



# HIV and KIDNEY DISEASE

## **WHY SHOULD PEOPLE WITH HIV CARE ABOUT KIDNEY DISEASE?**

HIV disease can cause kidney failure due to HIV infection of kidney cells. This is known as HIV-Associated Nephropathy or HIVAN. Other causes of kidney disease include diabetes and high blood pressure. These problems, especially HIVAN, are much more common in African-Americans. Taking some medications used to treat HIV infections or related health issues can also cause kidney disease. Kidney problems can lead to end-stage renal disease (ESRD) or kidney failure. This can require dialysis or a kidney transplant.

The rate of kidney disease in patients with HIV has gone down significantly since the introduction of modern antiretroviral therapy (ART.) However, about 30% of people with HIV may have kidney disease. If kidney disease advances, it can cause heart disease (see fact sheet 652) and bone disease (see fact sheet 557.)

## **WHAT IS NORMAL KIDNEY FUNCTION?**

The main job of the kidneys is to filter out waste products. They reabsorb what is needed and remove the waste in urine. The most important waste products are excess sodium and water. Each kidney contains about a million filtering units called nephrons. They:

- eliminate wastes from the body,
- regulate the volume and pressure of blood, and
- control levels of electrolytes and blood acidity.

## **HOW DO I KNOW IF THERE ARE PROBLEMS WITH MY KIDNEYS?**

Unfortunately, most symptoms of kidney disease only show up when a large part of kidney function has already been lost. Swelling of the legs or face or changes in urination may occur. Other symptoms, such as fatigue and loss of appetite, can be confused with other health problems.

Your health care provider should monitor your kidney function, even if you have no symptoms. The most common test of kidney function is a urine test. A simple "dipstick" is used. This test checks levels of protein, sugar, ketones, blood, nitrites, and red and

white blood cells. Small amounts of protein in the urine show up before kidney disease has caused a loss of kidney function.

Nearly one-third of all HIV-positive people have high levels of protein in their urine. This is a sign of possible kidney trouble.

Other kidney tests include the blood urea nitrogen or BUN, the blood creatinine level and the rate of creatinine clearance

**Blood Urea Nitrogen (BUN)** shows up in the blood when protein breaks down. It is normally removed by the kidneys. High BUN levels can be due to a high-protein diet, dehydration, or kidney or heart failure. High BUN levels should trigger a search for kidney disease.

**Creatinine** is produced by the normal turnover of muscle cells. Blood levels of creatinine are a measure of kidney function. High levels are usually due to kidney problems. Doctors use the creatinine level to see how well the kidneys are working.

Normal laboratory levels of creatinine have to be adjusted for race, age, weight, and gender. The most common formula for adjusting creatinine values is the Cockcroft-Gault formula. Another adjustment formula is the MDRD or Modification in Diet in Renal Disease equation. These provide a measure called glomerular filtration rate (GFR).

Doctors use the GFR to get a better picture of what your creatinine level really means. People without kidney disease have a GFR of about 100. As kidney disease takes away kidney function, the GFR falls. People need a kidney transplant or dialysis when the GFR falls to about 15 or less.

The simple screening test of a urine exam for protein is the most sensitive way to diagnose kidney disease. People at risk for kidney disease should have this exam performed at least yearly.

## **WHAT ARE THE RISK FACTORS FOR KIDNEY DISEASE?**

Kidney disease is more likely in people who:

- Are African-American
- Have diabetes
- Have high blood pressure
- Are older

- Have a lower CD4 count (see fact sheet 124)
- Have a higher viral load (see fact sheet 125)
- Have hepatitis B or C (see fact sheets 506 and 507)

HIV patients should be carefully screened for signs of diabetes or high blood pressure. They should control their blood sugar and their blood pressure as much as possible.

## **HIV MEDICATIONS AND THE KIDNEYS**

Several HIV medications are hard on the kidneys. This includes antiretroviral medications and some medications used to treat HIV-related health problems. Tenofovir is known to cause kidney problems. If you are taking tenofovir, your health care provider may want to monitor your creatinine levels regularly.

*The dosages of several medications that are cleared through the kidneys need to be reduced for people with kidney problems. Be sure your health care provider knows if you have any kidney problems.*

## **DIALYSIS AND KIDNEY TRANSPLANTATION**

People with HIV have gone onto dialysis and some have received a kidney transplant. There are concerns about suppressing the immune system following transplant, so most transplant centers only accept people with over 200 CD4 cells and an undetectable viral load. The outcomes for these people appear to be the same as for other people getting kidney transplants.

## **THE BOTTOM LINE**

HIV infection can cause kidney problems that may become serious. Also, people with kidney problems may need to lower the amount of some medications that they take.

Kidney problems don't really show up as symptoms of disease. It's important to get the urine checked regularly for signs of trouble.

*Reviewed February 24, 2014*