Kidney Health Information

Diabetes

- is the most common cause of established renal failure (ERSF) requiring dialysis or a kidney transplant in the UK
- about 20% of those starting dialysis in the UK have diabetes
- the condition is becoming more common and it is estimated that numbers will double in the UK over the next few years
- mainly this is due to the type of food eaten and lifestyle – diabetes is more common in the overweight
- 30-40% of diabetics may eventually develop kidney complications, known as diabetic nephropathy

What is it and what are the causes?

- **Type I Diabetes** (Insulin dependent) - people are unable to produce enough insulin and need regular insulin injections as a life saving treatment. This type more often starts in young children or adolescents. It is usually caused by autoimmunity – the body's immune system attacks the insulin-producing cells in the pancreas.
- **Type 2 Diabetes** (Maturity onset) - Usually occurs after age 40, and usually in people who are overweight. Insulin is still produced by the pancreas but the body becomes resistant to it and needs more. This

form is commonly controlled with drugs and by diet, but some people need insulin. It is this type of diabetes that is increasing alarmingly, and now occurring in younger people.

Diabetes can cause an urgent need to go to the loo!

How does it affect the kidneys?

Up to 40% of diabetics develop serious kidney trouble in their lifetime.

Taking things in the order that they occur:

- kidney function seems to improve at first – glomerular filtration rate (GFR) is increased. (For an explanation of GFR see our glomerulonephritis page)
- an increased GFR is common in poorly controlled diabetes and an early sign that there may be trouble ahead
- glomeruli, the kidney's filters, are slowly damaged by the high blood sugar level. It usually takes at least 10 years for signs of this develop
- high blood pressure is an early problem

- the glomeruli begin to leak small amounts of protein that can be picked up by special tests – microalbuminuria
- protein leakage becomes detectable in urine using ordinary tests
- nephrotic syndrome may develop if the leak is severe. There is fluid retention and the level of protein in the blood fall because of the leakage. There is more information about nephrotic syndrome on the glomerulonephritis page
- kidney function (GFR) deteriorates
- eventually kidney function becomes so poor that dialysis or a transplant is necessary to keep you alive.

Other diabetic complications

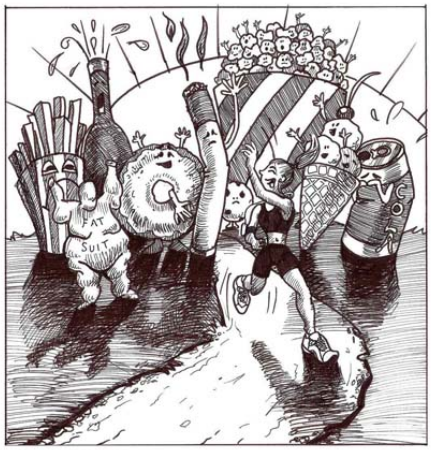
- **Artery Disease**: People with diabetes have more heart attacks and strokes – this disease of arteries is called atherosclerosis. As in other patients, it is made worse by high cholesterol and high blood pressure.
- **Retinopathy**: The retina at the back of the eye can be affected by disease of tiny blood vessels – this can cause bleeding and loss of vision. A regular eye check is very important, to protect and preserve eyesight.
- **Neuropathy**: Numbness and tingling in the feet result from nerve damage. Care of the feet is very important to prevent ulceration.

Certain groups of people are more likely to develop diabetic kidney complications

- Some families may be genetically prone to it, especially if family members already have other kidney diseases or high blood pressure.
- Certain ethnic groups seem more susceptible to diabetes and its complications, including African-Caribbean people and those of South Asian descent.
- Males
- Smokers.

Treatments

- Give up smoking – to benefit the kidneys, as well as the cardiovascular system and general health.
- Regular exercise, keeping alcohol intake down, good healthy diet, control of cholesterol, also reducing salt in the diet will help reduce blood pressure. This helps prevent kidney damage or a worsening of the condition.
- Blood pressure tablets
- Control of glucose levels is important
- If a protein leak has developed, treatment with ACE inhibitors or ARB's can protect the kidneys. They may reduce or 'cure' the protein leak, and prevent further kidney damage. They will need to be continued long-term.



A healthy lifestyle will benefit your kidneys

What if Kidney Failure gets worse?

- Dialysis and transplantation are possible, but can have particular problems because diabetes can affect so many other organs, and large arteries.
- For those who can have a transplant, adding a pancreas transplant can be good because if successful it leads to better diabetic control and better long term results. However, it is a big operation with extra risks so needs to be thought about carefully.

In the future it is hoped that pancreas cell transplants, or other new methods, will make it easier to replace pancreas function in more patients. If this works it could eventually reduce the number of young diabetics developing kidney failure.

Finding out more:

Diabetes information from Diabetes UK

http://www.diabetes.org.uk/home.htm

Kidney Disease and diabetes from the NKF (UK)

http://www.kidney.org.uk/Medical-Info/kidney-disease/diabetes.html

Diabetic Nephropathy from EDREN

http://renux.dmed.ed.ac.uk/EdREN/EdRenINFObits/Diabetic_nephLong.html

Some of our recent research projects into diabetic kidney disease:

2005 Dr Prabjal Chatterjee. Glucotoxicity and Diabetic Nephropathy.
High glucose levels in diabetes promote kidney damage by generating oxygen metabolites.. Certain enzymes act to protect the kidney, but may become depleted in diabetes. This study investigates these processes at a cellular level and it is hoped this will lead to the development of new treatments. Further information from:
http://www.kidneyresearchuk.org/images/pdfs/research/chatterjee.pdf

2004 Prof P W Andrew. The role of the hexosamine pathway in global protein synthesis and protein wasting states.

Diabetics with kidney failure treated by dialysis frequently suffer from a gradual reduction in their amount of muscle. Losing muscle is a bad sign and associated with reduced long-term survival. Further information from: http://www.kidneyresearchuk.org/content/view/94/150/

2003 Prof A Peter Maxwell. Identification of genetic risk factors for diabetic nephropathy

A genetic susceptibility to diabetic kidney disease has been proved – but which genes? This project compares genes in diabetics with and without kidney disease to find out why. Further information from: http://www.kidneyresearchuk.org/content/view/94/150/

2002 Prof GC Viberti. Glomerular injury in diabetic nephropathy

In kidneys, specialised cells called podocytes form a major part of the sieve in the glomerular filters. Podocytes are attached via little extra cellular proteins called Integrins. This study investigates some of the ways that podocytes may become detached, as observed in diabetic kidney disease. Further information from http://www.kidneyresearchuk.org/content/view/38/63/

Follow this link for further details of our ABLE initiatives: http://www.kidneyresearchuk.org/content/view/58/85/

Diabetic Nephropathy has emerged as the most common cause of renal failure. For details of a possible genetic link go to: http://www.kidneyresearchuk.org/content/view/94/150/ Professor A Peter Maxwell 2003 'Identification of genetic risk factors for diabetic nephropathy'

Also of interest, go to: http://www.kidneyresearchuk.org/content/view/94/150/ the details of Professor P W Andrew's current study

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