

in slowing the rate of decline of kidney function. Some BP lowering drugs, such as ACE (angiotensin converting enzyme) inhibitors and angiotensin receptor blockers, have been shown to decrease proteinuria and slow the progression of kidney disease in diabetic nephropathy.

#### • Cholesterol or Fats in the Blood

Control of high blood fats (cholesterol and triglycerides) will help prevent disease of blood vessels and may also help slow the rate of decline of kidney function. In addition to reducing the intake of fats in the diet, medication to lower blood cholesterol levels may also be prescribed.

#### • Low Protein Diet

Research has shown that a low protein diet may help to slow down deterioration of kidney function in people who have kidney damage. This effect is separate from the effects of blood pressure control and blood sugar levels. The degree of restriction of dietary protein depends on the extent and rate of renal damage. Because of the importance of having the correct balance of carbohydrate, fat and protein in the diet, advice from a dietitian associated with a diabetic clinic or renal unit is strongly recommended.

#### • Smoking Habits

It is well known that smoking is related to the development of atherosclerosis (disease of blood vessels). Smoking also contributes to the development of microalbuminuria in diabetic nephropathy. It is therefore important that all diabetic patients stop smoking.

Not only will all of the above measures help to control diabetic nephropathy but they will help to prevent other complications of diabetes.

#### • What Happens if the Kidneys Fail?

If as a result of diabetic nephropathy, kidney function is lost, treatment in the form of dialysis or kidney transplantation is available.

Both haemodialysis (artificial kidney machine) and peritoneal dialysis (CAPD or continuous ambulatory peritoneal dialysis and APD or automated peritoneal dialysis) are very effective in helping people to lead healthy and active lives. For many people, kidney transplantation is possible. Some younger people, usually with Type 1 diabetes, may be suitable for a combined kidney and pancreas transplant.

Information about dialysis treatment and transplantation is available from the Renal Resource Centre, from your renal physician and renal unit and Kidney Health Australia.

### RENAL RESOURCE CENTRE, 2006

37 Darling Point Road

Darling Point NSW 2027 Australia

Tel: 61 2 9362 3995 or 61 2 9362 3121

Freecall: 1800 257 189 Fax: 61 2 9362 4354

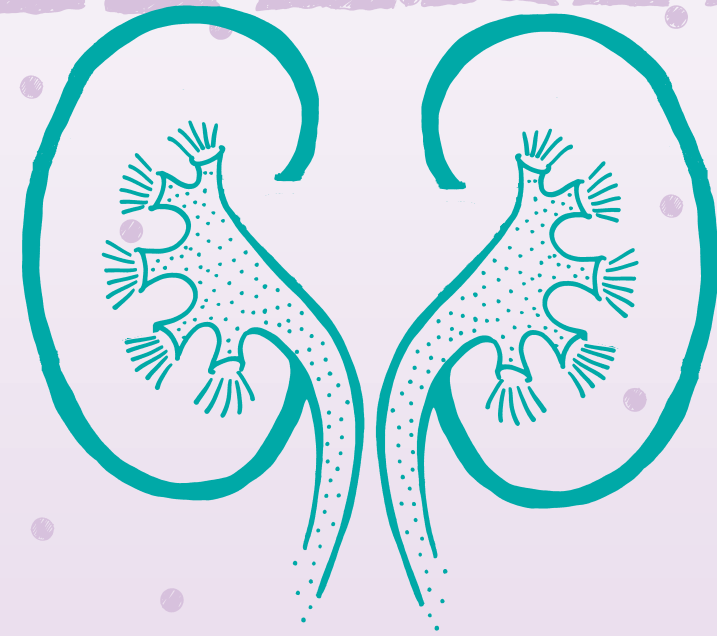
renalresource@nscchahs.health.nsw.gov.au www.renalresource.com

NORTHERN SYDNEY  
CENTRAL COAST  
NSW HEALTH

Publications of the Renal Resource Centre are endorsed by  
The Australian and New Zealand Society of Nephrology,  
Transplant Australia and supported by Kidney Health Australia



# Diabetes and Your Kidneys



### RENAL RESOURCE CENTRE, 2006

37 Darling Point Road

Darling Point NSW 2027 Australia

Tel: 61 2 9362 3995 or 61 2 9362 3121

Freecall: 1800 257 189 Fax: 61 2 9362 4354

renalresource@nscchahs.health.nsw.gov.au www.renalresource.com

NORTHERN SYDNEY  
CENTRAL COAST  
NSW HEALTH

Publications of the Renal Resource Centre are endorsed by  
The Australian and New Zealand Society of Nephrology,  
Transplant Australia and supported by Kidney Health Australia



## What is Diabetic Nephropathy?

Diabetes can affect the kidneys in a variety of ways but one of the most important complications is diabetic nephropathy. This is a kidney condition that occurs only in people with diabetes mellitus and results in progressive damage to the small filtering units of the kidney (glomeruli). This eventually leads to lots of protein in the urine, high blood pressure and declining kidney function. Diabetic nephropathy is an important cause of failure of kidney function. About 25% of people who need dialysis (artificial kidney) treatment or kidney transplantation in Australia have diabetic nephropathy.

## Who Gets Diabetic Nephropathy?

Diabetic Nephropathy is a long term complication of diabetes but only 20-30% of people with diabetes develop diabetic nephropathy. It is not entirely understood why only a small proportion of people with diabetes develop diabetic nephropathy. However, there are a number of factors which appear to increase the risk of kidney disease. These include hypertension (high blood pressure) and high blood glucose levels (particularly in the early stages of diabetes). Smoking is also detrimental. People with a family history of high blood pressure are at greater risk of developing diabetic nephropathy. It is important to realise that these are only risk factors. It is possible to have no risk factors and still develop kidney problems. Conversely, there are some people with all the risk factors who do not develop kidney problems.

## The Course of Diabetic Nephropathy

Remember that only 20-30% of people with diabetes develop diabetic nephropathy. There are 2 types of diabetes. These are Type 1 diabetes - most frequently seen in younger people and usually requiring insulin treatment immediately and Type 2 diabetes - seen usually in older people and often treated initially with diet and tablets. The course of diabetic nephropathy appears to be a little different in the two types of diabetes. It is more consistent in Type 1 diabetes, in which the time of onset of the diabetes is known. Following a silent stage of 5-20 years after diagnosis, a proportion of people with Type 1 diabetes mellitus will begin to pass excess protein in the urine. Initially, this can only be detected by measurements of a protein called albumin and is termed microalbuminuria (albumin in the urine). Gradually (usually over years) the amount of protein in the urine increases and eventually the kidney function begins to decline. When the protein in the urine exceeds the body's ability to make sufficient protein, fluid retention will develop. High blood pressure is almost always present at this stage. Over a period of time the declining kidney function can result in kidney failure.

In Type 2 diabetes, the course of diabetic nephropathy is not so well established, mainly because the date of onset of this type of diabetes is often not known. People may have mild Type 2 diabetes for years before it is detected and treated.

Unfortunately, when diabetic kidney disease develops, other diabetic complications affecting eyes (diabetic retinopathy), nerves (diabetic neuropathy) and blood vessels (diabetic atherosclerosis) often occur simultaneously.

## How Is Diabetic Nephropathy Diagnosed?

As it is not known which people with diabetes will develop kidney disease, it is important that testing for the earliest signs of kidney disease occur regularly. Treatment which may slow the progression of the disease can then be started early.

When someone with diabetes develops microalbuminuria, it is usually due to diabetic nephropathy. However, occasionally there may be some doubt and a kidney biopsy may be recommended. This is a simple procedure which involves taking a small sample of kidney tissue via a needle inserted into the kidney under local anaesthesia.

## Prevention and Treatment of Diabetic Nephropathy

### • Blood Glucose

There is now good evidence that tight control of blood glucose (blood sugar) levels early in the course of diabetes will delay and possibly prevent the development of kidney disease (and other complications) in people with diabetes.

### • Blood Pressure

Early detection and treatment of high blood pressure will also slow down the rate of kidney damage in people with diabetes who already have kidney disease. *Regular monitoring and good control of blood pressure are absolutely essential, aiming for blood pressure consistently less than 125/80 mmHg.* Once kidney function starts to decline, control of blood pressure has been found to be the single most important factor