Chronic kidney disease

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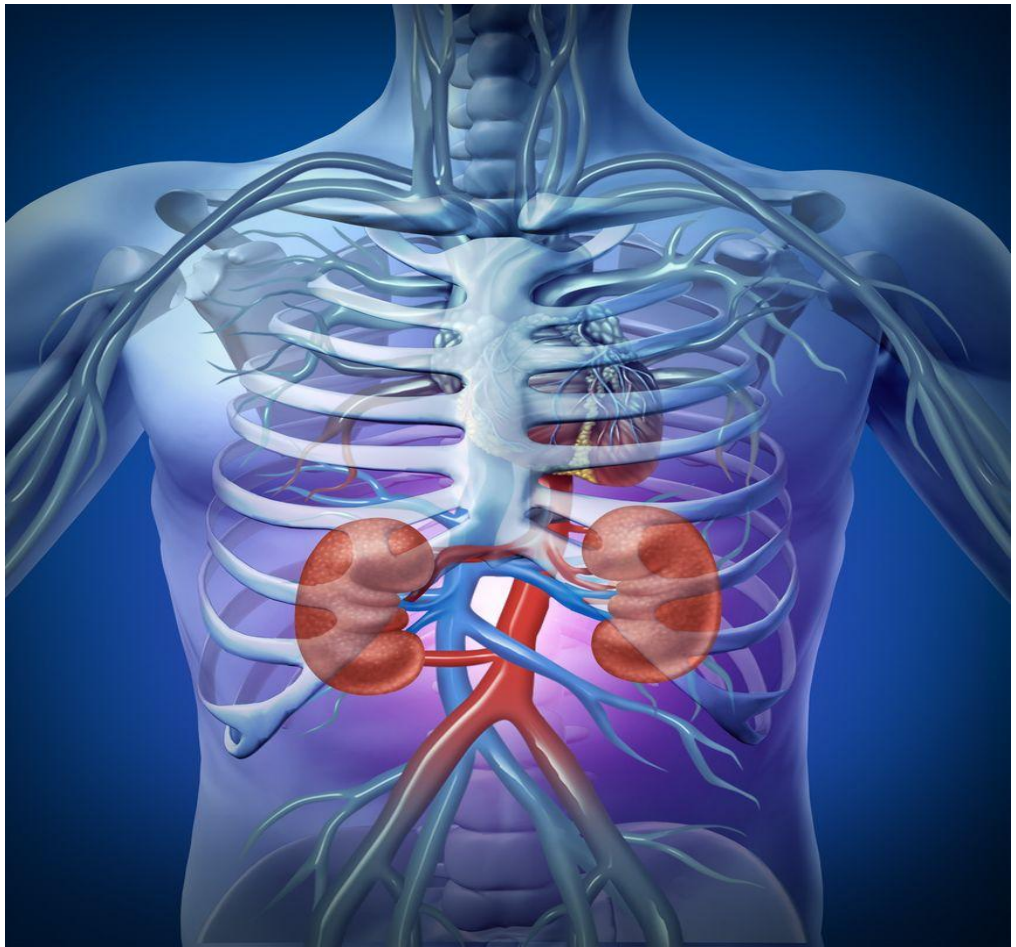

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Causes of chronic kidney disease **include :diabetes**, **high blood pressure**, **glomerulonephritis**, and **polycystic kidney disease.**

Risk factors include a **family history of chronic kidney disease**.

Diagnosis is by **blood tests** to measure the estimated glomerular filtration rate (eGFR), and a **urine test** to measure **albumin**.
Ultrasound or **kidney biopsy** may be performed to determine the underlying cause.[

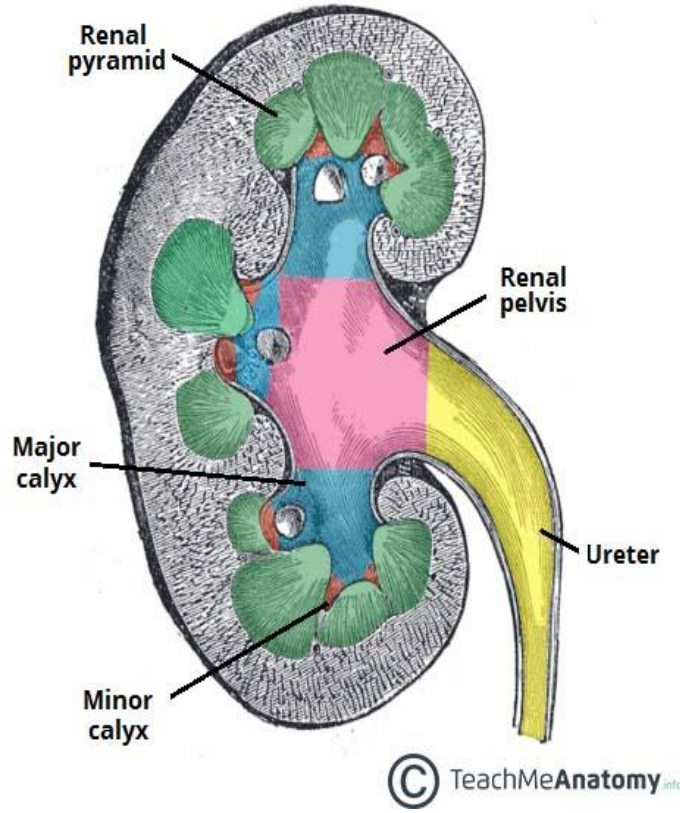
Several severity-based staging systems are in use. **Screening at-risk people is recommended**.
Initial treatments may **include medications** to **lower blood pressure**, **blood sugar**, and **cholesterol**.

Angiotensin converting enzyme inhibitors (ACEIs) or angiotensin II receptor antagonists (ARBs) are generally first-line agents for **blood pressure control**, as they slow progression of the **kidney disease** and the **risk of heart disease.**

Loop diuretics may be used to control edema and, if needed, to further lower blood pressure.

NSAIDs should be avoided. Other recommended measures include staying active, and **certain dietary changes** such as a low-salt diet and the right amount of protein.[

Treatments for anemia and bone disease may also be required.
Severe disease requires hemodialysis, peritoneal dialysis, or a kidney transplant for survival



Chronic kidney disease

The **kidneys** are bilateral bean-shaped organs, reddish-brown in colour and located in the posterior abdomen. Their main function is to filter and excrete waste products from the blood. They are also responsible for water and electrolyte balance in the body.

Metabolic waste and excess electrolytes are excreted by the kidneys to form **urine**. Urine is transported from the kidneys to the bladder by the ureters. It leaves the body via the urethra, which opens out into the perineum in the female and passes through the penis in the male.

In this article we shall look at the **anatomy of the kidneys** – their anatomical position, internal structure and vasculature

The kidneys lie **retroperitoneally** (behind the peritoneum) in the abdomen, either side of the vertebral column. They typically extend from **T12 to L3**, although the right kidney is often situated slightly lower due to the presence of the liver. Each kidney is approximately three vertebrae in length.

The adrenal glands sit immediately superior to the kidneys within a separate envelope of the **renal fascia**

'Chronic' means a condition that is **long term** and **does not get better**, but it does not always mean that it is **serious.** So chronic kidney disease (CKD) describes any **abnormality in kidney function**, even if the kidneys may only be slightly damaged.

Guidelines for doctors from NICE say that people who have relatives with **Autosomal dominant polycystic kidney disease** (ADPKD) should be offered testing for CKD. Patient with the ,Diabetes ,High blood pressure

•Heart disease ,Problems with the structure of kidneys or urinary tract (eg kidney stones, prostate problems in men)

•Other diseases that affect the kidneys (eg systemic lupus erythematosus), Blood or protein in your urine. **are liable to CKD .**

•CKD should never be diagnosed based on a single test. Instead, specialist doctor should only diagnose CKD after at least three tests done over at least three months.

Doctors divide CKD into five stages, according to the percentage of the remaining healthy kidney function.

The stage will be based on the estimated **glomerular filtration rate** (eGFR) and other problems may have.

Glomerular filtration rate (GFR) is a measure of how much fluid your kidneys can filter in a minute. There are a number of ways to measure GFR but in clinical practice, it is estimated based on the creatinine levels in your blood, your age, gender and ethnicity. This estimate or eGFR is roughly the same as % function. So an eGFR of 90 is roughly 90% kidney function.

Use the links below to learn about each stage of kidney disease:

- ***Stage 1 with normal or high GFR (GFR > 90 mL/min)***
- ***Stage 2 Mild CKD (GFR = 60-89 mL/min)***
- ***Stage 3A Moderate CKD (GFR = 45-59 mL/min)***
- ***Stage 3B Moderate CKD (GFR = 30-44 mL/min)***
- ***Stage 4 Severe CKD (GFR = 15-29 mL/min)***
- ***Stage 5 End Stage CKD (GFR <15 mL/min)***

kidney disease in which there is gradual loss of **kidney function** over a period of months to years.

Initially there are generally **no symptoms**; **later**, symptoms may include leg swelling, **feeling tired**, **vomiting**, **loss of appetite**, and **confusion**.

Complications can relate to **hormonal dysfunction of the kidneys** and include (in chronological order) high blood pressure (often related to activation of the Renin-Angiotensin-Aldosterone system), **bone disease**, and anemia.

Additionally CKD patients have markedly increased cardiovascular complications with increased **risks of death** and **hospitalization**.

Oral manifestation of CKD

The mouth is a powerful mirror AND diagnostic tool in the clinical assessment of systemic health . Peculiar oral findings have been reported in diseases such as **Human Immunodeficiency Virus (HIV)** infection where unusual oral lesions have aided the diagnosis of HIV infection among routine dental patients . Other diseases where oral manifestations may **play a vital role** in the diagnosis and management include **diabetes mellitus** , coronary heart disease , **graft versus host disease and chronic kidney disease** .

Generally, the reported oral lesions in systemic illness include periodontitis, white patches, red patches, mucositis, oral candidiasis, burning sensation, changes in salivary composition and flow rates, pale mucosa and **abnormal pigmentation** .The presence of these specific oral lesions is not only helpful in detecting underlying systemic diseases but may also indicate the severity of such systemic diseases.

Chronic kidney disease (CKD) like many other systemic diseases, have associated oral problems arising from the disease process or the effects of therapy or both. Consequently, untreated oral lesions may worsen the clinical presentation and prognosis . CKD is associated with clinical and radiographic changes in the mouth .

The radiographic changes include loss of lamina dura, maxillary and mandibular radiolucent lesions [11]. The clinical findings in CKD patients are essentially as stated for oral lesions in systemic disease . Unfortunately, attention to the oral aspects has been lacking despite the many merits associated

High graft rejection rate (in kidney transplant patients) and increase in systemic inflammatory burden which worsen the underlying systemic disease are consequences of untreated oral lesions in CKD.

The cause effect relationship between oral infections and systemic diseases is yet to be fully established; **Poor dental awareness among the patients and some medical colleagues are contributory factors**

Oral lesions are usually due to restricted diets, malnutrition, mouth neglect, immunosuppression and the effects of medications and ureamic toxins on the oral tissues . CKD patients on hemodialysis have also been found to be associated with **reduced dental vi**sits which further **worsen the oral care .**
A common oral symptom of CKD is the **sensation of a dry mouth**, which may be caused by restricted fluid intake which is necessary to accommodate the reduced excretory capacity of the kidney, adverse effects of drug therapy, and the low salivary flow rate

Abnormal lip pigmentation, Oral and cutaneous hyperpigmentation in renal patients is due to inability of the kidney to excrete excess beta melanocyte stimulating hormone (b-MSH), the accumulation of which results in the stimulation of melanocyte at the basal layer of oral epithelium .

Abnormal taste has been commonly reported . The mechanisms underlying alterations in taste perception in uremia patients are unknown, but are probably attributable to **influences of ureamic toxins** on the central nervous system (CNS) and the peripheral nervous system (the taste receptors) .

Bleeding gum has been attributed to poor oral hygiene, ginigival/periodontal inflammation and bleeding abnormalities

Burning mouth sensation which was significantly higher in CKD patients (16%) was a consistent finding in many other studies. It was attributed to effects of dry mouth, damage to peripheral nerves by the **ureamic toxins** and **effects of medication**

In CKD, there is usually fluid restriction, electrolyte imbalance, and use of medications, such as **frusemide** and **hydrochlorothiazide**. These may contribute to the complaint of a **dry mouth .**

The aetiological factors such as diabetes mellitus, hypertension, amyloidosis and autoimmune disease not only cause renal disease but also initiate salivary gland disease independently [12]. In Africans, the commonest aetiology of renal disease is glomerulonephritis which usually results from infections [29]. The complaint of halitosis was significantly higher in CKD patients (12%) and has been attributed to dry mouth, poor oral hygiene and ureamic smell [11].

Reduced salivary flow rate is a consistent finding in CKD patients and it has been reported that reduce flow is **due t**o effects of **drugs**, **emotional stress** and **neuropathy in CKD patients**

Oral candidiasis was more prevalent in CKD cases and may be due to **immune suppression from malnutrition**, **restricted diets, anaemia**, **stress**, and **immunosuppressive drugs.**

Gingival swelling, because of the poor oral hygiene and some medication are use such as **nifedipine**, **cyclosporine** and **tacrolimus**.

Systemic inflammation arising from oral infection could have an effect on microvasculature of heart and kidney .The possible establishment of bi-directional relationship between oral infection such as between periodontitis and heart disease has also been postulated between oral lesion and kidney disease .This probably explains the lower mean GFR in CKD subjects with oral lesions when compared with a relatively higher mean GFR in CKD subjects without oral lesions.

Dental treatment

Since kidney diseases may be more or less severe, there is no **uniform dental treatment**. Nevertheless, an invasive dental treatment requires **consultation with the nephrologist who administers prophylactic antibiotic therapy** Penicillin or cephalosporin are usually administered. Tetracycline and streptomycin should be avoided because they are nephrotoxic. **Patients should be asked if they suffer from allergies because allergy to penicillin is quite common**. Due to poor gastrointestinal resorption, antibiotics should be administered i.V. I.m. administration may show counter-indications because of kreatinine increase.

In patients with chronic kidney disease the **endodontic treatment** of the deciduous and multi-root teeth should be **avoided** at all costs because of **increased infection risk**. We should also avoid treatments of gangrenous teeth and those with apical parodontitis because they **can later develop into an inflammatory focus**.

Extractions should be done with local anesthetic. As for anesthetics, anesthetics of **amidic type** should be applied such as **lidocain**, Xylocain because of their reabsorption **potential in the liver**. **Analgetics of almost any kind may be administered** and also **codeine-based medicaments that are also metabolized in the liver**. Since these patients often suffer from hepatitis B or C dentist must undertake all the precautionary measures (protective glasses, mask, cap, gloves, and inoculation against B hepatitis). If the dental intervention must be done with a total anesthetic consultations with the nephrologist or anesthetist prior to the intervention are obligatory

Patients who use dialysis

There are two possible therapies for patients with kidney dysfunction:

1.dialysis (hemodialysis, peritoneal dialysis)

2.kidney transplants

The level of kreatinine in serum should be 600-800 μιηοΐτ if a patient is to use dialysis. Dialysis represents the perfusion of the patient's blood and the dialysis solution on **either side of the membrane**. At this, it is necessary to note that in the **course of dialysis the patient** is **given heparin in order to prevent blood coagulation outside the body**. The majority of patients undergo **dialysis three times a week** in the duration **of 4 hours**.

Heparin is an anti-coagulant agent for parenteral administration and its effect is prevention of activated coagulation factors Xa and trombone, and thus prevention of coagulation. It is retained in the circulatory system **4-6 hours** upon administration. **This fact is important because of proper timing of dental intervention**.

Accordingly, since heparin prolongs the **bleeding time** because of it's anticoagulant effect, the tooth extraction should be **done a day after dialysis** when the anti-coagulent agent's presence is reduced to the minimum while the dialysis effect is maximal. APTT and INR should be checked prior to the **surgical intervention**. **Heparin can also bring about mild thrombocytopenia .**

Approximately 90% of patients with **chronic renal failure present** with oral manifestations Treatment of CRFranges fromconservative management suchas life-style changes toinvasive procedures such as **dialysis or kidney transplantation** **Dental management requires prior consultation with patient's nephrologist to determine status of the disease**, **timing for dental care**, as well as procedural and pharmacologic modifications Modification includetiming dental care on non-dialysisdays, obtaining CBC prior to invasive treatment and considering antibiotic prophylaxis for patients with central lines. Drug modifications include avoidance of tetracycline andaminoglycosides,and dosing interval of **penicillin**, **clindamycin** and cephalosporin Multidisciplinary approach to patient's health care is critical to ensure patients **safety** and **prevent complications in the dental chair. The nephrologist** should undertake all the preparatory measures prior to sending the patient to his/her dentist. In addition to bleeding, the patients who undergo dialysis are also **very sensitive to infection**. Because of possible bacterial infection the prophylactic administration of antibiotics of broad specter is strongly recommended. We can administer cephalosporins. **Penicillin should be administered in the dosage of 2 mg after dialysis.**

Surgical interventions should be made with local anesthetic. The general anesthesia is to be avoided because of **concomitant hypertension, arteriosclerosis** and **anemia**

Patients with kidney transplants:

In general, kidney transplants involve the **risk of transplanted organ rejection**. In order to prevent this, patients who have undergone an **organ transplant operation**, are **given large doses of immunosuppressants** such as **corticosteroids, azatioprin, cyclosporine A** and **anti-lymhocite globulin** .

These patients are **extremely sensitive to infection**. After tooth extraction the wound healing is significantly impaired. The immunosuppressant therapy may involve many **side effects that, in turn**, may largely affect oral surgical intervention. The side effects are hypertension, increased bleeding, diabetes .Accordingly, in patients who underwent **kidney transplant operations prophylactic antibiotics should be administered in consultation with the patient's physician**. **Because of potential adrenalin crisis risk it is necessary to alter steroid therapy**. If the stress suffered during the **oral surgical intervention is minimal**, the therapy should not be altered. If the stress is insignificant, it is recommended to **increase the steroid dosage twice a day two days prior and following the oral surgical intervention**. If the stress is great, **100mg of hydrocortisone should be administered i.m. prior to the operation**, gradually reducing dosage by **50 % on a daily basis for three days after the intervention until the dosage of 20mg which should be administered twice a day for the subsequent for** 7 days.

In any case, **steroid dosage is administered by the expert physician after consultations with the dentist and the expected stress assessment**. The patients who are getting prepared for kidney transplantation should be treated with regard to the following:

1.Comprehensive treatment of the **oral cavity should be done** ,including prophylactic measures, treating the teeth with caries, doing the necessary extractions, particularly of the gangrenous, pulpal and periorodontopathic teeth and the remaining roots.

2.Advise the patient on the importance of oral hygiene since oral infection may bring about the rejection of the organ transplant.

3.Mouth rinsing with chlorhexidine solution (0.2%) is recommended one day prior to the organ transplant operation in order to prevent candidiasis and bacterial infection.

4.The effect of immunosuppressant therapy (cyclosporin A) may induce **gingival hyperplasi**a similar to diIantine gingivitis in **epileptic patients**. ucus and remove any signs of infection ,rinsing with chlorhexidine solution prior to gingivectomy it is necessary to clean the teeth from calculus but also to motivate the patient to maintain a regular oral hygiene. **It is advisable to administer antibiotics with these patients.**

Please remember

1.Patients with kidney diseases are an extremely delicate group of patients.

2.They have tendency to infection and therefore, prophylactic antibiotics treatment is a must prior to surgical interventions.

3.They are also prone to bleeding and therefore surgical interventions should be undertaken in the days when the patient does not use dialysis.

4.We should always bear in mind that patients with kidney transplants are prescribed immunosuppres-sant therapy.

5.Dental treatment of such patients implies close cooperation between the dentist and the nephrologist.

THANK YOU