INFORMATION FOR PATIENTS ABOUT DIABETIC NEPHROPATHY

Diabetes is the most common cause of end-stage renal disease and dialysis in the United States. Patients at higher risk include males, African-American, and Native Americans.

The damage that occurs in kidney disease to diabetes takes place in and around the glomeruli, the blood-filtering units of the kidneys. Early in the disease, the filtering deteriorates, and important proteins in the blood are lost to the urine. Medical professionals check for early kidney disease by measuring protein in the urine. Later in the disease, the kidneys lose their ability to remove waste products, such as creatinine and urea, from the blood.

Symptoms related to Kidney failure usually occur only in late stages of the disease, when kidney function has decreased to less than 25% of normal capacity. For many years before that point, kidney disease of diabetes exists without signs or symptoms. The patient may feel just fine.

Microalbuminuria, or the presence of the blood protein in the urine, is the earliest sign of increased protein excretion. A urine test for protein can detect serum albumin. An individual at home using a dipstick method can perform this test, but more accurate testing should be done by a healthcare provider regularly as part of a diabetic exam. It is very simple urine test. Ask your doctor if he has ordered one.

People with mild to moderate kidney failure may have only mild symptoms and an increase in the amount of urea levels. Symptoms that your kidneys are getting damaged and that you should tell your doctor about it include:

- The need to urinate (make water) during the night, because the kidneys are unable to absorb water from the urine as is usual and bladder fills more quickly.
- Symptoms of toxicity (too much waste in the blood) as the kidneys fail, including fatigue or tiredness and being less mentally alert.
- Nervous system symptoms including pins-and-needles sensations in the arms and legs or loss of sensation (numb).

Scientists have described five stages in the progression to ESRD (End-Stage Renal Disease) or kidney failure in people with diabetes. They are as follows:

**Stage I**
The flow of blood through the kidneys, and therefore through the glomeruli, increases-this called hyperfiltration-and the kidneys are larger than normal. Some people remain in stage I indefinitely; others advance to stage II after many years.

**Stage II**
The rate of filtration remains high or at near-normal levels and the glomeruli begin to show damage. Small amounts of blood protein known as albumin leak into the urine- a condition known as microalbuminuria. In its earliest stages, microalbuminuria may come and go. But as the rate of albumin loss increases from 20 to 200 micrograms per minute, microalbuminuria becomes more constant (normal losses of albumin are less than micrograms per minute.) A special but simple urine test is required to detect microalbuminuria.
People with Type 1 and 2 diabetes may remain in stage II for many years, especially if they have normal blood pressure and good control of their blood sugar levels.

Stage III:
The loss of albumin and other proteins in the urine exceeds 200 micrograms per minutes. It now can be detected during routine urine test. Because such test often involve dipping indicator strips into the urine they are referred to as “dipstick methods.”

Stage IV:
This stage is sometimes referred to as “dipstick-positive proteinuria,” “clinical albuminuria,” or “overt diabetic nephropathy.” Some patients develop high blood pressure. The glomeruli suffer increased damage. The kidneys progressively lose the ability to filter waste, and blood levels of creatine and urea nitrogen (BUN) rise. People with Type 1 and 2 diabetes may remain at stage III for many years.

Stage V:
This stage is referred to as “advanced clinical nephropathy.” The glomerular filtration rate decreases to less than 75 milliliters per minute, large amounts of protein pass into the urine, and high blood pressure almost always occurs. Levels of creatinine and urea-nitrogen in the blood rise further.

Stage VI:
This final stage is ESRD or kidney failure. The glomerular filtration rate drops to less than 10 milliliters per minute. Symptoms of kidney failure occur, including loss of appetite, nausea, vomiting, and unpleasant taste in the mouth, and possibly the development of intestinal ulcers and bleeding. The skin may be discolored, turning a yellowish-brown or developing a white powdery deposit on the surface from urea crystals (uremic frost). Generalized skin itching may also occur.

These stages describe the progression of kidney disease for most people with Type 1 diabetes whose onset of kidney disease to stage IV is 17 years.

The average length of time required to progress to ESRD is 23 years. Progression to ESRD may occur more rapidly (five to 10 years) in people with untreated high blood pressure. If proteinuria (protein in the urine) does not develop within 25 years, the risk of developing advanced kidney disease begins to decrease.

Advancement to stage IV and V occurs less frequently in people with Type 2 than in people with Type 1 diabetes. Nevertheless, about 60 percent of people with diabetes who develop ESRD have Type 2 diabetes.