

Clinical guidelines

Document of care for older people with diabetes

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Diabetes mellitus is a major chronic disorder affecting our growing elderly population which is associated with increased morbidity, disability and mortality.^{1–3} Much can be done by effective education and good management to prevent deterioration in health and improve quality of life. These guidelines are designed to assist all health professionals, including physicians who regularly manage diabetic care for older adults, and suggest appropriate and up-to-date approaches to delivering this care.

Initial physical assessment of diabetes in older adults

- symptoms
- body weight
- lying and standing blood pressure
- peripheral pulses
- lower limb sensation and examination of feet
- visual acuity using a Snellen chart
- ophthalmoscopy after mydriasis

Box 1

Social and functional assessment

- Barthel ADL assessment or similar measure including mobility, sight, hearing and continence assessment
- abbreviated mental test score or similar measure of cognition
- social assessment should include smoking history, alcohol intake, accommodation, marital status and Social Services support

Box 2

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Aims of care

- To prevent symptoms of hypoglycaemia and reduce symptoms of hyperglycaemia.
- To screen for, prevent deterioration of, and treat diabetic complications.
- To manage coexisting diseases to reduce functional disability, and improve quality of life.
- To engender a positive attitude by the patient and their carers to their condition.

Diagnosis of diabetes mellitus in the elderly

- More than 90% of older people with diabetes are non-insulin dependent but may require insulin treatment some years after initial diagnosis. Patients who are underweight with a new diagnosis of diabetes or are losing weight rapidly should be suspected of having insulin-dependent diabetes.
- The World Health Organisation criteria⁴ should be followed to confirm the diagnosis of diabetes in older adults. The criteria used are identical to those used for younger patients with this condition.
- Stress-induced hyperglycaemia may occur after a myocardial infarction, severe infection or cerebrovascular accident. An oral glucose tolerance test four to six weeks after recovery from the acute episode of illness may be required to confirm or exclude the diagnosis of diabetes.

Initial management plan

ACUTE PRESENTATION OF ILLNESS

When patients presents acutely in diabetic ketoacidosis or hyperosmolar non-ketotic coma, they require admission into hospital for intensive medical care. Treatment will include rehydration, insulin therapy and the treatment of co-existing disease. Other therapies may be required depending on the individual circumstances of the patient. For example, patients with hyperosmolar coma may require subcutaneous heparin prophylaxis for deep venous thrombosis or full intravenous heparinisation to avoid arterial thrombosis. It is important to avoid hypoglycaemia in insulin-treated patients presenting with hypothermia.

ASYMPTOMATIC OR MILDLY SYMPTOMATIC PATIENTS

The following are necessary for the initial management of the patient after diagnosis:

- a full clinical examination to detect other pathology
- screen for the presence of micro- and macro-angiopathy
- assessments and measurements to guide future management of diabetes (box 1)
- a full social and functional assessment (box 2)
- educate the patient and carer as appropriate on basic management of diabetes
- inform the patient and carer of the British Diabetic Association and provide appropriate literature
- laboratory and investigational assessment (box 3)

Initial investigations
<i>In all cases:</i> ● glycosylated haemoglobin ● serum creatinine, urea and electrolytes ● urinalysis for protein, sugar, ketones ● ECG <i>In some cases:</i> ● chest X-ray ● full blood count ● liver function tests ● thyroid function tests ● lipid profile (especially in the presence of symptomatic macrovascular disease)

Box 3

Initial care plan for the older diabetic
● realistic glycaemic goals ● frequency of diabetic follow-up by primary or secondary healthcare ● organise monitoring of glycaemic control by the patient and/or carer, for example, by home urine or blood glucose monitoring or if the patient cannot manage this, by regular review ● referral to social or community services as appropriate ● advice on stopping smoking, exercise (ideally a minimum of three weekly brisk walks of 30–45 min duration) and alcohol intake

Box 4

Services required by elderly diabetics
● state-registered dietitian ● state-registered chiropodist ● optician ● specially trained diabetes nurse

Box 5

The diabetic annual review
● full clinical examination ● weight ● blood pressure lying and standing ● urinalysis for protein ● glycosylated haemoglobin or fructosamine estimation ● urea and creatinine estimation ● estimation of lipids if patient has symptomatic macrovascular disease ● measurement of visual acuity, with and without pinhole ● fundoscopy through dilated pupils ● examination of the feet and lower limbs for deformity, infection and ulceration

Box 6

INITIAL TREATMENT
An 8-12 week course of dietary instruction by a trained dietitian is suggested in patients whose random glucose values are <20 mmol/l and are not troubled significantly by symptoms. For patients with significant symptoms of diabetes or initial random glucose of >20 mmol/l or who fail to respond to diet alone, oral agents should be used as indicated in these guidelines. The goals are adapted for each individual patient and agreed with them and/or their carer (box 4). Patients and carers should be educated about the indications for referral to hospital as an out-patient and when admission is likely.

Follow-up plan

LOCAL CIRCUMSTANCES
These often dictate the method of provision of regular follow-up whether by general practitioner, hospital or shared care. However, diabetic care must include access to various services (box 5).

COMPONENTS OF DIABETIC FOLLOW-UP
Components of follow-up should include the following:

- A record of symptoms of hypo- and hyperglycaemia as well as symptoms of complications and taking appropriate action, eg, referral to other specialties eg, vascular surgery.
- A review of the records of home and hospital glucose monitoring to determine whether previously agreed targets have been met and if not, institute action such as altering medication and including referral to a hospital diabetic or geriatric clinic, if required.
- An assessment of mental and functional disability and taking appropriate action eg, referral to a geriatric out-patient clinic, day hospital or Social Services department. The patient and/or carer should be informed of their eligibility for welfare benefits.
- A check on the patient and/or carer’s understanding of diet and medication and arrangement of provision of literature or further education by other members of the diabetic team. The British Diabetic Association have an education booklet specifically aimed at the older person with diabetes.⁵ Education will need to take account of the level of both physical and mental performance and may be best given in the patient’s own home.
- Advice on smoking, exercise and alcohol intake, where appropriate.
- Modifying targets and goals if appropriate and making management plans in conjunction with the principal carer if the patient will not or cannot be responsible for diabetic self-management.
- Entry of data into a database for audit if a format such as the British Diabetic Association/Royal College of Physicians dataset is available, although modification will be needed for this age group.
- The annual review (box 6).

Oral antidiabetic therapy

Oral agents are required when dietary therapy alone is no longer sufficient to control symptoms of hyperglycaemia, or random blood glucose levels are >20 mmol/l, or control is unacceptable as estimated by long-term measures of diabetic control, eg, glycosylated haemoglobin. In general, the lowest effective dose of an oral agent should be used. Treatment options can be based on the following categories of patients:

NORMAL WEIGHT PATIENTS (BMI>20 kg/m² AND <26 kg/m²)
Therapy is usually started with a sulphonylurea agent, eg, tolbutamide or gliclazide. Tolbutamide is least potent and has the least risk of causing hypoglycaemia. It can be started at 500 mg bid prior to the main meals. Gliclazide can be used if tighter control is required and is started at 40–80 mg daily before breakfast. The recently introduced alpha-glucosidase inhibitor, Acarbose, may also be used. To avoid gastrointestinal side-effects the starting dose should be 50 mg per day for one week with the first mouthful of the main meal, slowly increasing the dose over the next two to three weeks to a dose of 50 mg tid. Further increases in the dose to a maximum of 100 mg tid may be considered according to the patient’s tolerance and the therapeutic benefit obtained. Metformin can be used if necessary in addition to a sulphonylurea if glucose levels remain unacceptably high, noting the cautions mentioned in the next paragraph.

Suggested oral agents for older adults with diabetes

- tolbutamide 500 mg od to 1 g bid
- gliclazide 40 mg od to 160 mg bid
- acarbose 50 mg od to 100 mg tid
- metformin 500 mg od to 850 mg bid

Box 7
OVERWEIGHT PATIENTS (BMI > 26 kg/m²)

In the absence of cardiac, renal or hepatic failure and alcohol abuse, critical limb ischaemia or acute illness, metformin may be given as monotherapy starting at a dose of 500 mg with the main meals and gradually increasing to a maximum of 850 mg bid with meals depending on the diabetic control (box 7). When metformin is ineffective in producing adequate control a sulphonylurea preparation can be added. Although metformin does not generally cause hypoglycaemia at therapeutic doses, it may be associated with lactic acidosis if the above conditions are present. It is recommended that all patients receiving metformin are monitored closely with tests of renal and hepatic function. Sulphonylureas can be used in overweight patients following the instructions above in combination with metformin or alone. An increase in body weight often results when used alone.

Insulin therapy

Insulin is required for:

- Patients with insulin-dependent diabetes mellitus.
- Non-insulin-dependent patients with poor control in spite of oral agents used at maximum tolerated dose. For these patients insulin is used on a trial basis for 6–12 weeks, observing the effect on diabetic control, how the patient and carer cope with insulin, and noting the frequency of hypoglycaemia. If the patient does not wish to continue insulin at the end of the trial than oral agents can be resumed.
- Acute conditions such as severe illness, hyperosmolar states, surgery, diabetic amyotrophy or peripheral neuropathy.
- The development of a ketosis-prone state.

The decision to use insulin depends on the following:

- The ability of the patient and carer to recognise and manage hypoglycaemia.
- The availability of community support to educate patient and carer on use of insulin.
- Cognitive impairment of the patient and/or carer or other disability affecting the administration of insulin.

PRACTICAL ASPECTS OF INSULIN ADMINISTRATION
Starting insulin

Insulin is best started at home for those with poor control using the experience of the diabetes specialist nurse and the support of a community dietitian and involving, if necessary, the district nurse. The general practitioner should always be involved.

Type and frequency of insulin

The insulin regimen with a low risk of hypoglycaemia for non-insulin-dependent diabetes is twice daily isophane insulin although many patients use a mixture of short and intermediate acting insulins, for example, Mixtard or the Humulin M range of insulins. Some patients, however, may have reasonable control with frequent hypoglycaemia with once daily animal isophane insulin or human or animal insulin zinc suspension (eg, Humulin Zn, Human Ultratard or beef lente insulin). A once-a-day regimen is particularly appropriate where tight control is not needed, eg, in patients who have a terminal illness or dementia.

Insulin-related equipment

Insulin pens or pre-filled syringes stored in the refrigerator and glucometers with a memory, a large figure display or which speak out results are particularly helpful for disabled patients who are blind or have hand problems. Training in the use of such equipment is given by the diabetes-trained nurse.

Hypoglycaemia
THE IMPORTANCE OF HYPOGLYCAEMIA

The risk of hypoglycaemia is an important worry for older patients treated with sulphonylureas or insulin since it may have severe consequences in this age group.⁶ There is evidence to suggest that knowledge of the symptoms and signs of hypoglycaemia in the elderly is also limited.⁷

REDUCING HYPOGLYCAEMIA RISK

In order to reduce the risk, sulphonylureas with a long half-life, eg, chlorpropamide or glibenclamide, should be avoided in patients aged over 60

years. They should be discontinued in patients with a normal glycosylated haemoglobin. If insulin is being used a less than optimal level of control is often accepted in order to avoid recurrent hypoglycaemia.

SPECIAL RISK GROUPS

Patients with cognitive impairment and those with loss of the warning symptoms of hypoglycaemia are vulnerable since they may not recognise impending hypoglycaemia and/or fail to communicate their feelings to their carers. They are often incapable of treating hypoglycaemia themselves.

EDUCATION

The educational programme should include advice and information relating to the detection and treatment of hypoglycaemia, including the criteria for hospital admission in cases of unresponsive hypoglycaemia.

Home monitoring of diabetic control

PATIENTS USING INSULIN

Blood glucose monitoring is recommended for patients with insulin-dependent diabetes and for those with non-insulin dependent diabetes being treated with insulin, though at present there is no definite evidence that this improves control or reduces complications. This should be performed by the patient or principal carer.

PATIENTS ON DIET THERAPY AND/OR ORAL AGENTS

For patients with non-insulin-dependent diabetes who are taking diet therapy and/or oral agents, home blood glucose monitoring should be offered although it is not essential. Blood glucose monitoring is important for those patients who have poor metabolic control or who are at risk of hypoglycaemia, eg, those taking sulphonylurea drugs or insulin. Urine monitoring in the fasting state and pre-prandially once per week is adequate for some patients if the patient has a normal renal threshold. Monitoring is of more value when a patient or carer is able to interpret and react to the results.

TIMING OF GLUCOSE MONITORING

Blood glucose monitoring should be carried out on at least two occasions per day for those patients who are in poor metabolic control, but for stable patients a four-point profile once per week is adequate. The timing of blood glucose estimations is pre-meals and at bedtime.

TARGETS FOR BLOOD GLUCOSE

Targets for metabolic control will vary depending on the circumstances of the patient and the advice of the physician. In general, a fasting glucose level of 7–9 mmol/l, and a random level of 8–11 mmol/l will be sufficient to avoid the symptoms of hyperglycaemia and to avoid the risk of hypoglycaemia. In some situations, much tighter metabolic control can be achieved and, in fact, may be warranted to prevent the onset and progression of the chronic complications of diabetes.

GLUCOMETERS

Glucometers are helpful for those using blood glucose monitoring who have adequate visual acuity and dexterity. For those patients who are blind, a large figure meter or a glucometer that speaks and/or has a memory is valuable.

Referral from primary care to the hospital specialist

LOCALLY AGREED GUIDELINES

Referral should follow locally agreed guidelines. Guidelines on good practice are given indicated in several recently published documents.^{8–10}

USUAL REASONS FOR REFERRAL

In general patients should be referred:

- Urgently for in-patient treatment in the presence of long-acting sulphonylurea hypoglycaemia, persistent vomiting, ketonuria, uncontrolled hyperglycaemia, and severe infection, eg, cellulitis.
- For new patients where there are inadequate facilities for education in primary care.
- Where there is inadequate control of diabetes on current therapy with either hyperglycaemia or recurrent hypoglycaemia and there is uncertainty as to how to proceed.

Indications for ophthalmic referral

Immediate referral required for:

- proliferative retinopathy, eg, new vessels on disc, pre-retinal haemorrhage or fibrous tissue
- advanced diabetic eye disease, eg, vitreous haemorrhage or retinal detachment

Referral as soon as possible required for:

- proliferative retinopathy with venous irregularities or multiple cotton wool spots
- nonproliferative retinopathy with macular involvement
- nonproliferative retinopathy without macular involvement with large plaque hard exudates within major temporal vascular arcades
- any other findings which cannot be reasonably interpreted

Box 8

Outcome measures in diabetes care

- glycosylated haemoglobin levels
- blood pressure
- urinary protein and ketones
- frequency and severity of hypoglycaemic episodes
- frequency of hospital admissions for diabetes-related conditions
- presence of other complications of diabetes, eg, retinopathy, nephropathy, neuropathy and foot disorders
- changes in the level of dependency or quality of life (measured by a Barthel ADL score or a quality of life measure such as the SF36). Recording data for measures of patient satisfaction and symptom scores is also valuable

Box 9

- For out-patient treatment of chronic complications such as macrovascular disease, eg, severe angina; foot ulceration or critical ischaemia; microvascular disease, eg, retinopathy other than minor background and any macular disease; painful neuropathy; impotence; diarrhoea or nephropathy with proteinuria, raised serum creatinine or uncontrolled hypertension.
- To the geriatric team where multidisciplinary assessment is required in the presence of disability and the patient is having difficulty managing at home or requires rehabilitation.

Diabetic foot care

Foot ulceration, gangrene and amputation are important avoidable problems in older people with diabetes. Good education, appropriate footwear, regular chiropody for those in need and regular foot examinations by the patient or carer can reduce the frequency of these complications. Footcare includes:

- Daily inspection of all the foot, ideally by trained carer.
- Provision of extra-depth or bespoke surgical footwear in any patient with more than minor foot deformity or evidence of pressure points or a Charcot-type foot. Well-fitting quality trainers may be helpful for patients with minor foot problems.
- Examination of touch (cotton wool) and pain (pinprick) sensation and pulses annually at least as well as an inspection at each diabetic clinic attendance. A warm pink foot with bounding pulses or deformity of the toes suggests neuropathy. The brachial/ankle systolic blood pressure index may be artificially elevated due to calcification of blood vessels and cannot be relied on.

Guidelines for referral to the ophthalmologist

Each older patient with diabetes requires fundal inspection with dilated pupils and assessment of visual acuity at least on an annual basis. Guidelines for referral need to be agreed locally to prevent over-referral to ophthalmologists. This requires the cooperation of both general practitioners and diabetologists (box 8).

Outcome measures

A number of recommended measures of the efficacy of medical care of older people with diabetes are given in box 9.

Conclusions

In general, the same measures of management are appropriate in the older patient with diabetes but may need to be modified in the presence of social isolation or reduced life expectancy from other disease. Quality of life and independence are more important targets than quantity of life in the frail older patient. The majority of patients can be managed within primary healthcare but there is a requirement for special training of the staff involved and access to support services such as dietetics and chiropody and the diabetes specialist nurse. Older people with diabetes often have associated disability and disabled patients benefit from full assessment by a multidisciplinary team.

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Further reading

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