Nephrotic syndrome

What is nephrotic syndrome?

Nephrotic syndrome is a kidney condition characterised by:

- Very high levels of protein in the urine (proteinuria)
- Low levels of protein in the blood
- Swelling, especially around the eyes, feet, and hands.

Other indicators include a high cholesterol level in the blood, and sticky blood which can cause blood clots in the legs (deep vein thrombosis) or lungs (pulmonary embolus). Some causes are serious.

What causes nephrotic syndrome?

It results from damage to the kidneys' glomeruli – tiny blood vessels that filter wastes and excess water from the blood and send them to the bladder as urine. We eat about 80g of protein per day. This goes into the blood and then to the kidneys. Healthy glomeruli allow less than 0.4g (400mg) of protein to escape into the urine per day. In nephrotic syndrome, more than 3g of protein leaks through.

As a result, protein levels in the blood fall. Blood protein soaks up fluid into the bloodstream and so regulates fluid throughout the body. When blood is low in protein, fluid accumulates in the body's tissues rather than circulating. This causes swelling ('oedema') and puffiness. Children can present with swelling around the eyes ('periorbital oedema').

Nephrotic syndrome can occur with diseases affecting (1) the whole body – such as diabetes or SLE ('lupus'); or (2) only the kidneys – such as glomerulonephritis ('nephritis' or 'GN'). What causes these diseases is unknown. But, they are thought to be due to an over-active immune system. Nephritis is normally the cause of nephrotic syndrome in children.

How is nephrotic syndrome diagnosed?

The doctor may first measure the level of protein in a urine sample using a dipstick. Then, this and a blood sample are sent to the laboratory. Diagnosis is confirmed if the urine protein level is high and blood protein level is low. If kidney damage has occurred, blood tests may show signs of early kidney failure with a raised creatinine level. The doctor may then recommend a kidney biopsy. A tiny piece of kidney is removed for examination to help determine the treatment. If a person has had diabetes for some time, and diabetes is thought to be the cause of nephrotic syndrome, a biopsy is occasionally necessary.

How is nephrotic syndrome treated?

Treatment usually focuses on reducing high cholesterol, blood pressure, leg swelling and protein in urine – through diet and medication. Two groups of blood pressure tablets – angiotensin-converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARBs) – also protect the kidneys by reducing protein loss in the urine.

Note: there is no evidence that limiting protein in the diet helps to reduce the protein loss in the urine.

Nephrotic syndrome may go away once the underlying cause, if known, has been treated. In children, 80% of cases of nephrotic syndrome are caused by a nephritis called minimal change disease, which can be successfully treated with prednisolone (a steroid). Occasionally, a biopsy will be done.

In adults, however, if nephrotic syndrome is due to nephritis, patients may need treatment with prednisolone and other stronger immunosuppressive drugs, such as azathioprine, mycophenolate, ciclosporin and cyclophosphamide.

What is the outcome for nephrotic syndrome?

In some patients, nephrotic syndrome can go away completely after treatment. In others, it can be controlled with tablets. But, depending on the cause, as many as half of the patients may develop kidney failure that progresses to end-stage renal disease (needing dialysis or a transplant).

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