WEEK 2 of three articles aimed at helping you to update your knowledge and understanding of diabetes

Diabetes: treatment and complications – the nurse’s role

THE AIM of treatment for diabetes is to alleviate the symptoms, maintain quality of life and slow the progression of specific and non-specific complications. This Part looks at treatments for diabetes and related complications. It also examines the nurse’s role in assessing the health of the person with diabetes and in the delivery of care and its evaluation.

Treating type 1 diabetes
The treatment for type 1 diabetes is insulin. This is given by subcutaneous injection by several means, including a syringe, pre-filled pens or a pen containing a pre-filled cartridge. It can also be delivered via a continuous subcutaneous insulin infusion, using a pump.

There are two types of insulin: animal insulin and human insulin. These can be slow-acting or quick-acting.

The usual areas of injection are the abdomen or thighs because of their large surface area. The injection technique is to pinch up the fat between the thumb and forefinger so that the needle goes in at 90°, avoiding the underlying muscle. Short needles are available for people who find it difficult to pinch up the fat or who experience discomfort in doing so. The arms are not usually recommended for self-injection because it is difficult for individuals to pinch up their own fat on their arm and then inject. It is possible, however, for someone else to inject into a patient’s arms or buttocks.

It is important to vary the injection site so as to prevent the development of lipo-hypertrophy (usually the case when using human insulin) or atrophy (more often seen in those using animal insulin). It is important not to inject into hypertrophic and atrophic areas because insulin is absorbed more slowly here. This can be a cause of unexplained hypoglycaemia if, inadvertently, a ‘fresh’ section of subcutaneous fat is then used.

It should be noted, too, that insulin absorption varies in different anatomical sites. For example, absorption from the leg is slower than from the abdomen and is quicker from the arm than both of these. When a patient is changing injection site, the insulin dose may therefore need to be adapted according to the new site and some extra blood sugar monitoring should be advised when making changes.

Trials are currently taking place on the use of inhaled insulin, and many people who are fearful of injections are watching the results of these studies with interest. Studies are also under way to investigate the use of both inhaled and oral insulins.

The only other treatment possibilities for people with type 1 diabetes are pancreas transplants and islet cell transplants. Again, work is under way, but as yet no viable alternative to insulin has been discovered.

Treating type 2 diabetes
The majority of people (80%) who develop type 2 diabetes are overweight. The basis of initial treatment is to pay attention to dietary intake and to encourage exercise so as to induce weight loss, the rationale being to improve nutrition, maintain normoglycaemia, be aware of cardiovascular risk factors and prevent the complications of diabetes.

When diet and exercise fail to control glycaemia, stepped therapy is used, starting with oral hypoglycaemic agents (OHAs). These fall into four main categories: sulphonylureas and sulphonylurea-like drugs; metformin, a biguanide; thiazolidinedines, and post-prandial regulators. Metformin has the advantage of encouraging weight loss and does not cause hypoglycaemia if used alone.

The choice of drug used will depend on the needs of the individual patient but it is clear that OHAs fail as time progresses. Therapy is stepped up by adding other drugs in combination, but when the maximum tolerated oral dosages are reached, insulin is required either alone or in combination to maintain normoglycaemia. It should be made clear to the patient that he or she is not failing if insulin is eventually required but that it is an inevitable consequence of type 2 diabetes. A patient should never be ‘threatened’ with having to have insulin therapy.

Complications of diabetes
There are both acute and long-term complications of diabetes. The acute complications are hypoglycaemia and hyperglycaemia. Hypoglycaemia is a clinical entity seen in people with diabetes on insulin and some OHAs. Hospital laboratories set a blood sugar level for hypoglycaemia, and this is usually below 3.3mmol/L. The signs and symptoms of hypoglycaemia are shown in Table 1. These can be neuroglycopenic – characterised by impairment of cognitive function, irrational or aggressive behaviour – or they can be adrenergic, involving the sympathetic and parasympathetic systems. The adrenergic responses are those seen in the classical ‘fight or flight’ response.

If hypoglycaemia is untreated, the individual becomes increasingly confused and eventually will become uncon-
TABLE 1. SIGNS AND SYMPTOMS OF HYPOGLYCAEMIA

<table>
<thead>
<tr>
<th>Signs</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallor</td>
<td>Trembling</td>
</tr>
<tr>
<td>Sweating</td>
<td>Hunger</td>
</tr>
<tr>
<td>Confusion</td>
<td>Palpitations</td>
</tr>
<tr>
<td>Headache</td>
<td>Feeling faint</td>
</tr>
</tbody>
</table>

sciou s. Consciousness will be recovered when the effect of the injected insulin has worn off, but this may take some hours, depending on the amount of insulin injected. However, hypoglycaemia may have dangerous consequences in certain circumstances, for example if the person is driving a vehicle.

Some people have no awareness of an impending hypoglycaemic episode. This can be devastating for them and may lead to a major loss of confidence. Both the Diabetes Control and Complications Trial research group (DCCT, 1993) and the UK Prospective Diabetes Study group (UKPDS, 1998) found that the consequences of hypoglycaemia have an adverse effect on quality of life.

Hypoglycaemia happens more slowly than hyperglycaemia and follows the pattern similar to that described in the development of the symptoms of diabetes (see Part 1 last week). Physical and psychological stress can cause hyperglycaemia owing to stress hormones such as adrenalin and corticosteroids being released in times of illness and causing the blood glucose to rise. People with diabetes who become ill and who are self-adjusting their treatment should therefore increase their insulin or OHA dose (if they are not on the maximum dose of the latter) and reduce to their normal dose for each when they start to feel better in themselves.

**Long-term complications**

The long-term complications of diabetes include retinopathy, cataracts, neuropathy, nephropathy, coronary heart disease, peripheral vascular disease. These result in visual impairment, foot ulcers and amputation, kidney failure, heart attacks and strokes. However, the complications are, to a large extent, preventable (DCCT, 1993; UKPDS, 1998; Adler et al., 2000) if attention is paid to maintaining glycaemic control (noting HbA1c levels), blood pressure, lipid levels and other cardiovascular risk factors. Even if complications are already present when an individual is first diagnosed, good glycaemic control prevents them from worsening.

The cost of the complications of diabetes to individuals and their families is enormous. Much of diabetes care is therefore targeted at preventing or treating these.

**The nurse’s role in diabetes care**

The nurse’s role in diabetes care may be as a specialist or as part of general care – primary or secondary. Wherever care is given, the emphasis is always on patient self-management.

Diabetes UK (formerly known as the British Diabetic Association) is a patient and doctor organisation that was formed in 1934. The founders recognised that self-care was key to the management of diabetes, except, possibly, when the patient is ill with, for example, intercurrent illness or has undergone surgery. Self-care should resume as soon as possible, however. Nevertheless, when a person with diabetes does need assistance this needs to be from knowledgeable health professionals.

Most of the work published today on the expert patient concept has come from the USA and has focused on mental health and chronic disease. The UK Department of Health is interested in this concept and has set up pilot sites around the country to explore the benefits of this approach. This ties in with the principles of The NHS Plan (2000), the aim of which is to enable people who use the NHS to become active participants and decision-makers in their care rather than passive recipients of interventions from health professionals.

One expert patient pilot centre, the Heart of Birmingham Teaching Primary Care Trust, has addressed the issue by employing lay tutors who have diabetes, and training them on a residential course on how to hold group education sessions in their area for people with diabetes. It is hoped that some of those attending will be interested in forming groups of their own. The outcomes of these pilot studies are awaited.

Diabetes education in the UK has, traditionally, been undertaken by diabetes specialist nurses alongside their other clinical, management and research roles. Some teaching is done on a one-to-one basis, but health professionals have come to realise that people with diabetes learn a lot from each other, so group education, to which partners and members of the family are also invited, has become the norm. It is important to invite to education sessions the person who shops for, and cooks, the family food. This may be a family member but it could be a home help or a carer in a care home.

As the number of people in the community who have diabetes has increased, practice nurses and district nurses have taken on tasks that were previously in the domain of the diabetes nurse specialist. They will therefore be involved in planning and delivering diabetes education for patients. Today, many people with diabetes, especially those with type 2, will never have seen a diabetes nurse specialist, since these nurses tend to be hospital-based.

Today’s technology has resulted in many changes in the way people obtain advice about health. Using NHS Direct, both by telephone and via drop-in centres, and using the internet are now common ways of accessing health information. Consequently, more and more people are coming to health professionals armed with useful (and sometimes confusing) information that they have obtained from these sources or maybe from the radio, television and friends. Interactive health advice through digital television is being piloted in Birmingham and some health promotion agencies have touch screen programmes and interactive CD-roms.

This increased choice for patients should be welcomed.
It may mean that nurses’ roles will change and that they will no longer be the first information-givers, but other important roles will develop. These will include interpreting what the information means to people individually and to their friends and relatives, and creating forums for discussions about how to put the advice into action.

Nurses caring for patients with diabetes need to be working towards the same objectives, therefore target-setting and determining priorities for managing their condition are important aspects of care. It is known from both the Diabetes Control and Complications Trial (DCCT, 1993) and the UK Prospective Diabetes Study Group (UKPDS, 1998) that it is possible to prevent diabetic complications, and that, if they do appear, their worsening progression can be slowed. The maintenance of good glycaemic control is therefore vital.

The target for glycated haemoglobin (HbA1c) for those with type 1 diabetes is 7.5% (for type 1) and below 7% for those with type 2. Blood pressure is known to be a factor in diabetic complications and should be below 140/80mmHg for both type 1 and type 2 diabetes – the lower the better, but without feeling the symptoms of hypotension, such as dizziness. Total cholesterol should be below 5 mmol/L, with an HDL of greater than 1.0, and LDL less than 3. If there are complications, these targets may be set even more tightly to prevent their worsening. Patients need to know what the recommended levels are and for these tests so they can ask for the results of the investigations and make sense of the information they are given. In this way they will be able to see for themselves if they need more treatment and whether or not they need to make changes to lifestyle and food choices.

Screening for complications
Routine screening for diabetic complications is often the nurse’s responsibility. This will include urine testing for protein as a check on renal function, taking blood for lipid estimations, measuring blood pressure, examining the eyes and the feet.

Screening for retinopathy: This is performed when pupils are dilated, either by fundoscopy or retinal photography. The nurse’s role is to explain what will happen during the procedure and what the findings mean. The nurse may also measure visual acuity. Some patients may need to be referred for laser photoacoagulation, and again, the nurse should be able to offer information and reassurance.

Screening for neuropathy: Patients with normal circulation, gait, and vision are at low risk of neuropathy. Advice about foot hygiene and the wearing of sensible shoes should be offered to these patients. When patients cannot feel their feet and their circulation is impaired through peripheral vascular disease, the risk of neuropathy is greatly increased. These patients will need to be advised not to rely on how their feet feel but to look at them every day to check for any damage and to seek assistance urgently if a problem occurs. This may need to be done by someone else if vision is a problem. Putting a mirror on the floor can be helpful for self-examination.

Temperature sense can be diminished in patients with neuropathy, so they must be advised not to use hot water bottles and to take care when stepping into a bath or sitting close to a source of heat.

Neuropathy is assessed by checking the foot pulses (dorsalis pedis and post-tibial). If they are not palpable, a referral for vascular assessment and treatment may be necessary. An assessment using a hand held Doppler can be useful to determine whether there is peripheral vascular insufficiency. Patients whose foot pulses are reduced or absent should be told that this puts their feet at risk and that they should take extra precautions to protect their feet. This may mean seeking care from a podiatrist, being fitted for special shoes with appropriate insoles, inspecting their feet daily and acting on any abnormalities discovered.

Absence or reduced vibration sense is the first sign of neuropathy. This is measured by a tuning fork, a weighted monofilament or a neurothesiometer. If the vibration sense is absent or reduced, there is a risk of foot damage.

To prevent amputations in patients with peripheral disease it is important to ensure early referral to a vascular surgeon. Early referral to an orthotist for special shoes can prevent amputation in the neuropathic foot.

Nutrition advice: As for anybody, the usual advice for healthy eating is to have at least five pieces of fruit and vegetables a day; to restrict alcohol to fewer than three units a day for women or four units a day for men, and to limit salt intake. Calorie restriction is important if the individual is overweight, and advice should be given about having less fat overall, with proportionately more monounsaturated and polyunsaturated fat. If the cholesterol level is above target, a referral should be made to the GP for possible treatment with a statin.

Patients who are having difficulty achieving their targets on nutrition should be given an opportunity to see a dietitian (preferably a diabetes specialist dietitian).

Conclusion
When screening for complications and running diabetes clinics, nurses need to be aware that psychological and social issues will have a bearing on how patients view their diabetes and whether they are likely to make lifestyle changes.

The role of the patient with diabetes is as an active decision-maker and the role of the nurse in this case is to provide information, direction and support. The nurse will be assessing risk, so that appropriate interventions can be made at appropriate times. In addition, the nurse should regard every annual review or screening visit as an opportunity to find out what information the patient has and to fill in any gaps, supported by educational materials. Exploring why patients may not feel able to make changes to their lifestyle and to undertake suggested treatments may help the nurse to suggest actions that such patients are likely to follow.

Next: New treatments and guidance