Proteinuria, Protein in the Urine

Proteinuria describes a condition in which urine contains an abnormal amount of protein.

Proteins in your blood perform a number of important functions. They include:

- Protecting you from infection.
- Helping your blood thicken at the site of an injury to prevent blood loss (*coagulate*).
- Keeping the right amount of fluid circulating through your body.

As blood passes through healthy kidneys, the kidneys filter the waste products out. The main protein that is most likely to appear in urine is albumin. Albumin is smaller and more likely to escape through the filters of the kidney.

CAUSES

- Many diseases can cause this inflammation of the kidney, which leads to proteinuria. Problems that can damage the kidney and cause proteinuria include:
  - Diabetes.
  - High blood pressure (*hypertension*).
  - Other forms of kidney diseases.
- Research shows that the level and type of proteinuria strongly determine:
  - The extent of damage.
  - Your risk for developing progressive kidney failure.
- Proteinuria has also been shown to be associated with cardiovascular disease. Damaged blood vessels may lead to heart failure or stroke as well as kidney failure. If your caregiver finds that you have proteinuria, you will want to do what you can to protect your health and prevent any of these diseases from developing.
- Several health organizations recommend that some people be regularly checked for proteinuria. This is to detect and treat kidney disease before it progresses. Proteinuria may be the best predictor of progressive kidney failure in people with type 2 diabetes. The American Diabetes Association recommends regular urine testing for proteinuria for people with type 1 or type 2 diabetes.

WHO IS AT RISK?

- People with diabetes, high blood pressure, or certain family backgrounds are at risk for proteinuria. Diabetes is a leading cause of end-stage renal disease (ESRD). That is the result of chronic kidney disease. In both type 1 and type 2 diabetes, the first sign of deteriorating kidney function is the presence of small amounts of albumin in the urine. This is a condition called microalbuminuria. As kidney function declines, the amount of albumin in the urine increases. Microalbuminuria becomes full-fledged proteinuria.
- High blood pressure is the second leading cause of ESRD. Proteinuria in people with high blood pressure is an indicator of declining kidney function. If high blood pressure is not controlled, it can lead to full renal failure.
- African Americans are more likely than white Americans to have high blood pressure and to develop kidney problems from it. African Americans ages 20 to 49 are 20 times more likely than their white counterparts to develop high blood pressure-related kidney failure. High blood pressure is the leading cause of kidney failure among African Americans.
- Other groups at risk for proteinuria are:
  - American Indians.
  - Hispanic Americans.
  - Pacific Islander Americans.
  - Older people.
  - Overweight people.
  - People with a family history of kidney disease.

SIGNS OF PROTEINURIA AND KIDNEY FAILURE

Large amounts of protein in your urine may cause it to look foamy in the toilet. Also, because the protein has left your body, your blood can no longer soak up enough fluid. So you may notice swelling in your:

- Hands.
- Feet.
- Abdomen.
- Face.

These are signs of large protein loss. You may have proteinuria without noticing any signs or symptoms. Testing is the only way to find out how much protein you have in your urine.

TESTS FOR PROTEINURIA

- To test for proteinuria, you will need to give a urine sample. A strip of chemically treated paper will change color when dipped in urine that has too much protein. More sensitive tests for protein or albumin in the urine are recommended for people at risk for kidney disease. If the lab test shows high levels of protein, another test should be done 1 to 2 weeks later. If the second test also shows high levels of protein, you have persistent proteinuria. You should have additional tests to evaluate your kidney function.
- Your caregiver will also test a sample of your blood. This is to look for waste products (*creatinine* and *urea nitrogen*). Normally healthy kidneys remove these from the blood. High levels of creatinine and urea nitrogen in your blood indicate that kidney function is impaired.
- If screening tests raise concern that you may have proteinuria, 24 hour collection of urine may be needed to determine the amount of protein in your urine. Instructions on the proper collection and storage of a 24 hour specimen will be included when you receive the collection device.

TREATMENT

- If you have diabetes, high blood pressure, or both, the first goal of treatment will be to control your blood glucose and blood pressure. If you have diabetes, you should test your blood glucose often, follow a healthy eating plan, take your medicines, and get plenty of exercise. If you have diabetes and high blood pressure, your caregiver may prescribe:
  - Angiotensin-converting enzyme (ACE) inhibitors.
  - Angiotensin receptor blockers (ARB).
- People who have high blood pressure and proteinuria but not diabetes may also benefit from taking an ACE inhibitor or ARB. Their blood pressure should be maintained below 130/80.
- Your caregiver may refer you to a dietitian. They may restrict your dietary salt and protein. They can help you follow a healthy eating plan.

FOR MORE INFORMATION

American Kidney Fund
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National Kidney Foundation
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The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health. It is under the U.S. Department of Health and Human Services. Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts.

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