Kidney Function Tests

- The major functions of the kidneys are to excrete metabolic waste products as well as to maintain water, pH, electrolyte balance, production of calcitriol and erythropoietin.
- A decrease in kidney function is due to a reduction in the performance of nephrons. The functional unit of the kidney is the **nephron.**

Functions of kidney

1. Excretion of urea and other waste products, such as creatinine, uric acid and metabolites of xenobiotics.
2. Maintaining water balance.
3. Excretion of sodium (effect on BP).
4. Excretion of potassium (effect on heart).
5. Excretion of hydrogen ions (maintenance of pH).
6. Activation of vitamin D (effect on bone).
7. Production of erythropoietin (effect on RBCs).
8. Filtration: 180 liters/day of water with all sodium, chloride, sugar and amino acids.
9. Reabsorption: 178.5 liters reabsorbed; all glucose and amino acids reabsorbed; most of sodium and chloride reabsorbed.

Types of kidney function tests

- **Urinalysis-**A urinalysis screens for the presence of protein and blood in the urine. There are many possible reasons for protein in your urine, not all of which are related to disease. Infection increases urine protein, but so does a heavy physical workout. Your doctor may also ask you to provide a 24-hour urine collection sample. This can help doctors see how fast a waste product called creatinine is clearing from your body. Creatinine is a breakdown product of muscle tissue.
- **Serum creatinine test**-This blood test examines whether creatinine is building up in your blood. The kidneys usually completely filter creatinine from the blood. A high level of creatinine suggests a kidney problem. According to the National Kidney Foundation (NKF), a creatinine level higher than 1.2 milligrams/deciliter (mg/dL) for women and 1.4 mg/dL for men is a sign of a kidney problem.
- **Blood urea nitrogen (BUN)-**The blood urea nitrogen (BUN) test also checks for waste products in your blood. BUN tests measure the amount of nitrogen in the blood. Urea

nitrogen is a breakdown product of protein. However, not all elevated BUN tests are due to kidney damage. Common medications, including large doses of aspirin and some types of antibiotics, can also increase your BUN. It's important to tell your doctor about any medications or supplements that you take regularly. You may need to stop certain drugs for a few days before the test. A normal BUN level is between 7 and 20 mg/dL. A higher value could suggest several different health problems.

- **Estimated GFR**-This test estimates how well your kidneys are filtering waste. Any result lower than 60 milliliters/minute/1.73m^2 may be a warning sign of kidney disease The test determines the rate by looking at factors, such as:

    - test results, specifically creatinine levels
    - age
    - gender
    - race
    - height
    - weight

How the tests are performed-Kidney function tests usually require a 24-hour urine sample and a blood test.

- **24-hour urine sample-**A 24-hour urine sample is a creatinine clearance test. It gives your doctor an idea of how much creatinine your body expels over a single day. On the day that you start the test, urinate into the toilet as you normally would when you wake up. For the rest of the day and night, urinate into a special container provided by your doctor. Keep the container capped and refrigerated during the collection process. Make sure to label the container clearly and to tell other family members why it's in the refrigerator. On the morning of the second day, urinate into the container when you get up. This completes the 24-hour collection process. Follow your doctor's instructions about where to drop the sample off. You may need to return it either to your doctor's office or a laboratory.
- **Blood samples-**BUN and serum creatinine tests require blood samples taken in a lab or doctor's office. The technician drawing the blood first ties an elastic band around your upper arm. This makes the veins stand out. The technician then cleans the area over the vein. They slip a hollow needle through your skin and into the vein. The blood will flow

back into a test tube that will be sent for analysis. You may feel a sharp pinch or prick when the needle enters your arm. The technician will place gauze and a bandage over the puncture site after the test. The area around the puncture may develop a bruise over the next few days. However, you shouldn’t feel severe or long-term pain.