Kidneys - nephrotic syndrome

Nephrotic syndrome is a condition of the kidneys. It is usually caused by one of the diseases that damage the kidneys' filtering system. This allows protein to be filtered out into the urine (proteinuria).

When the protein level in the blood drops, liquid seeps out of the smallest blood vessels (capillaries) all over the body and settles into the surrounding tissue, causing fluid swelling (oedema). Treatment includes medications and dietary changes.

'Minimal change' disease (lipoid nephrosis) is the most common form of nephrotic syndrome in children.

How your body is affected

Blood is 'cleaned' in the kidneys as it passes through tiny filters called nephrons. Each kidney contains about one million nephrons. The kidneys remove waste products from the blood (such as products of food metabolism), while maintaining a balance of nutrients, salts and water.

Normally, protein is not removed when the kidneys filter waste from the blood. However, when the kidneys are damaged, protein leaks through the damaged filters and is removed from the body in the urine, along with the waste products. The two proteins that are most likely to be present in the urine when this happens are albumin (controls blood volume) and globulin (largely made up of antibody proteins).

Normally a person loses less than 150mg of protein in the urine in a 24-hour period. A person with nephrotic syndrome can lose more than 3.5g of protein in the urine during a 24-hour period or 25 times the normal amount.

Signs and symptoms

The symptoms of nephrotic syndrome include:

- Foamy and frothy urine
- Unexplained weight loss
- General malaise (feeling unwell)
- Oedema (fluid retention or swelling), particularly around the abdomen (belly area), legs and eyes
- Muscle wasting
- Stomach pain
- Dizziness when standing up from a lying or sitting position (orthostatic hypotension).

Causes of nephrotic syndrome

Some of the causes of nephrotic syndrome include:

- **Changes to the immune system (minimal change or lipoid nephrosis) –** this type is most common in children. It is called 'minimal change' because the kidney filters appear normal under a microscope. The cause is thought to be changes in certain cells of the immune system. The function of the kidneys is normal and the outlook for recovery is usually excellent.
- **Inflammation** – local inflammation or swelling damages and scars the kidney filters. Examples of this are focal glomerulosclerosis and membranous nephropathy. Treatment may not resolve the condition and the kidneys may gradually lose their ability to filter wastes and excess water from the blood.

- **Secondary nephrotic syndrome** – can be caused by certain conditions including diabetes, drugs, cancer and systemic lupus erythematosus (SLE).

Complications

Complications of nephrotic syndrome can include:

- **Dehydration** – low protein levels may lead to a reduction in blood volume. In severe cases, intravenous fluids may be given to boost the body's water content.
- **Blood clots** – in the leg veins and occasionally in the kidney veins. Blood clots can also go into the lungs and cause chest pain, breathlessness or coughing up of blood.
- **Infection** – infection and inflammation (peritonitis) of the peritoneal cavity. This is the thin elastic lining that contains the pancreas, stomach, intestines, liver, gallbladder and other organs. A fever may indicate infection.
- **Kidney failure** – without treatment, the kidneys may fail in extreme cases.

Diagnosis

Diagnosing nephrotic syndrome involves a number of tests, including:

- **Urine tests** – excessive protein makes the urine appear frothy and foamy. A dipstick urine test can also detect protein levels (proteinuria). A 24-hour urine collection or a spot urine protein/creatinine ratio may be done if urine protein is found on the dipstick. These tests measure the amount of protein more precisely and identify whether kidney damage is mild, moderate or heavy.
- **Blood tests** – to check the blood protein and creatinine (waste made by muscle activity) levels.
- **Biopsy** – a small sample of kidney tissue is taken and examined in a laboratory.

Further tests

Sometimes further tests may be required. These may include:

- **Ultrasound** – an examination of the kidneys using sound waves to outline the structure of organs.
- **Computed tomography (CT) scan or magnetic resonance imaging (MRI)** – using radio-frequency wavelengths and a strong magnetic field to provide clear and detailed pictures of internal organs and tissues.

Treatment

'Minimal change' nephrotic syndrome fixes itself in around 40 per cent of cases. Other causes of nephrotic syndrome are also often treatable. It is essential to consult a kidney specialist (nephrologist) who can develop a management plan for your condition.

Treatment depends on the severity of the condition, but may include:

- Specific medications treatment for some of the causes (for example, steroids for minimal change, immunosuppression for membranous nephropathy or focal sclerosis) – this may lead to complete or partial remissions of the nephrotic syndrome
- Diuretics to control the swelling tendency
- Medication to control high blood pressure.

All patients with persisting nephrotic syndrome should be treated with:

- Angiotensin active agents (ACE inhibitors or angiotensin blockers) to reduce the amount of proteinuria
- A low salt diet to help swelling and to assist in the reduction of proteinuria
- Statins to help with cholesterol control and to reduce proteinuria.

Where to get help

- Your doctor
- Kidney Health Information Service Tel. 1800 4 KIDNEY (543 639), or TTY users phone 1800 555 677 then ask for 1800 454 363

Things to remember

- Nephrotic syndrome is the failure of the kidneys to maintain enough protein in the blood.
- 'Minimal change' disease (lipoid nephrosis) is the most common form of nephrotic syndrome in children.
- Treatment includes medications and dietary changes.

This page has been produced in consultation with, and approved by:

Kidney Health Australia