Patient

View this article online at: patient.info/kidney-urinary-tract/chronic-kidney-disease-leaflet/proteinuria

Proteinuria

Proteins are molecules that are found in almost every part of the body, including in the blood. The kidneys normally have a filter which stops protein from entering the urine, except in very tiny amounts; however, kidney problems can cause higher levels of protein to be found in the urine.

What is proteinuria?

Proteinuria means that there is an abnormally high level of protein in urine. The kidney normally has a filter that stops all but a tiny amount of protein from leaving the blood and entering the urine.

So, it's normal to have a tiny amount of protein in urine, but larger amounts (proteinuria) - can be a sign of kidney problems, or other illnesses.

The level and type of proteinuria are a good indicator of the extent of kidney damage. Sometimes the only protein which leaks out is albumin - this form of proteinuria is also known as albuminuria.

Proteinuria is also a sign that someone is at risk of developing progressive worsening of kidney function. Even small degrees of albuminuria/proteinuria are also associated with an increased risk of developing heart and blood vessel disease.

Proteinuria symptoms

Proteinuria, like many other signs of kidney problems, often has no, or few, symptoms, particularly in the early stages. Laboratory testing is the only reliable way to detect protein in the urine, which is why some people are offered regular tests for it (see below).

Foamy urine can be a symptom of proteinuria. However, occasionally foamy urine is very common - it can happen when urine reacts with cleaning chemicals in the toilet bowl, and also happens if people have a full bladder causing urine to come out very quickly when weeing - so is not necessarily a concerning symptom if it happens occasionally. If your urine is often foamy, or becoming more foamy over time, speak to a doctor.

Sometimes, losing large amounts of protein from the body can cause fluid to leak out of the blood, causing swelling in the hands, feet, abdomen, or face. This happens in a condition where there is a very large amount of protein lost in the urine, called nephrotic syndrome.

Causes of proteinuria

There are lots of different causes of proteinuria. They include:

- Kidney damage, which itself has many different causes, such as:
    - Diabetes.
    - High blood pressure (hypertension).
    - Medications harmful to the kidney (eg, non-steroidal anti-inflammatory drugs).
    - Systemic lupus erythematosus and other inflammatory conditions.
    - Multiple myeloma, a type of cancer.
    - Other conditions that affect the filtering part of the kidney directly, causing glomerulonephritis.
- Excessive levels of protein in the blood. For example, some types of multiple myeloma produce very high levels of a specific protein - called free light chains - which can spill over into the urine if blood levels get too high.
- Urinary tract infections. These usually cause signs and symptoms of infection, though, and proteinuria should disappear after the infection is treated.

- Standing up for long periods of time. This is called 'orthostatic proteinuria' and affects some people. It's harmless and does not indicate any kidney problems. It can be ruled-out by testing for proteinuria on a urine sample taken first thing after waking up (this sample should be normal in people with orthostatic proteinuria, as they have been lying in bed for hours before taking it).
- Intense exercise.
- Dehydration.

How to test for proteinuria

Proteinuria can be tested for in two main ways:

- Using a urine dipstick, which gives a result within a few minutes.
- Sending the urine sample to a laboratory for an accurate measurement.

Urine dipsticks are less sensitive for proteinuria and will usually miss small amounts of protein in the urine. Laboratory analysis is more sensitive and also allows the amount of protein to be accurately measured.

Ideally, urine samples for proteinuria tests should be taken first thing in the morning. This is because, as above, some people have a harmless condition where small amounts of protein enter the urine when they've been standing upright for some time (orthostatic proteinuria). Taking the sample first thing in the morning stops this from affecting the results.

Who should have their urine routinely tested for proteinuria?

In the UK, the National Institute for Health and Care Excellence (NICE) recommends that the following people are offered a urine test for proteinuria:

- People with reduced kidney function on a blood test. This assessment is made using a kidney measurement called the estimated glomerular filtration rate (eGFR).
- People with diabetes.

- People with high blood pressure (hypertension).
- People with a history of kidney disease such as glomerulonephritis.
- People who have conditions which could damage the kidneys by blocking the outflow of urine (eg, enlarged prostate gland, recurrent kidney stones).
- People with heart and blood vessel (cardiovascular) disease (coronary heart disease, chronic heart failure, peripheral arterial disease and cerebral vascular disease - stroke or TIA).
- People with complex diseases which may involve the kidneys - for example, systemic lupus erythematosus (this is a disease where a person's immune system attacks and injures the body's own organs and tissues) or myeloma.
- People with a family history of kidney failure or a family history of inherited kidney disease.
- People found to have blood in their urine.

How often do I need to have a test for proteinuria?

People who are at increased risk of developing kidney disease should have this test annually as a minimum or as part of their routine check-ups by the doctor. The exact frequency should depend on the clinical situation (level of risk) of the patient.

It is important that people with CKD and diabetes should have a test for proteinuria as part of their regular reviews at least once a year.

Proteinuria treatment

Treatment of proteinuria depends on the cause. If proteinuria is found, doctors should determine the cause. If the cause isn't clear, or if there is a lot of proteinuria, they may refer to a kidney (renal) specialist (nephrologist) for a specialist opinion.

Treatment might include:

- Medicines.
    - For example, types of medicine called ACE inhibitors or angiotensin receptor blockers (ARBs) are very good at treating kidney problems from diabetes, which can cause proteinuria.
- Lifestyle changes such as losing excess weight, exercising and stopping smoking.
- Sometimes changes in your diet.

Generally, it's important to keep diabetes and high blood pressure under good control; both can cause harm to the kidneys if not controlled.

Can proteinuria be cured?

This depends entirely on the underlying cause of the proteinuria.

For example, proteinuria due to a urinary tract infection should go away completely once the infection has cleared. Proteinuria that occurs due to a fever or exercise should also go away completely.

Proteinuria due to kidney problems may be difficult to cure. Treatment for those kidney problems is usually aimed at slowing or stopping further damage to the kidney, although sometimes treatments can reduce the level of proteinuria.

Proteinuria, particularly in diabetes, can be a very early sign of kidney problems. This is why doctors check for it; if it's picked up early, treatment to protect the kidneys is more likely to be successful.

Further reading

- Blann A; Routine blood tests 1: why do we test for urea and electrolytes? Nursing Times; 110: 5, 19-21, 2014.
- Fraser SD, Blakeman T; Chronic kidney disease: identification and management in primary care. Pragmat Obs Res. 2016 Aug 17;7:21-32. eCollection 2016.
- Chronic kidney disease; NICE CKS, March 2024 (UK access only).
- Chronic kidney disease: assessment and management; NICE guideline (last updated November 2021)

- Chronic kidney disease: what are the causes and risk factors?; NICE CKS, May 2023 (UK access only)

Authored by:	Peer Reviewed by: Dr Hayley Willacy, FRCGP	
Originally Published: 19/11/2023	Next review date: 27/10/2023	Document ID: doc_12494

View this article online at: patient.info/kidney-urinary-tract/chronic-kidney-disease-leaflet/proteinuria

Discuss Proteinuria and find more trusted resources at Patient.