

Complications OF CKD

In chronic kidney disease (CKD), patients may develop complications that could affect almost all the other organ systems in the body. Therefore, it's important that patients with CKD undergo periodic check-ups, tests and monitoring, to detect these complications early.

Complications

Some of these possible complications associated with CKD include:

- **Anemia:** Anemia develops when the body has less hemoglobin or red blood cells, which affects the supply of oxygen to the different cells. This could develop due to several reasons, but most often because the kidneys do not make sufficient quantities of the erythropoietin (EPO) hormone. Other reasons could be deficiency of vitamin B12, folic acid or iron; bleeding in the gastrointestinal tract; inflammation or a shorter life-span of the red blood cells.
- **High blood pressure:** When the kidneys are functioning normally, they produce a hormone (renin) to help blood pressure normal. But in CKD, since their function is affected, the kidneys are unable to regulate blood pressure efficiently which could lead to high blood pressure.
- **Bone conditions:** These develop because the kidney is involved in the steps of vitamin D and phosphate/phosphorous metabolism (metabolism refers to the way the body breaks down and forms important compounds that are required for normal functioning). Calcium levels are also affected, which can together lead to changes in the structure of the bone.
- **Cardiovascular risk and heart disease:** Patients with CKD often have inflammation, anemia, and excrete protein in the urine, which are linked to a higher risk of heart disease. This elevated risk may even be seen in the early stages of CKD.
- **Acidosis:** Kidneys help to regulate the acid-base balance of the body fluids. But since the kidneys are not functioning normally in CKD, they are unable to remove enough acid from the body fluids. Also, there may be a drop in bicarbonate levels, which act as a buffer to help maintain the correct acid-base balance. All of this may mean a high acid content of the body fluids, which could lead to other health problems including lethargy.

Screening for Complications

A doctor may recommend some of the following tests, in stages 3 and 4 of CKD, to look for possible signs of complications:

- Hemoglobin testing
- Red blood cell tests (including iron tests, reticulocyte counts)
- Estimation of serum electrolytes
- Estimation of total protein and albumin levels in serum
- Estimation of phosphorous, calcium and parathyroid hormone levels

COMORBIDITIES

As we have already seen, many complications arise because the kidneys are affected in CKD. But in addition, the factors that put a person at risk for CKD could also put a person at risk for other conditions (comorbidities i.e. the condition other than the primary disease), some of which we have already considered in the previous section.

These conditions include:

- **High blood sugar/diabetes:** Patients with high blood sugar levels are said to have diabetes. These high or uncontrolled blood sugar levels can also damage the blood vessels in the kidney by increasing the load on the kidneys. Over time, this may cause the kidneys to leak protein in the urine. When a lot of protein is leaked into the urine, the condition is called macroalbuminuria, which could lead to end-stage renal disease.
- **High blood pressure/hypertension:** When the kidneys are damaged, a person may develop high blood pressure (hypertension). But high blood pressure can cause further damage to the kidneys because it damages the blood vessels here. When the force of blood flow is high, it causes the blood vessels to stretch, to allow the blood to flow easily. But this stretching eventually weakens the blood vessels, including those in the kidneys. About 84% of patients with stage 4–5 CKD also have hypertension (as compared to 23% of those without CKD).
- **Heart disease:** Many of the risk factors for cardiovascular disease (high cholesterol, high blood pressure, smoking, lack of exercise, being overweight or obese, and family history of heart disease) are also risk factors for CKD.

CKD = chronic kidney disease EPO = erythropoietin

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