of medicine, publisher Churchill Limestone , edition 2014.
9. Sushruta Samhita , Ayurvedatatvasandeepika commentry by Dr Ambikadutt Shastru, 9/11
10. Charka Samhita , vidhyotani commentry by Kashinath Shastri and Gorakhnath Chaturvedi , Vimana Sthana , 5/16
11. Sushruta Samhita , Ayurvedatatvaderpika commentry by Dr Ambikadutta Shastri, sutra Asthana, 15/20
12. Davidson book of Medicine, publisher Churchill Limestone, edition 2014.
13. Sarnak, M. J., Levey, A. S., Schoolwerth, A. C., Coresh, J., Culleton, B., Hamm, L. L., ... & Wilson, P. W. (2003). Kidney disease as a risk factor for development of cardiovascular disease. Circulation, 108(17), 2154-2169.
14. Levey, A. S., Becker, C., & Inker, L. A. (2015). Glomerular filtration rate and albuminuria for detection and staging of acute and chronic kidney disease in adults: A systematic review. JAMA, 313(8), 837-846.