Diabetes mellitus

M Cottee, IR Hastie

Diabetes is a common condition in our society and can lead to serious long-term complications but there is mounting evidence that tight glycaemic control can reduce the incidence of some of these. The majority of diabetics are elderly and in this large group intensive treatment is often considered unnecessary. It is frequently argued that if you are diagnosed as diabetic at 60 and it takes 15 years to develop complications, tight control is unimportant. The other argument used to justify not attempting to gain normoglycaemia is the danger of hypoglycaemia in the elderly. With our population now living longer and diabetic complications being a common cause of morbidity and mortality in the elderly, these arguments are no longer valid.

Prevalence and diagnosis

The prevalence of diabetes in the elderly depends on the population observed and the diagnostic criteria used. The Coventry Diabetic Study showed a prevalence of 30.7% in Asian males over 65 and only 7.7% in Europeans. However, 55% of the Asians were already diagnosed compared to only 33% of the Europeans.¹ In New Zealand the figures for people 65 and over would appear to be 17.2% for men and 12.5% for women.²

The prevalence is affected by the diagnostic criteria used. Glucose homeostasis changes with age, the decline in glucose tolerance starting in the third decade. Glucose levels two hours after a 50 g carbohydrate load increase by 0.3–0.7 mmol/l per decade. Absorption and serum insulin levels appear normal but there is a failure of peripheral glucose uptake. The number of insulin receptors is normal so the defect is probably at a post-receptor level. Hepatic uptake is also delayed following ingestion of glucose.

Fasting serum glucose has been shown to be an unreliable diagnostic method. In the Rancho Bernardo study only 69 of 254 diagnosed elderly diabetics had a fasting blood glucose above 7.8 mmol/l.³ HbA1c has also been demonstrated to be unreliable for screening or confirming diabetes in the elderly.⁴

Serum fructosamine has been investigated as a possible diagnostic tool for screening for or diagnosing diabetes. In two studies it has shown promise as a screening test for diabetes in older people but not for impaired glucose tolerance.^{5,6} A firm diagnosis of diabetes mellitus is probably best made using the 1985 criteria of the World Health Organisation (a 75 g oral glucose tolerance test following a 10–16 h fast). A venous plasma glucose of ≥ 11.1 mmol/l (normal range 7.8–11.1 mmol/l) at 2 h indicating diabetes.

Complications

The associated morbidity and mortality in the elderly are greatly increased, life expectancy being only 70% of non-diabetic, blindness 10 times and gangrene 20 times more common. In a study in Oxford, 188 type II diabetics were followed for a median of six years. There were 63 deaths. The incidence rates per 1000 person years were 56 for ischaemic heart disease, 22 for stroke, 146 for peripheral vascular disease, 60 for retinopathy, and 19 for proteinuria.⁷ Another study of diabetics over 65 years showed a prevalence of 61% for peripheral neuropathy, 24% for peripheral vascular disease and 51% for impaired vision.⁸

In the Nottingham Community Survey of diabetes in the elderly visual impairment, strokes, mental test scores, altered vibration sense, absent leg pulses and perceived health were all worse in diabetics than controls.⁹

There is now mounting evidence that good glycaemic control can reduce the incidence of some complications. Studies have shown that intensive treatment of diabetes lowers the average glycosylated haemoglobin and with this delays the onset and slows the progression of diabetic retinopathy, nephropathy and neuropathy. The disadvantage of this intense therapy is that the incidence of hypoglycaemia is increased two to three fold.^{10,11} These studies were not specifically carried out in an elderly population but there is no reason to presume that benefit would not be seen in this group.

Division of Geriatric Medicine, St
George's Hospital Medical School,
London SW17 0RE, UK

M Cottee
IR Hastie

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Some aspects of cognitive function are reduced in elderly diabetics and this has been shown to be reversible with good glycaemic control.¹² In macroangiopathic damage hyperglycaemia has a permissive role. Once present, even mild damage takes place to a degree dependent on other factors such as tobacco, hypertension, and lipids.

Yet the control needed to prevent these complications so commonly seen in the elderly is frequently not being achieved. The Oxford Diabetic Community Study showed an average HbA1 of 9.7%⁸ while Nottingham found 9.9% with 10% severe hyperglycaemia, both demonstrating the need for better control.⁹ This need to achieve normoglycaemia should be balanced against the risk of hypoglycaemia; 26% of elderly insulin-dependent diabetics experience hypoglycaemia at least monthly and 25% are admitted with a hypoglycaemic attack each year.⁷

Acarbose, an α -glucosidase inhibitor has been shown to improve glycaemic control in NIDDM and IDDM.^{13,14} It acts by delaying the absorption of carbohydrates and therefore the rise in postprandial blood glucose is diminished but there is no increased risk of hypoglycaemia. This may prove to be of advantage in the elderly where hypoglycaemia can be so disastrous.

Factors other than hyperglycaemia

Diabetic management involves more than the control of hyperglycaemia; 55% of elderly diabetics are overweight and 52% hypertensive, both important problems to be addressed. Education is also under-provided. The Charing Cross study showed self monitoring of urine and blood was incorrectly performed in 53%, 18% did not know what to do in the event of a hypoglycaemic attack and 46% did not know the symptoms of hyperglycaemia.⁷

In a study following up in-patients who had completed an in-patient education programme those undergoing a 4-week follow-up interview showed no improvement in HbA1 but did significantly improve self-care behaviour compared to those not re-interviewed.¹⁵

Foot care is vital if ulcers and gangrene are to be avoided yet 15% wash their feet infrequently, 40% walk with bare feet at times and 47% take dangerous action with foot injuries.⁷ In a simple yet elegant study 'test lesions' were stuck on elderly diabetics feet; 39% were unable to reach their toes and remove the lesions and only 14% could reach plantar lesions.¹⁶ This demonstrates unsupported foot care education is unlikely to be effective. Access to chiropody services, as well as education, is vital.

The ACE inhibitors captopril has been shown to delay the onset and slow the progression of diabetic nephropathy in people with diabetes independent of blood pressure effects. It also slows the progression of diabetic nephropathy in diabetics who have poorly controlled hyperglycaemia.¹⁷ Control of hypertension using other drugs has also been shown to reduce the onset and progression of diabetic nephropathy, but the effects are dependent on changes in systolic blood pressure while ACE inhibitors also have an independent benefit.¹⁸

Learning points

- age changes in glucose homeostasis start in the third decade
- in older people the main problem is a failure of peripheral glucose uptake rather than insulin production
- fasting serum glucose and HbA1 levels are unreliable for screening
- in elderly people it is important to get good diabetic control without hypoglycaemia
- potential complications should be actively sought, especially regarding the feet, kidneys and eyes

Conclusions

In summary, diabetic care in the elderly is often inadequate. Better glycaemic control needs to be achieved without increasing hypoglycaemia. There is a need to address other factors when reviewing patients, such as hypertension, obesity, and lipid levels. Elderly patients are capable of being educated and the information and time needed should be readily available. Support services such as chiropodists and dietitians must be easily accessible. These are commonly found in diabetic clinics but not in geriatric out-patients or day hospitals where many elderly diabetics are cared for.

On a more positive note the statistics for renal dialysis and transplantation have remained unchanged in young male diabetics in Italy between 1981–90 but in elderly males have increased from 6.23 to 12.88 per million population,¹⁹ perhaps indicating that elderly diabetics are beginning to receive the attention they deserve.

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Thackray Medical Museum

The Thackray Medical Museum project is unique in that one of its established partnerships is with a major NHS Trust Hospital.

The Museum, an independent registered charity, searched long and hard for a building and eventually secured a long term lease on the Ashley Wing of St James's University Hospital, Leeds. Originally built as the Leeds Union Workhouse in 1861 it did not fit into the hospital's long-term plans to improve patient care, particularly with the additional costs of refurbishment imposed by its Grade 2 Listed status.

However, it was ideal for the £3.7 m museum project, being in its original condition and offering good access and adequate car parking. The Museum also saw the benefit of being adjacent to one of the best known hospitals in the country, 'Jimmy's'.

The new Museum, which expects to attract over 100 000 visitors a year, will open in mid 1996 and displays will illustrate the ways in which changes in medicine and health care provision have affected the lives of people throughout history, but focusing upon the last 150 years. However, history is only relevant if it can be related to the present day and used as a reference for future activity. Therefore the Museum will show how present day health care is delivered and how it may develop in the future. It will also consider the ethical and financial issues that will gain even greater importance as more technological advances are applied.

Facilities within the museum will include a 120 seat conference facility, shop, restaurant, conservation workshops and St James's postgraduate medical education centre.

The Museum collection now totals over 16 000 artefacts, the library has 5000 books and the largest collection of medical trade literature in the world. It is constantly searching for artefacts and archive material, of significant historical importance, to help illustrate the ways in which medical care has been, and is, delivered.

At present the museum has a temporary display, within the St James's site, open to the public 10.00 to 16.00 weekdays. Should you be able to help to expand the collection or wish to arrange a group visit please contact Mike Cooper on Leeds (0113) 244 4343.