

# Microalbuminuria, hypertension and renal disease in diabetes

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**M**icroalbuminuria is in principle so-called sub-clinical proteinuria which means that the excretion rate is not normal, but not as high as in the proteinuric range. We thus have 3 categories; normo-, micro-, and macroalbuminuria. Microalbuminuria is usually defined as an excretion rate between 20-200 microgram/min or 30-300 mg/ 24h period. Albumin creatinine ratios are also widely used.

## Type 1 diabetes

Microalbuminuria in type 1 diabetes clearly predicts development of overt nephropathy as well as risk of progression within the microalbuminuric range. The increase rate is usually around 10-20 % per year without treatment. However, treatment with ACE-inhibitors and better metabolic control can slow the progression and patients may even regress to normoalbuminuria by antihypertensive treatment and better glycaemic control. GFR is well preserved in this state and antihypertensive treatment, especially with ACE-inhibitors, preserves not only renal function but also renal structure.

## Type 2 diabetes

In type 2 diabetes, many studies have shown that microalbuminuria predicts progression within the normoalbuminuric range and also progression to clinical proteinuria. Interestingly, many studies have also con-

firmed the old observation that microalbuminuria in type 2 diabetes predicts early mortality and is associated with cardiovascular and microvascular disease. Intervention strategies mainly with ACE-inhibition as in the HOPE-study document that microalbuminuria is not only a risk marker but also a parameter that can be used as an indication for treatment since it prevents progression.

## Population-based studies

Population-based studies in the background population microalbuminuria is also clearly predictive of cardiovascular mortality and associated with risk factors as shown in several epidemiological studies. It remains to be proven that early treatment prevents more advanced disease but studies are in progress.

## Conclusion

In conclusion, microalbuminuria is a major risk marker, associated with late complications. It can be used to define "at-risk patients", and more importantly it can be used as an indicator for more aggressive antihypertensive and glycaemic control, at least in diabetes.

## REFERENCE

Mogensen C.E. (ed.), THE KIDNEY AND HYPERTENSION IN DIABETES MELLITUS, 5th ed. Kluwer Academic Publishers, Boston, Dordrecht, London, 2000.