WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 12, 85-102. Review Article ISSN 2277–7105

REVIEW ON CHRONIC KIDNEY DISEASE AND ITS TREATMENT IN AYURVEDA

Mr. Datta Siddheshwar Wagh, Mr. Rohit Babasaheb Goyekar, Mr. Shubham Ashok Pawar, Mr. Kunal Kishor Patil, Mr. Saurabh Bharat Jagdale, Prof. Ganesh B. Ahire, Prof. Ashwini D. Pagare

Rupesh Badhan Institute of Pharmacy Pimpalner, Tal. sakri, Dist. Dhule, Maharashtra Pin Code 424306.

Article Received on
23 April 2024,

Revised on 13 May 2024,
Accepted on 02 June 2024

DOI: 10.20959/wjpr202412-32713

***Corresponding Author**
Mr. Datta Siddheshwar Wagh
Rupesh Badhan Institute of Pharmacy Pimpalner, Tal. sakri, Dist. Dhule, Maharashtra Pin Code 424306.

ABSTRACT

Renal failure is the most important disease that causes losing in the efficiency of kidney and is renal failure or may called end stage kidney disease where capacity for kidney become 15% less than the normal levels. This disease can be classified into two types : first (acute kidney failure) which may resolve and it rapidly developed. Second (chronic kidney failure): it slowly developed and may become a permanent condition Symptoms of Renal failure include vomiting; swelling in the legs; a loss of appetite; confusion and tiredness. Several complications occurred which include high blood potassium; volume overload and uremia in acute condition while high blood pressure; anemia and heart disease in the chronic condition. There are several factors that may lead to the progress of acute renal failure conditions such as hypotension, a blockage of the urinary tract, hemolytic uremic syndrome and some medications. While diabetes, hypertension, polycystic renal disease and nephrotic syndrome represent the majorcauses of chronic renal failure. Signs that help in identification of acute and chronic renal failure based on mishmash of several factors and help in distinguish between its types such as increasing of creatinine levels and decreasing of urine production are the signs of acute failure while decrease the rate of glomerular filtration to below of 15 or therapy with renal replacement are the signs of chronic renal failure. Acute failure can be treated depending on the main causes, on the other hand may use dialysis (hemodialysis or peritoneal dialysis) or kidney transplant in order treating chronic failure.

KEYWORDS: Chronic kidney disease, GFR, Acute renal failure, Chronic renal failure**,** Diagnosis**,** Treatment.

INTRODUCTION

A progressive loss of kidney function over months or years is called chronic kidney disease (CKD). Worsening kidney function can cause a variety of symptoms, such as feeling generally sick and having less appetite. People who are known to be at risk of kidney difficulties, such as those with high blood pressure, diabetes, or a blood relative with chronic kidney disease (CKD), are frequently screened in order to diagnosis chronic kidney disease. A recognized complication of this disease, such as anemia, pericarditis, or cardiovascular disease, may also be discovered as a result of it. In order to be distinguished from acute renal disease, the decline in kidney function must last longer than three months. A blood test for creatinine, a breakdown product of muscle metabolism, can detect chronic renal disease. Elevated levels of creatinine signify a reduced glomerular filtration rate, which in turn signifies a diminished kidney's ability to eliminate waste materials. Early on in chronic kidney disease (CKD), creatinine levels may be normal. The illness is identified through a urine test called a urinalysis, which determines if the kidneys are allowing red blood cells or protein to pass into the urine. In order to thoroughly look at the underlying cause of kidney impairment, blood tests, kidney biopsies, and other medical imaging techniques are employed to find out if a reversible cause for the kidney malfunction is present. CKD poses a growing problem to society as the incidence of the disease increases at an annual rate of 8%. The incidence of chronic kidney disease in India, which is a densely populated country with low income, different food, cultural traditions and lifestyle habits, is 7.85 million CRF patients of its 1 billion population and the prevalence rate is 0.78%. The United States Renal Data Systems 2011 Annual Data Report determined that 15.1% of all adults above the age of 20 years have chronic kidney disease. It is estimated that more than 10% of adults in the United States - more than 20 million people - may have CKD at varying levels of seriousness. Chronic kidney disease resulted in 956,000 deaths in 2013 up from 409,000 deaths in 1990. Screening of at-risk people is important because treatments exist that delay the progression of CKD.[1,2,4,3]

Definition of CKD

Chronic kidney disease (CKD) is defined as the presence of kidney damage or an estimated glomerular filtration rate (eGFR) less than 60 ml/min/1.73 mt2, persisting for 3 months or

more, irrespective of the cause.

What is (CKD) Chronic Kidney Disease

Chronic kidney disease (CKD) means your kidneys are damaged and can't filter blood the way they should. The disease is called "chronic" because the damage to your kidneys happens slowly over a long period of time. This damage can cause wastes to build up in your body. CKD can also cause other health problems.

Renal failure can be divided into two categories

- **Acute Renal Failure**
- **Chronic Renal Failure**

Acute Renal Failure (ARF): is the term used to describe the abrupt and typically reversible loss of renal function during a few days to weeks. ARF is defined by biochemistry as a rise in plasma creatinine concentration of more than 200 micromole/l. Severe ARF has been linked to several up to 90% death rates and organ failures.

Chronic Renal Failure: This is a term used to describe an irreversible decline in renal function that often occurs over several years. It only shows up as a metabolic anomaly at first. Eventually a decline in metabolic, endocrine, and excretory functioning of kidney leads to the development of the clinical symptoms and signs of renal failure. When death is likely without renal replacement therapy, it is called end stage renal failure.[13]

Who has a higher risk of developing CKD?

Kidney illness is a possibility if you have

- **Diabetes:** The most common cause of CKD is diabetes. Diabetes-related elevated blood glucose, or blood sugar, can harm kidney blood vessels. Approximately one in three diabetics also has CKD.1.

- **Elevated Blood Pressure:** The second most common cause of CKD is high blood pressure. Similar to elevated blood glucose, hypertension can also lead to renal blood vessel damage. In people with high blood pressure, CKD affects nearly one in five.

- **Heart Condition:** Studies reveal a connection between heart disease and kidney illness. Heart patients are more likely to get kidney disease, while kidney patients are more likely to have heart disease. To learn more about the connection between heart disease and renal

illness, researchers are working.

- **Family history of kidney failure:** You are at risk for kidney disease (CKD) if your sister, brother, father, or sister has renal failure. Renal illness typically runs in families. Get your family members tested if you have renal illness. Speak with your family during special occasions and make use of the advice provided in the family health reunion guide. Your chances of having kidney disease increase with age.1 The longer you have had diabetes, high blood pressure, or heart disease, the more likely that you will have kidney disease. African Americans, Hispanics, and American Indians tend to have a greater risk for CKD.2 The greater risk is due mostly to higher rates of diabetes and high blood pressure among these groups. Scientists are studying other possible reasons for this increased risk.[11,12]

Types of Chronic Kidney Disease

1. **Glomerulonephritis:** Glomerulonephritis is a type of kidney disease. It involves damage to the glomeruli (tiny filters) inside your kidneys. If you have glomerulonephritis, your kidneys can have trouble removing waste and fluid from your body. Many mild cases resolve with treatment. If the condition becomes severe, it can lead to kidney failure.[14]

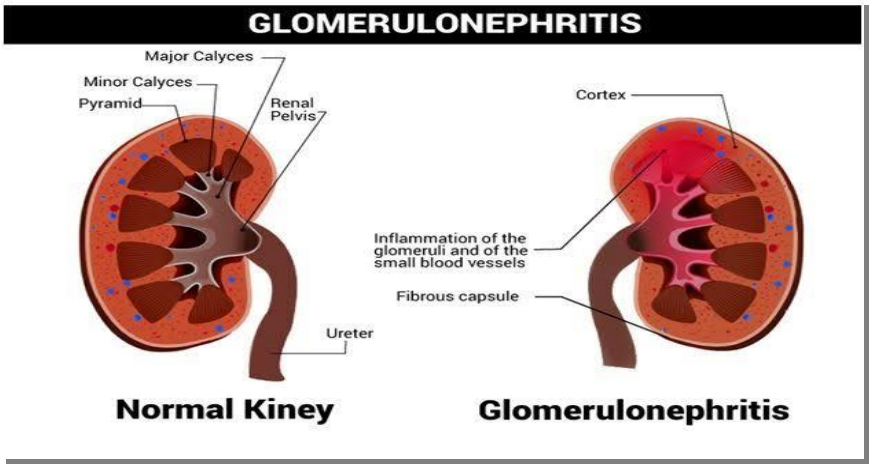


Fig. 1: Glomerulonephritis.[22]

2. **Kidney Stones**

Kidney stones are hard deposits of minerals and acid salts that stick together in concentrated urine. They can be painful when passing through the urinary tract, but usually don't cause permanent damage**.**

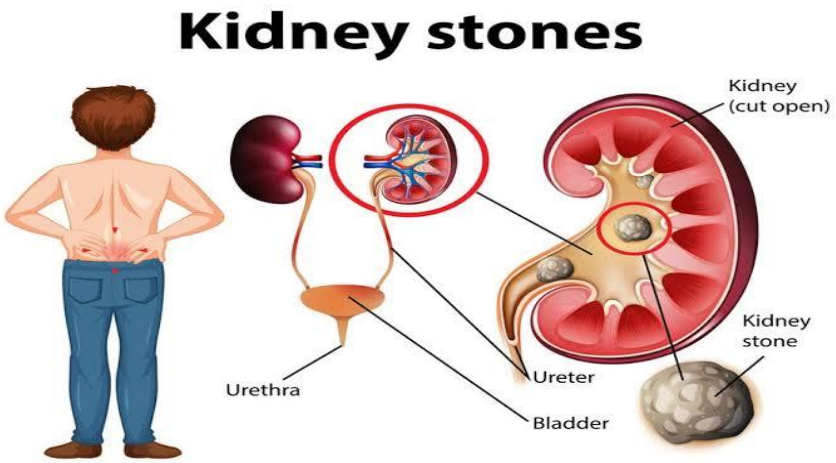


Fig. 2: Kidney Stone.[23]

Types of Stones

Stones are mainly classified based on crystalline/mineral substances in the stone

I. **Calcium Oxalate Stones:** This is the most common type of stones which occurs in two forms calcium oxalate and calcium phosphate .These stones cannot be dissolved with medicine. The only treatment is letting the small ones pass and treating the large ones with surgery**.**

II. **Uric acid stones:** This type of stone is common seen in gout patients because of purine abnormalities. Uric acid stones sometimes be dissolved by bicarbonates, if stones are not dissolved then surgery may be necessary.

III. **Struvite stones:** This type of stone is called as infection stone. They form large stones in the kidney which typically need multiple surgical treatments**.**

IV. **Cysteine stones:** Cysteinuria is a rare autosomal –recessive hereditary disorder of amino acids transport in the renal tubules which results in the urinary excretion of large amounts of cysteine.[15]

3. Lupus

Lupus is a disease in which the body's immune system attacks its own cells and organs, called autoimmune disease. Lupus causes the immune system to make proteins called autoantibodies. These proteins attack tissues and organs in the body, including the kidneys.[16]

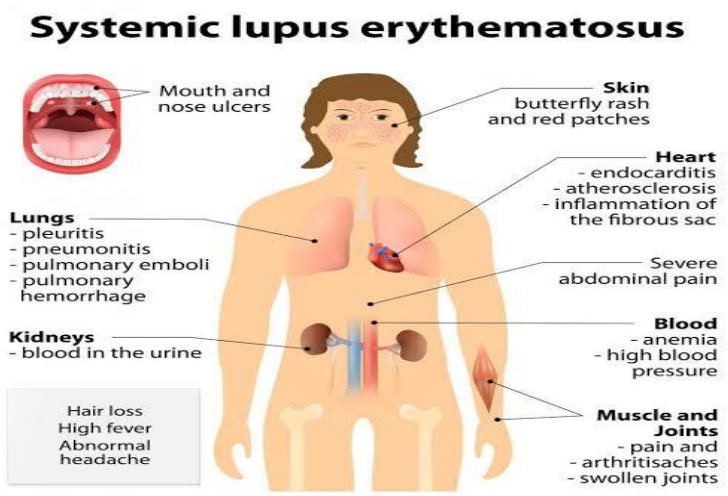


Fig. 3: Lupus.[24]

4. Urinary Tract Infection

Urinary tract infection (UTI) is an infection in any part of the urinary system. The urinary system includes the kidneys, ureters, bladder and urethra. Most infections involve the lower urinary tract — the bladder and the urethra.

Women are at greater risk of developing a UTI than are men. If an infection is limited to the bladder, it can be painful and annoying. But serious health problems can result if a UTI spreads to the kidneys.[15]

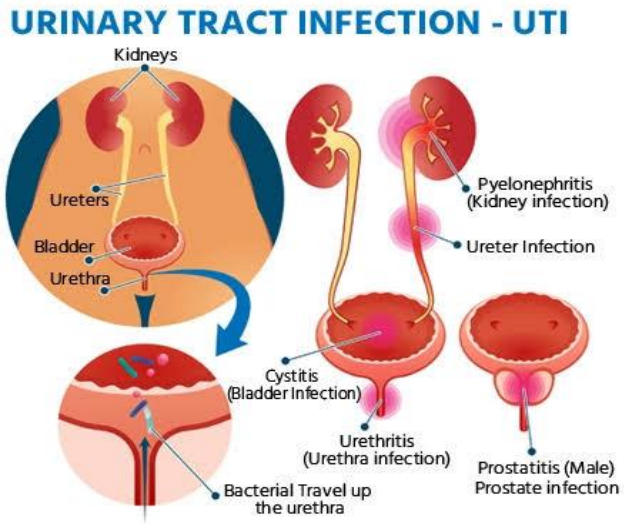


Fig. 4: UTI.[25]

5. Acute Tubular Necrosis

Acute tubular necrosis is a condition that causes the lack of oxygen and blood flow to the

kidneys, damaging them. Tube-shaped structures in the kidneys, called tubules, filter out waste products and fluid. These structures are damaged in acute tubular necrosis.

When this happens acute kidney failure may occur, with electrolytes and fluids increasing in the body, possibly past safe levels.[17]

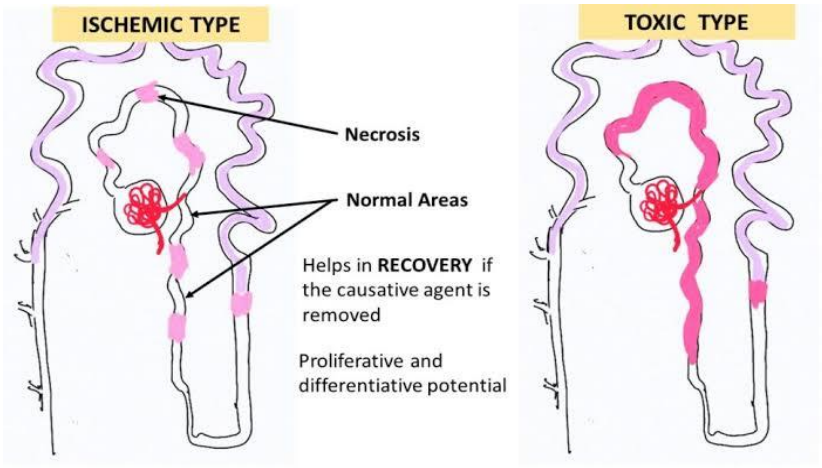


Fig. 5: Acute Tubular Necrosis.[26]

6. Analgesic Nephropathy

Analgesic nephropathy involves damage to one or both kidneys caused by overexposure to mixtures of medicines, especially over-the-counter pain medicines (analgesics).[18]

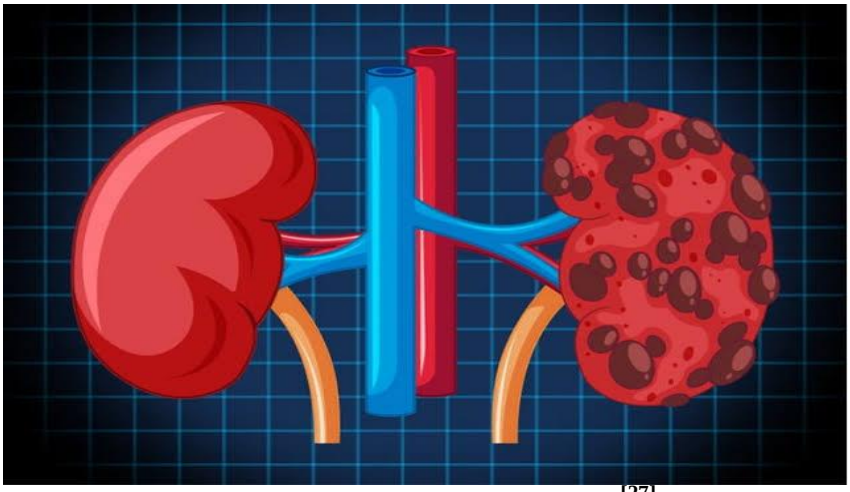


Fig. 6: Analgesic Nephropathy.[27]

7. Cystinosis

Cystinosis is a rare, multisystem genetic disorder characterized by the accumulation of an amino acid called cystine in different tissues and organs of the body including the kidneys, eyes, muscles, liver, pancreas and brain. The kidneys and eyes are the two organs most often

affected.[19]

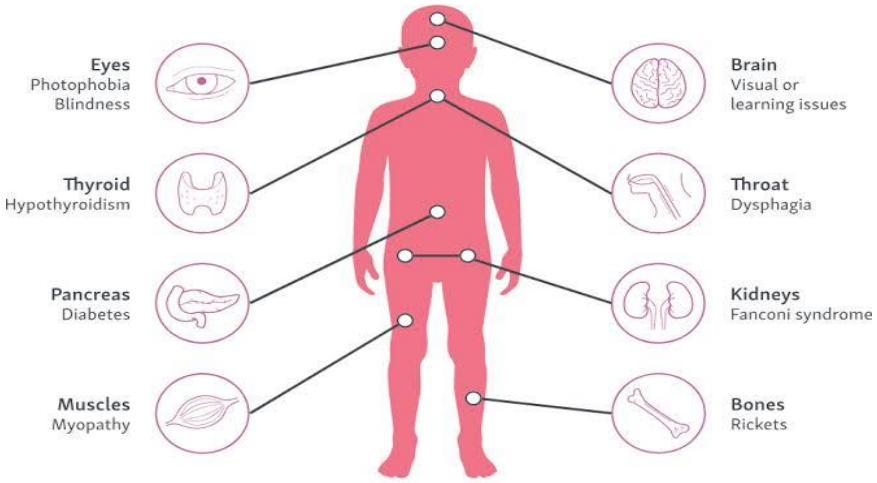


Fig. 7: cystinosis.[28]

8. Interstitial Nephritis

Interstitial nephritis is a kidney condition characterized by swelling in between the kidney tubules. The main functions of your kidneys are to filter your blood and to get rid of waste from your body. The kidney tubules reabsorb water and important organic substances from the filtered blood and secrete substances you don't need into your urine for removal from your body. Swelling of these tubules can cause a number of kidney symptoms that range from mild to severe.[20]

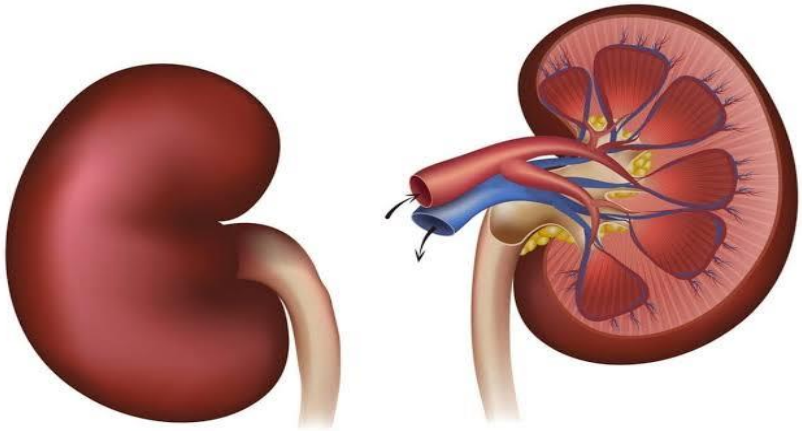


Fig. 8: Interstitial nephritis.[29]

9. Acute Kidney Injury

Acute kidney injury (AKI) is where your kidneys suddenly stop working properly. It can range from minor loss of kidney function to complete kidney failure.

AKI normally happens as a complication of another serious illness. It's not the result of a physical blow to the kidneys, as the name might suggest**.** This type of kidney damage is usually seen in older people who are unwell with other conditions and the kidneys are also affected.[21]

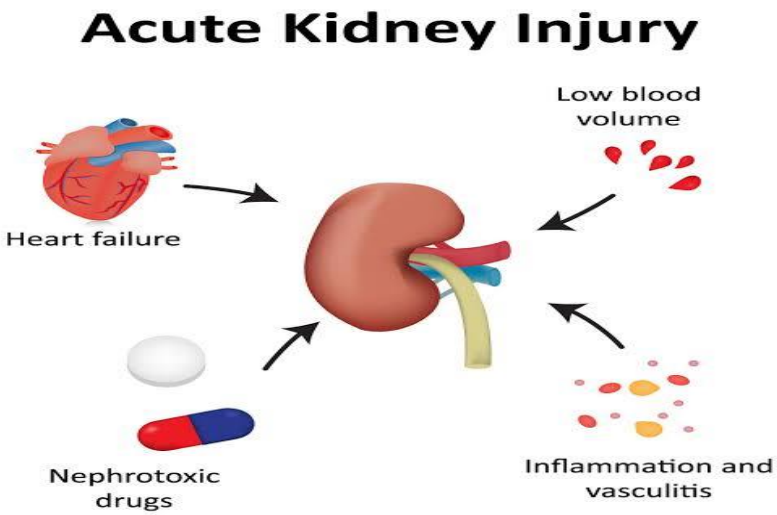


Fig. 9: Acute Kidney Injury.[30]

About Chronic Kidney Disease (CKD)

Your kidneys do many important jobs. Some of the ways they keep your whole body in balance include:

- Removing natural waste products and extra water from your body
- Helping make red blood cells
- Balancing important minerals in your body
- Helping maintain your blood pressure
- Keeping your bones healthy

Chronic kidney disease (CKD) is when the kidneys have become damaged over time (for at least 3 months) and have a hard time doing all their important jobs. CKD also increases the risk of other health problems like heart disease and stroke. Developing CKD is usually a very slow process with very few symptoms at first. So, CKD is divided into 5 stages to help guide treatment decisions.[5]

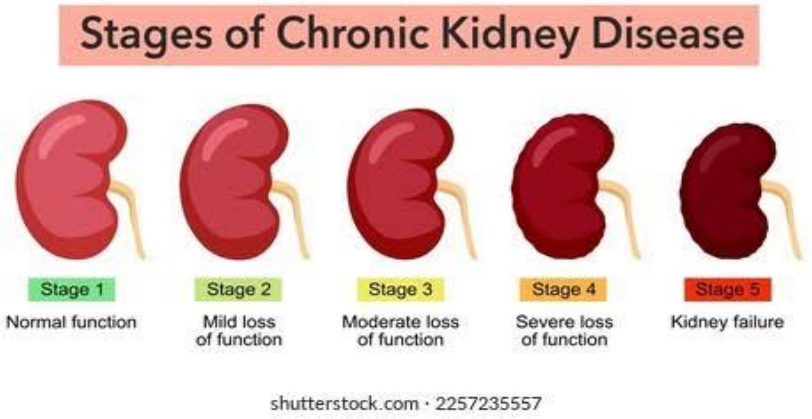


Fig. 10: Stages of CKD.[31]

Chronic Kidney Disease Has Been Classified Into 5 Stages

Stage 1

Slightly diminished function; kidney damage with normal or relatively high GFR (≥90 ml/min/1.73 m2). Kidney damage is defined as pathological abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

Stage 2

Mild reduction in GFR (60–89 ml/min/1.73 m2) with kidney damage. Kidney damage is defined as pathological abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

Stage 3

Moderate reduction in GFR (30–59 ml/min/1.73 m2): British guidelines distinguish between stage 3A (GFR 45–59) and stage 3B (GFR 30–44) for purposes of screening and referral.

Stage 4

Severe reduction in GFR (15–29 ml/min/1.73 m2).Preparation for renal replacement therapy.

Stage 5

Established kidney failure (GFR <15 ml/min/1.73 m2), permanent renal replacement therapy, or end-stage kidney disease.

There is no specific treatment to slow the worsening of chronic kidney disease. If there is an underlying cause to CKD, may be treated directly with treatments aimed to slow the damage. Severe CKD needs dialysis or a kidney transplant.[1]

Clinical Trial Design

Patient heterogeneity is considered one of the main reasons why clinical trials in nephrology commonly fail Indeed, in adults, a CKD diagnosis might be the consequence of several contributing factors that have accumulated over time, such as APOL1 or UMOD variants (which modify CKD progression), low nephron endowment or AKI episodes earlier in life. Such complexity has important implications for the design of CKD trials that necessitates the characterization ofhomogeneous patient subgroups. The ensuing targeted clinical trials will require fewer participants and increase the possibility of identifying appropriate drugs for different patients. Trial design could be improved by reconsidering disease entities defined by descriptive histological features without causative clues such as FSGS, avoiding add-on designs that incorporate drugs with redundant mechanisms of action, preselecting patients on the basis of biomarker profile and studying end points that better predict CKD progression to ESRD. For example, to test the efficacy of the C5a receptor inhibitor avacopan in patients with ANCA vasculitis, the CLEAR trial at first avoided the usual add-on standard of care approach and instead compared avacopan plus low- dose steroids versus placebo plus high-dose steroids on top of either cyclophosphamide or rituximab This strategy enabled researchers to prove that avacopan was effective in replacing high-dose glucocorticoids in treating vasculitis.[9,10]

Signs and Symptoms

Many people living with CKD do not have any symptoms until the more advanced stages and/or complications develop. If symptoms do happen, they may include:

- Foamy urine
- Urinating (peeing) more often or less often than usual
- Itchy and/or dry skin
- Feeling tired
- Nausea
- Loss of appetite
- Weight loss without trying to lose weight[5]

People who have more advanced stages of CKD may also notice

- Trouble concentrating
- Numbness or swelling in your arms, legs, ankles, or feet
- Achy muscles or cramping

- Shortness of breath
- Vomiting
- Trouble sleeping
- Breath smells like ammonia (also described as urine-like or "fishy"

Causes

Risk Factors

Anyone can develop CKD - at any age. However, some people are at a higher risk than others. The most common CKD risk factors are:

- Diabetes
- High blood pressure (hypertension)
- Heart disease and/or heart failure
- Obesity
- Over the age of 60
- Family history of CKD or kidney failure
- Personal history of acute kidney injury (AKI)
- Smoking and/or use of tobacco products[5]

For many people, CKD is not caused by just one reason. Instead, it is a result of many physical, environmental, and social factors. Early detection is important – CKD often begins without causing any noticeable symptoms. Knowing the risk factors can help you know your level of risk and if you should get checked for CKD.

Other Causes

CKD can also be caused by many other conditions or circumstances. Some examples include:

- **Glomerular diseases:** glomerulonephritis, IgA nephropathy (IgAN), and HIV nephropathy.
- **Inherited conditions:** polycystic kidney disease.
- **Autoimmune conditions:** lupus (lupus nephritis).
- **Severe infections:** sepsis and hemolytic uremic syndrome (HUS).
- **Other causes:** kidney cancer, kidney stones, frequent untreated and/or long-lasting urinary tract infections (UTIs), hydronephrosis, and kidney and urinary tract abnormalities before birth.

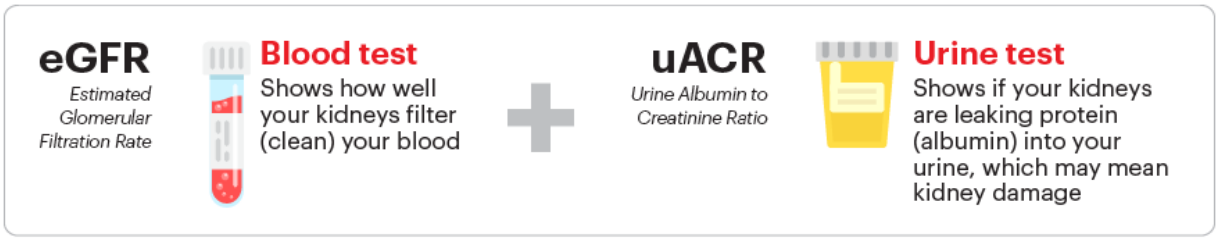
Diagnosis

Test

Checking for CKD is easy with two simple tests:

- **blood test** known as the estimated glomerular filtration rate (eGFR).
- **urine test**: known as the urine albumin-creatinine ratio (uACR).

Both tests are needed to have a clear picture of your kidney health. Having an eGFR under 60 and/or a uACR over 30 for three months or more is a sign you may have kidney disease.[5]



The eGFR is an estimate of how well your kidneys are removing waste products from the blood. It is calculated using your serum creatinine level, age, and sex. It can also be calculated using your cystatin C level. A "normal" eGFR varies according to age – it decreases as you get older. For this test, a higher number is better. Your eGFR number is used to determine your stage of CKD.

The uACR measures the amount of two different substances in your urine – albumin (protein) and creatinine. Healthy kidneys keep the albumin in your blood while filtering the creatinine out into the urine. So, there should be very little or no albumin in your urine. The uACR is calculated by dividing the amount of urine albumin by the amount of urine creatinine to find the ratio. For this test, a lower number is better. Your uACR number is used to test for albuminuria - a significant risk factor for complications.

In some cases, your healthcare professional may order additional tests to get more information about your kidney health. Some examples include a kidney biopsy or medical imaging (CT scan, ultrasound, or MRI).[5]

Treatment

Homoeopathic Remedy

The individualized homoeopathic treatment does wonders here and has prevented a large number of cases progressing to stage of dialysis or renal transplant.

Majority of these cases come to homoeopathic rescue as a last resort as they can`t afford long-term dialysis and transplant.

The other small group of patients want to know the benefits of Homoeopathic treatment over dialysis and if Homoeopathic treatment be carried along with Hemodialysis.

1. Patients Already On Long-Term Hemodialysis Pending Renal Transplant

Homeopathy has a great role to play here. Research experiments in various hospitals reveals the following facts:

a. Indicated homoeopathic remedies reduced the number of dialysis needed over a period of time.
b. Indicated homoeopathic remedies reduce and overcome the complications associated with chronic dialysis therapy.

2. Complications of dialysis & its Homeopathic Management

These patients develop a variety of psychiatric, neurologic and somatic disorders. A neurologic disorder Dialysis dementia is a characteristic example.

In the mental sphere, these patients become very depressive; their reduced physical abilities make them sad and depressive. Heparin necessary during the hemodialysis procedures to prevent clotting leads to complications such as subdural hematoma and intracerebral hemorrhage. Selected homoeopathic medicine is of great help here.

Complications of dialysis & its Homeopathic Management

Numerous physical, neurological, and mental diseases manifest in these people. Dialysis dementia is an example of a neurologic condition.

These patients experience severe depression on a mental level; their diminished physical capacities contribute to their melancholy. Heparin, which is required for hemodialysis operations in order to prevent clotting, can cause problems such intracerebral hemorrhage and subdural hematoma. Here, a small amount of homoeopathic treatment is quite beneficial.

Advantage of Homeopathic Treatment

1. Homeopathic medicines can be stopped in 2 to 5 years depending on the severity and underlying cause of the disease.
2. Though Homeopathy does not provide any substitute for Kidney but it can revive the

damaged organ as it has been proved.

3. Patient's kidney starts improving as soon as he/she starts taking homeopathic treatment. It helps the patient withdrawing from dialysis.
4. Homeopathy stimulates someone's immune system to perform normal functions, in this way damaged kidneys start functioning normally.
5. Homeopathic treatment not only repairs the damaged kidneys but simultaneously it helps in maintaining the blood sugar level and blood pressure to a normal level.
6. Very well selected Homeopathic medicine can stop the further damage of diseased organ without delay and further treatment may revive the damaged tissue.
7. As the kidney starts working properly bio-chemistry becomes normal naturally.[6]

Ayurvedic Management

Kidney disease (Vrikka-Vikara) has not been specifically discussed in Ayurveda. However, based on the presentations, it is highly likely to be included in Mutravaha diseases. Srotasa. In this way, the patient was introduced to using Ayurvedic medications**.**

1. A specific decoction prepared with drugs like Trinapanchamoola Kwath, Ashmarihar Kwath, barks of Peepal and Nimba. (30 ml x BD empty stomach).
2. Ashmarihar Rasa-250 mg/day,
Shweta Parpati-250 mg/day,
Hazrulyahud Bhasma-250 mg/day,
Punarnava Mandura -500 mg/day
3. Chandraprabha Vati-1 tab TDS,
Gokshuradi Guggulu-1 tab TDS,
Vrikkadoshahara Vati-1tab TDS
4. Mahamanjishtharishta-10 ml x BD
+Usheerasava 10 ml x BD[7,8]

RESULT

The patient responded to the treatment in a superb manner in terms of subjective parameters. Most of his symptoms had subsided to almost nothing.

The patient's kidney GFR both before and after starting Ayurvedic treatment were adopted as the objective criterion for evaluating the effectiveness of the administered treatment. These are the outcomes that were attained.

The results are obtained as follow:

GFR by GATES method(ml/min)	Left Kidney	Right Kidney	Total
Normal rate of GFR	-	-	90.00
Before treatment	09.60	65.22	73.82
After treatment	19.51	82.21	101.01

CONCLUSION

From this study it is clear that a patient of Chronic Kidney Disease can be managed with Ayurveda treatment. Early Diagnosis and early starting Ayurveda treatment can gives Better Result in Chronic Kidney Disease. This is a single case study shows satisfactory results further more study needed in large scale with more number of Chronic Kidney Disease Patients.

REFERENCES

1. National Kidney Foundation (2002). "K/DOQI clinical practice guidelines for chronic kidney disease". Retrieved 2008-06-29.
2. Thaí za Passaglia Bernardes, Renato Demarchi Foresto, Gianna Mastroianni Kirsztajn. Fabry disease:genetics, pathology, and treatment. Review Article • Rev. Assoc. Med. Bras. 66 (Suppl 1) • 2020 •https://doi.org/10.1590/1806-9282.66.S1.10.
3. Pepys MB. Amyloidosis. In: Frank MM, Austen KF, Claman HN, Unanue ER, eds. Samter's Immunologic Diseases. 5th edn. Boston: Little, Brown and Company, 1994: 637 –655.
4. Pepys MB. Pathogenesis, diagnosis and treatment of systemic amyloidosis. Philos Trans R Soc Lond B BiolSci., 2001; 356: 203–10.
5. National kidney fundation. https://www.kidney.org/atoz/content/stages-chronic-kidney-disease-ckd.
6. https://www.homoeopathic-world.com/Chronic-kidney-renal-disease-Renal-Failure?gad_source=1&gclid=CjwKCAjwrvyxBhAbEiwAEg_Kgv6PdAgYV8uOWVWvLgKWAl36eyMntncu5eco65Uy16b6xZ92Q30o_BoC07MQAvD_BwE.
7. Pierratos A, McFarlane P, Chan CT. "Quotidian dialysis–update 2005". Curr. Opin. Nephrol. Hypertens., March 2005; 14(2): 119–24. doi:10.1097/00041552-200503000-00006. PMID.
8. bhatta harishankara., editor. Sarangadharacharya, Sarangdhara Samhita (gujarati bhasantara sahita), Madhyamakhanda, Adhyaya. 2nd ed. Mumbai: Pandit Narayan Mulaji Sanskrit pustakalaya, 1928; 7: 85–88.

9. Levin, A., Lancashire, W. & Fassett, R.G. Targets, trends, excesses, and deficiencies: refocusing clinical investigation to improve patient outcomes. Kidney Int 83, 1001-9 (2013).
10. Jayne, D.R. et al. Randomized Trial of C5a Receptor Inhibitor Avacopan in ANCA-Associated Vasculitis. J Am Soc Nephrol (2017).
11. Centers for Disease Control and Prevention. Chronic Kidney Disease in the United States, 2019. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2019.
12. Race, ethnicity, and kidney disease. NIDDK website. www.niddk.nih.gov. Published June 13, 2017. Accessed June 13, 2017.
13. Mirhelen Mendes de Abreu, David R.Walker, Ricardo C.Sesso, Marcos B.Ferraz. Health related quality of life of patients receiving hemodialysis and peritoneal dialysis in Sauo Paulo, Brazil: A longitudinal Study. Value in health, 2011; 14: s119-s121.
14. https://my.clevelandclinic.org/health/diseases/16167-glomerulonephritis-gn#management-and-treatment.
15. www.urologyhealth.org/Documents/Product%20Store/Stones_PatientGuide-web.pdf.
16. https://www.mayoclinic.org/diseases-conditions/lupus-nephritis/symptoms-causes/syc-20354335.
17. https://my.clevelandclinic.org/health/diseases/16426-acute-tubular-necrosi.
18. https://medlineplus.gov/ency/article/000482.htm.
19. https://rarediseases.org/rare-diseases/cystinosis/.
20. https://www.healthline.com/health/interstitial-nephritis.
21. https://www.nhs.uk/conditions/acute-kidney-injury/.
22. https://www.google.com/search?client=ms-android-samsung-gj-rev1&sca_esv=564deb1775a058e5&sca_upv=1&sxsrf=ADLYWIKk2ZKAbF0HBRvhJ48nDwgxu9N7aA:1715596640711&q=interstitial+nephritis&uds=ADvngMgXWjeBj_bf9Ovp70PX5IN10rqMhWmcvWIRixt28qWcox96pi0OhiA_7z-Loiy3ZUSdZkUyZqjgGb8WnbWXVhyblQX3olVS14rumibJe7IT4-60jWaThT8Z3Zuo2m8uJi1W5MF2HNfChe61NQifs6uINHae9Axjt-CgMj4Qmfc31FvN9wV7ikJi1xpgOBnMVtkgZdezMvNARcOX9KpRYDbVw99Ypx82TbaAtk6cClTstQ0I2wjvb5_bnqgg7EkavZ04YWxvfh77d0wPGYZ3ZZkTBVd_ldnmcGoUaXxtTJxPY8aheRDxQwFlOYiwaSstfhPc6qKZ&udm=2&prmd=ivsnbmtz&sa=X&sqi=2&ved=2ahUKEwjKsOPCt4qGAxVyi68BHRQ_B8QQtKgLegQIGhAB&biw=360&bih=650&dpr=2#vhid=h-oOPg9A4hpljM&vssid=mosaic.

23. https://images.app.goo.gl/RFRQhhmnGuPjMtC8A.
24. https://g.co/about/78g8gz.
25. https://g.co/about/hwkuu7.
26. https://g.co/about/9m3a9q.
27. https://www.google.com/search/about-this-image?img=H4sIAAAAAAAA_wEYAOf_ChYIlMeYyti0_JyaARDl6cXLt-CG4LUBonwmAhgAAAA%3D&q=https:%2F%2Fbrightkidneycentre.com%2Fanalgesic-nephropathy%2F&cs=1&ctx=iv&hl=en-IN&sa=X&ved=0CAwQg4ILahcKEwjApOXatoqGAxUAAAAAHQAAAAAQBA.
28. https://www.google.com/search?client=ms-android-samsung-gj-rev1&sca_esv=564deb1775a058e5&sca_upv=1&sxsrf=ADLYWILPzwkg_w4uTmCm0TbMQKw50Vcbbw:1715596538700&q=cystinosis+disease&uds=ADvngMgKmIZaYWf4Lsh5kVhwFLCSpR_zW-i4XRxmWOyNZa-66TxLIz8UY7DXaS6Lc4M32xUV9UwZeWvbll9aJX-bhtvKF9N9nDAS2GIa9aB_AAcRkABzBZhsvVy_0pwlx51GIpEKN_jmYpmIYVlavFrCfUdBQDFUXNAkQL2_YAQHprN5MhLBSWRufjTPV2OtUUtD_TvB2Kfgdzn6mGJBtiuagy7Pvj-qtewBh_6OIZv2ndf391ELVSqVGFd3B16-pd-6stQnK55nB6v1YoROGa1Cuw3KqnlqvKgxt7zn2kIsz7ZnCSpom4G_vVOhXk1tFkbmKOZjOh0c&udm=2&prmd=isvnbmtz&sa=X&sqi=2&ved=2ahUKEwjMl5GSt4qGAxWNcvUHHV7gCusQtKgLegQIDRAB&biw=360&bih=946&dpr=2#vhid=7nQKKpm5R9Y7MM&vssid=mosaic.
29. https://g.co/about/ktbu5t.
30. https://www.google.com/search?client=ms-android-samsung-gj-rev1&sca_esv=564deb1775a058e5&sca_upv=1&sxsrf=ADLYWIIfF_EU6BK4Jx3Yie_J0KjYhiAYfQ:1715597045452&q=acute+kidney+injury&uds=ADvngMg6Ek4HLA0JM9kZMaIKQ07OBBasyJz4gt7oUYh_IY0aq8CXI8sxvM7kG7WFLZzUaVtV6mktfIgyd0dA-dk8bO9NTGG9BKSWVa0lhI70aqd_FrpLP8DldVZwiikQ0Rab0DcJ2N6ZE-kWY91qdkaDYoYp4qdEQVfik-kkSCRa-c9CN-gpj6c9O1pfpVzg0tBIJsLk5xZjzvwIQkWXeVkzRGlT0x65noderMGMWUzbHK8asgfRGPmIqx4QohkHobGNh8xOb2Pss9FXTMEbf0WHeCNC0qF8AuecfI4LtX4S-ruKWMoCmMcydgORoCfgMkVLl1XvmlG5&udm=2&prmd=ivnsbmtz&sa=X&ved=2ahUKEwjF4OKDuYqGAxXYbmwGHTc2BxYQtKgLegQIEhAB&biw=360&bih=650&dpr=2#vhid=E288GAyzl6q1bM&vssid=mosaic.
31. https://images.app.goo.gl/MMXDRruqHQhsfo4HA.