Microalbuminuria

Preventing Diabetic Nephropathy

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Our kidneys
Wonderful Filters

Located at the abdominal cavity, at both sides of the spinal column, **kidneys are fantastic organs** with a precise filtration system, made up of millions of delicate filters called «glomerule».; they work extracting all the unnecessary substances from blood and retaining all the necessary nutrients like glucose and protein.

2

What is diabetic nephropathy?

Diabetes can damage these filters, allowing for the passage of proteins —which under other conditions do not cross the glomerulus—, and their loss in urine.

Since the kidney then does not filter adequately, **toxic substances accumulate** in the blood and excess fluid is retained in the body.

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And what does it cause it?

In individuals with diabetes, **if there is persistent hyperglycemia,** pressure is high in the glomerulus. Excessive pressure makes fluids and toxic substances filter faster than normal; this event is known as hyperfiltration.

It is thought that sustained hyperfiltration can be one of the factors, in the development of diabetic nephropathy, though it may not be the only one, the most important.

These factors can trigger a process in which overproduction of a cicatricial type material precipitates in basal membranes of the walls of small vessels filling this splendid filtration unit called a glomerulus.

This leads blood vessels to become too permeable, even for large molecules such as proteins, which in this situation, escape in the urine. When this occurs at an amount above 300 mg/24 h, **clinical nephropathy** occurs.

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How often does it occur?

Renal involvement, secondary to diabetes occurs in about **30-40% of patients with type 1 diabetes** and in approximately **10-20% of patients with type 2 diabetes.**

In about 1/3 of patients, requiring supplementary renal therapy, it is secondary to diabetes.

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And what is microalbuminuria?

Microalbuminuria is the **excretion of albumin in the urine** at very small amounts, **above the normal limits,** but without reaching the limits established to define clinical diabetic nephropathy.

Amount of albumin eliminated in 24 hour urine

Normal:	Less than 30 mg/24 h
Microalbuminuria:	30-300 mg/24 h
Proteinuria:	Over 300 mg/24 h

The results must be confirmed and at least two positive results should be obtained with three samples taken within 3-6 months before the **diagnosis of microalbuminuria** is established.

Not all patients with diabetes have the same **probability for the disease.** The factors determining a higher risk include: genetic susceptibility, familial or personal hypertension, history of poor metabolic control with HgbA1c above 8% for years and advanced degrees of diabetic retinopathy, among others.

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How and when is it measured?

The screening test can be performed analyzing any **urine sample,** though a sample from the **first morning urine** is preferable.

If this first test provides a positive analysis, it is **recommended** that measurement of a night urine sample be done, or better, a 24-hour urine test.

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How often should it be measured?

The microalbuminuria test must be performed **yearly** in all patients with diabetes from 12 years of age through adulthood.

8

Can false results occur?

The high **biological variability,** which can reach 40%, makes the transient positive microalbuminuria result occur. This testing may not subsequently be confirmed.

Other factors can also cause false results: very intense physical exercise, urinary infection, menstruation, heart failure, acute diseases, periods of significant high blood sugar levels, some urological conditions and some drugs will affect the results.

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Practical value

Microalbuminuria measurement is currently the first marker available to **detect** the existence of an incipient renal involvement.

The progression of this disease to more advanced stages can be influenced by different intervention measures: strict control of blood sugar levels, diet changes, pharmacological measures such as prescribing special hypotensive drugs (ACEIs).

Correction of microalbuminuria has been shown to be effective in stopping the progression of diabetic nephropathy, even in the absence of hypertension. In recent studies in **patients with type 1 diabetes,** the rate of progression rate of the disease could be reduced by 50%.

Since there are no markers which can distinguish between patients who will develop diabetic nephropathy and those who will not develop it, it is **essential** to perform the microalbuminuria testing, at least once a year.

This test is also a **marker** of diabetic retinopathy and of the progression of other diabetic complications.

Particularly, in **patients with type 2 diabetes,** microalbuminuria is an independent cardiovascular risk factor, which will determine the need for changing life style as instructed by the medical team: smoking, cholesterol, blood sugar levels and hypertension should be monitored more strictly by the physician.

In summary, thanks to this test, the patient will know if he/she must perform any plan of diet —amount of salt, proteins, etc.— and life style adjustment that will determine a better and longer renal function and, consequently, better life quality.

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