Understanding kidneys, from how they work normally to CNI

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Dear patient,

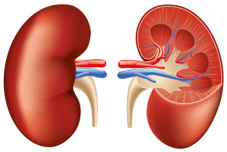
You may have problems with your kidneys and are being monitored by one of the doctors in our hospital. The purpose of this leaflet is to give you a brief explanation about the functioning of the kidneys. In this leaflet, you will find more information on what it means when your kidneys are functioning less well, the medication often given to patients with kidney problems and the treatment of chronic kidney problems. You can always contact us with your questions.

The Department of Nephrology

1. The functions of the kidney

1.1 The body's purification plant

Like a filter, the kidneys purify the blood of waste products resulting from the destruction of the cells of the body and from the digestion of nutrients. Two hundred litres of blood are filtered every day. This leads to the production of about 1.5 litres of urine that is highly concentrated in waste products.



1.2. Regulation of water and salts in the body

Hormones control the kidneys' regulation of water and salt very precisely according to the supply of food and any loss (through sweating, diarrhoea, etc.). The goal is to maintain a perfect and constant balance.

1.3. Producer of hormones

- **Erythropoietin (EPO)** is a hormone produced by the kidneys to stimulate the production of red blood cells.
- **Renin**, also produced by the kidneys, is a hormone that ensures a balance between water, salt and blood pressure.
- The kidneys are able to activate **vitamin D**, a hormone that is of vital importance for the regulation of calcium in the body. It is in fact thanks to this activated vitamin D that calcium can be absorbed from the diet and bind to bone.

2. Treatment of poorly functioning kidneys

Before the stage of needing dialysis, the goal is to reduce the symptoms of the disease and to slow its progression in order to delay dialysis or transplantation for a while.

Important in this are a

- balanced lifestyle and a healthy and appropriate diet. In some cases, a diet low in protein may be suggested. A low-salt diet is usually necessary.
- moderate exercise such as walking, cycling, swimming, etc.
- preventing and properly treating diabetes, high blood pressure and excessive cholesterol
- stopping smoking
- limiting the intake of salt by watching out for hidden salts (cold meats, preserved foods, etc.)
- limiting foods high in potassium and phosphorus
- adjusting the amount of liquid intake to the remaining capacity of the kidneys.

3. Medicinal products

Antihypertensives

These make it possible to keep blood pressure at a fairly low level.

Erythropoiesis-Stimulating Agent (ESA)

If anaemia causes symptoms (severe fatigue, breathing difficulties, muscle weakness, etc.) due to insufficient production of the hormone EPO, injections of an ESA can supplement the insufficient production of this hormone by the kidneys. By increasing the number of red blood cells, ESAs ensure a better supply of oxygen to the tissues of the body and therefore a marked improvement in the quality of life.

Iron supplements

Iron is the raw material for the production of red blood cells. For ESAs to work properly, there must be sufficient iron reserves.

Cholesterol-lowering medicines

The harmful effects of cholesterol are all the more important in patients with poorly functioning kidneys. It is absolutely necessary to control cholesterol as well as possible.

Calcium and vitamin D

Vitamin D supplements make it possible to compensate for a deficiency due to poorly functioning kidneys. Calcium not only improves bone mineralisation, but it is also able to bind the phosphorus present in the diet and excrete it through the stool. New medicines are now available to better control bone metabolism.

4. Renal replacement therapies

If the disease enters too advanced a stage, renal replacement therapy (RRT) must be initiated. Different techniques are possible.

Hemodialysis

Hemodialysis consists of ridding the blood of harmful substances using an artificial filter. Excess water is also removed. At least three sessions of four hours each are required weekly. Treatment takes place in the hospital or at an auto-dialysis clinic for the healthiest patients. In some cases, treatment can be done at home.

Peritoneal Dialysis

In this case, the peritoneum (the patient's own peritoneum, a natural membrane covering the internal organs) serves as a filter. This technique is gentler and similar to hemodialysis in terms of the quality of dialysis. The patient performs the technique himself or herself (or with a home nurse) in the home or nursing home (by the nursing home nurses). Treatment takes approximately nine hours daily (but can be done overnight).

Kidney transplant

This is the ideal solution as it restores the various kidney functions. Patients must take medicines for life to prevent rejection of the transplanted kidney. The limiting factor of kidney transplantation is the shortage of organs, which means that after undergoing various investigations, you will be placed on a waiting list until a suitable donor kidney is found. Above a certain age, the risks of kidney transplantation are often greater than haemodialysis or peritoneal dialysis.

5. If the kidneys are diseased...

The kidneys can be threatened by many factors. Some diseases of the kidneys are due to other common diseases such as: diabetes, high blood pressure, frequent use of certain medicines (including anti-inflammatory medicines), chronic urinary tract infections, etc.

The greatest risk of all these diseases is that they may progress to a worsening and irreversible disruption of the various functions of the kidney. This is called **chronic kidney disease**.

6. Chronic kidney disease (CKD)

The rate at which damage to kidney functions progresses can vary from one person to another and from one disease to another (from a few months to several years). Unfortunately, the early stages of the disease tend not to be noticeable, and it is not until later that it is diagnosed. At the time of diagnosis, it is not uncommon for a kidney to have lost more than 50% to 80% of its capacity.
Symptoms that were very discreet at the beginning of the disease become more significant the more the kidney disease progresses. The different symptoms of CKD are directly related to the loss of the different kidney functions:

Accumulation of waste products in the blood

Tiredness, loss of appetite, nausea, vomiting, nerve damage, sexual dysfunction, etc.

Disruption of blood concentrations of salt, calcium and water

High blood pressure, breathing difficulties, muscle cramps, heart rhythm disorders, etc.

Deficiency of kidney hormones

Anaemia, high blood pressure, calcium metabolism disorders, bone decalcification, etc.

As chronic kidney disease is a progressive disease, there comes a time when the accumulation of waste products, water and some salts endangers survival. This is the final stage of **kidney disease**.
From this time on, it is absolutely necessary to switch to dialysis or transplantation.

7. How can you know if your kidneys are working properly?

Do you have diabetes or high blood pressure?

Then kidney disease screening must be part of your regular follow-up care by your doctor.

No diabetes or high blood pressure?

Then there is less risk of kidney disease, but it should not be neglected. Simple blood sampling and urine analysis make it possible to detect disorders, even at an early stage.

A balanced lifestyle, a healthy diet and avoiding self-medication are essential for the prevention of kidney disease.

Contact

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