

# Renal replacement and diabetes care: the role of a specialist nurse

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## ARTICLE POINTS

**1** DSNs with an interest in renal care can help bridge the gap between renal and diabetes units and improve care for people with diabetes who have end-stage renal failure.

**2** When patients start on dialysis their diabetes regimen needs to be reviewed because both haemodialysis and peritoneal dialysis affect glycaemic control differently.

**3** Patients attending the predialysis clinic or dialysis unit in our trust are referred to the diabetes team and have routine reviews irrespective of the type of diabetes or treatment.

**4** The NSF for Renal Services (DoH, 2004) reflects the need for multidisciplinary skills for healthcare professionals working within a renal/diabetes remit.

## KEY WORDS

- Diabetes and dialysis
- Diabetes/renal specialist nurse
- Structured care
- Multidisciplinary team

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## Introduction

The NSF for Diabetes (DoH, 2002; DoH, 2003) and, more recently, the NSF for Renal Services (DoH, 2004), advocated a multidisciplinary and integrated service for people with both diabetes and end-stage renal disease. Development of the role of DSNs with knowledge in renal nursing can help to implement some of the standards required to improve clinical outcomes and quality of life for these patients.

Evidence from the Diabetes Control and Complications Trial (1993) showed that good glycaemic control reduces the risk of microvascular complications. Control of hypertension and hyperlipidaemia are also significant factors in reducing mortality and morbidity from macrovascular complications (UKPDS, 1998). It is still inevitable that some patients will progress to chronic renal failure and eventually end-stage renal failure requiring renal replacement therapy. Renal replacement therapy will impact on their glycaemic control and diabetes care. Patients and healthcare professionals may feel that good glycaemic control is no longer important. However, reducing further macrovascular complications for dialysis patients (Akmal, 2001) and preventing hypoglycaemia may improve the quality and length of patients' lives.

Renal and diabetes care are highly specialised areas of work. While the standard of care is high in both fields, a lack of co-ordination may lead to unstructured care. DSNs with an interest in renal care can help bridge the gap between these specialities.

### Diabetes care in the renal arena

Many patients with end-stage renal failure may not be given routine diabetes care due to a clash of appointments or because they feel too ill to attend diabetes clinics. There may be confusion by renal, diabetes and primary care health professionals as to the responsibility of diabetes care. This results

in a lack of routine care, particularly for people with type 2 diabetes which is controlled by diet or oral hypoglycaemic agents. Review of these patients can highlight significant problems.

Management of long-term complications for patients with renal disease is now incorporated into the NSF for Diabetes (DoH, 2002). Standard 12 states that patients:

*'requiring multiagency support will receive integrated health and social care'.*

When patients start on dialysis their diabetes regimen needs to be reviewed, because both haemodialysis and peritoneal dialysis affect glycaemic control differently. Prior to starting renal replacement therapy, patients' insulin requirements or oral hypoglycaemic requirements may have been reduced to prevent hypoglycaemia. However, after commencing renal replacement therapy requirements will increase again, particularly if patients are on peritoneal dialysis, because the dialysate used contains glucose.

Hypoglycaemia is common in end-stage renal failure. The kidneys metabolise insulin via the proximal tubule cells; as glomerular filtration rates decline this prevents insulin from reaching these cells resulting in increased amounts of circulating insulin (Meldrum, 1997). Patients attending the predialysis clinic or dialysis unit in our trust are referred to the diabetes team and have routine reviews irrespective of the type of diabetes or treatment. They are reviewed by the DSN in

the most appropriate environment for the patient – either at the renal unit, diabetes unit or at home. Concordance with other treatments is also discussed, e.g. antihypertensive and lipid lowering therapy. Smoking cessation can be discussed at this time and appointments at local smoking cessation clinics arranged. Patients who then start renal replacement therapy are reviewed weekly and problems about diabetes control are addressed. In some cases continuous subcutaneous insulin infusion can be used to optimise control (Figure 1).

Patients with end-stage renal failure may also have dietary restrictions (e.g. potassium, phosphate and fluid restrictions) that conflict with diets that people with diabetes are usually encouraged to eat. Patients with diabetes may well have been encouraged to have fruit for snacks and milky drinks for supper but if they have these restrictions they can find it difficult to find substitutions. Liaising with renal dietitians can help to solve this problem.

## Haemodialysis

Haemodialysis usually takes place three times a week for approximately 4h in the morning, afternoon or evening. Hypoglycaemia can occur as dialysis removes glucose, as well as toxins, from the blood. Sulphonylurea treatments or subcutaneous insulin can therefore increase the incidence of hypoglycaemia.

Many haemodialysis patients cannot eat while on dialysis since it causes hypotension and this may increase the risk of hypoglycaemia further. Hypotension is caused by food ingestion, as patients are unable to increase cardiac output when splanchnic blood flow increases after meals, which results in reduced peripheral vascular resistance. Diabetes treatments should be adjusted around dialysis regimens. Personalisation of a treatment regimen is easier with the newer analogue insulins and post-prandial regulators, which can improve diabetes control and minimise hypoglycaemic episodes.

Patients on two daily injections of premixed insulin may have the dose reduced or omitted before dialysis. A smaller dose may be given after dialysis with normal doses on non-dialysis days.

Basal bolus regimens are useful, because

the dose of fast-acting analogue insulin can be adjusted to control glycaemia predialysis, but because its duration is only short it will also prevent hypoglycaemia. Insulin glargine may also be beneficial in minimising hypoglycaemia (Bolli and Owens, 2000). If alteration of insulin regimens still fails to address hypoglycaemia and improvements in glycaemic control, then continuous subcutaneous insulin infusion can be considered (NICE, 2003).

Peritoneal dialysis causes fewer problems with glycaemic control as it occurs on a daily basis at set times and is less aggressive. However, because the dialysate used is glucose it can affect glycaemic control as small amounts of glucose are absorbed systematically. Patients absorb 100–150g of glucose per day depending on the strength of dialysate used (1.36%, 2.27% or 3.86%; Gokal and Khanna, 2001). Patients may be on continuous ambulatory peritoneal dialysis or overnight automated dialysis and diabetes regimens will need to be adjusted accordingly to cope with the glucose loads.

Assessment of glycaemic control can be undertaken using a continuous glucose monitoring system. This allows a 3 day profile of blood glucose levels to be taken and the effect of dialysis on glycaemic control can be accurately seen.

Monitoring blood glucose levels can be a

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Figure 1. A patient with type 1 diabetes and end-stage renal failure.

**PAGE POINTS**

**1** Deterioration in eyesight may cause problems for patients when they carry out blood glucose monitoring and administer insulin.

**2** The World Health Organisation criteria for diagnosis of diabetes define diabetes as a fasting blood glucose level above 7 mmol/l or a random blood glucose above 11 mmol/l.

**3** The NSF for Renal Services (DoH, 2004) reflects the need for multidisciplinary skills for healthcare professionals working within a renal/diabetes remit.

problem for patients on peritoneal dialysis because maltose, which can be used as a dialysate, can interfere with some blood glucose meters (Medical Device Alert, 2003). These patients need to be given suitable replacement meters for accurate monitoring. DSNs can liaise with the renal teams to ensure a protocol is in place.

Many patients with end-stage renal failure and diabetes will have other microvascular complications (i.e. retinopathy or neuropathy). Deterioration in eyesight may cause problems for patients when they carry out blood glucose monitoring and administer insulin. DSNs may have to encourage patients to change devices to help to maintain their independence. Peripheral neuropathy can result in loss of sensation or increased painful sensations particularly at night. Discussion of treatments, i.e. tricyclic antidepressants or capsaicin to reduce symptoms is another important role for the DSN, together with education of both patients and other healthcare professionals in the prevention of foot ulceration.

**Screening for diabetes**

After renal transplantation patients are referred to our hospital for routine follow-up care. Screening for diabetes is undertaken routinely as new onset diabetes occurs in up to 53% of post-transplant patients (Davidson et al, 2003). A protocol has been developed to ensure that all patients are effectively screened. Renal transplant patients have their fasting or random blood glucose taken at every clinic review and a glucose tolerance test is then arranged in the diabetes unit if the results are inconclusive. The World Health Organisation criteria for diagnosis of diabetes are used, which define diabetes as a fasting blood glucose level above 7 mmol/l or a random blood glucose above 11 mmol/l. Two samples are needed if the patient is asymptomatic (WHO, 1999). Occasionally tests are inconclusive and a glucose tolerance test is performed in these circumstances. Random or fasting blood glucose levels are taken at least annually from all transplant patients. When diabetes is diagnosed diabetes management is usually undertaken by secondary care, because of the complex pathology involved.

**Conclusion**

A large proportion of diabetes care focuses on prevention of long-term complications. Although these are of paramount importance, patients who have already developed these complications should not be forgotten. There is a lot that a multidisciplinary approach can do to reduce further complications and improve quality of life. The NSF for Renal Services (DoH, 2004) reflects the need for multidisciplinary skills for healthcare professionals working within a renal/diabetes remit. The five standards incorporate a patient-centred service that 'minimises complications and progression of their disease' and ensures that 'clinically appropriate treatment options are maximised'. The development of diabetes/renal specialist nurses can be beneficial in supporting both patients and healthcare professionals in this area. ■

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