

## Diabetic Kidney Disease and Glomerular Filtration Rate

Diabetes (diabetes mellitus) is a long-term condition characterized by high blood sugar levels. Diabetes mellitus can lead to other health problems. Kidney function is impaired due to inadequate normalcy. This problem occurs when diabetes is not treated promptly and consistently. Long-term diabetes is a major cause of kidney disease.

Abnormal kidney function can be detected by measuring the creatinine level in the blood. However, creatinine levels in the blood become higher than normal only after kidney function is reduced by approximately 50%. Therefore, early detection of kidney damage is essential. Glomerular filtration rate, an important and reliable test, is essential for patients with diabetes.

What is GFR?

The kidneys' function is to remove harmful and unnecessary substances and excess fluid from the body. This is accomplished by filtering the blood. The kidneys' filtration is performed by thousands of tiny clusters of blood vessels called glomeruli. Diabetes (high blood sugar) slows down the filtration function of these tiny blood vessel clusters. This decreases over time, leading to increased creatinine levels in the blood.

GFR testing is important in diabetes because the primary disease does not show external symptoms.

What is GFR?

This test is related to the measurement and analysis of the amount of creatinine in the blood. It measures the total amount of creatinine filtered from the blood fluid per minute. GFR is measured in ml/min. Normal GFR is 90-120 ml/m<sup>3</sup>. GFR is higher in youth and lower in old age.

The method for determining GFR is complex. Therefore, blood creatinine results vary according to your age and gender using an arithmetic calculation formula. This is called eGFR or estimated GFR.

Calculate eGFR using the Cockcroft-Gault formula. No special precautions are required to perform a GFR test. Follow the instructions given by your doctor.

What does an abnormal eGFR indicate?

An eGFR of less than 60 ml/mL indicates kidney disease and impaired kidney function. An eGFR of less than 15 ml/mL indicates kidney failure.

The main ways diabetes damages the kidneys are:

**Damaged blood vessels:** High blood sugar (hyperglycemia) causes the small, delicate blood vessels in the kidneys to thicken, narrow, and become blocked, reducing their filtering capacity.

**Glomerular damage:** Increased pressure inside the kidney's filtering units (glomeruli) causes damage, leading to a buildup of waste products in the blood.

Protein leakage (albuminuria): When the filter is damaged, essential protein (albumin) leaks into the urine, a major early symptom of kidney disease.

Nerve damage: Diabetes can damage nerves in the bladder, increasing pressure and potentially causing back pressure that damages the kidneys.

Concomitant conditions: Diabetes often causes high blood pressure, which further accelerates kidney damage.

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