

MANAGEMENT OF DIABETES IN THE ELDERLY

The care of diabetes in the elderly may be different from that in younger patients.

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Aetiology and prevalence

The prevalence of diabetes increases with increasing age. In a recent report it was found that diabetes affects 21% of adults 65 years of age and older.¹ The increase in the prevalence of glucose intolerance with increasing age is closely associated with impaired β -cell function and a simultaneous increase in insulin resistance.² The combined effect of increasing insulin resistance and declining β -cell function on plasma glucose is illustrated in Fig. 1.

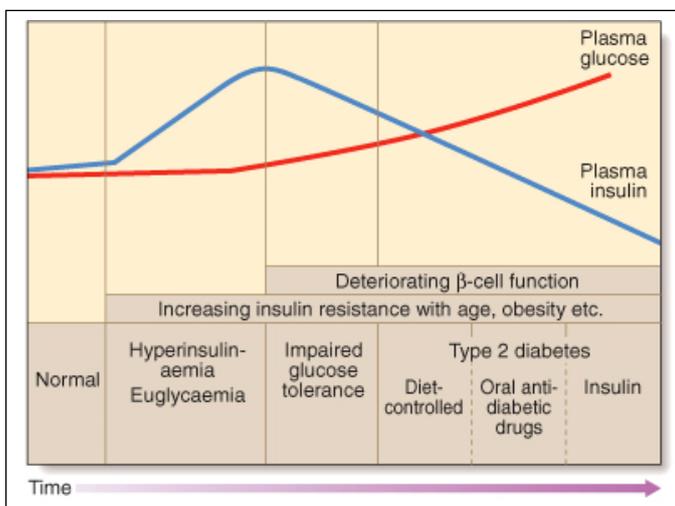


Fig. 1. The combined effect of increasing insulin resistance and declining β -cell function on plasma glucose as a function of time (ageing).³

Diabetes and carcinoma of the pancreas

In a recent report from the Mayo Clinic it was found that diabetes was present in 47% of 512 patients (mean age 68 years) diagnosed with carcinoma of the pancreas.⁴ In the majority of patients diabetes was of fairly recent onset and diagnosed in the 2 years preceding the diagnosis of pancreatic cancer. Diabetes associated with carcinoma of the pancreas often resolved after pancreatectomy, indicating a remote (paraneoplastic) effect of the tumour on carbohydrate metabolism.

Fasting plasma glucose concentrations do not rise significantly with age.

Diagnosis and screening

Fasting plasma glucose concentrations do not rise significantly with age.⁵ However, a small but significant increase in plasma glucose concentration 2 hours after a 75 g oral glucose load does occur in older individuals.⁵ In spite of this, the recommended diagnostic criteria for diabetes remain the same for all age groups.⁶ It is also noteworthy that the renal threshold for glucose rises with age; therefore glycosuria may not develop until the blood glucose concentration is markedly raised. The clinical presentation of diabetes in the elderly may be insidious or atypical, and vague symptoms such as fatigue, weight loss and mood changes are not uncommon.⁷ Annual screening for diabetes in asymptomatic but high-risk elderly patients should be considered as the detection rate is high.⁷

Co-morbidities and geriatric syndromes

Chronic diseases such as diabetes mellitus, coronary heart disease and congestive heart failure often co-occur in elderly patients with geriatric conditions such as urinary incontinence and injurious falls.⁸ Nevertheless, the management of diabetes in the elderly has received surprisingly little attention in the past.⁹ The following geriatric syndromes are commonly present in the elderly patient with diabetes: functional impairments, falls and fractures, urinary incontinence, depression, impaired cognitive function, dementia, malnutrition and sarcopenia.⁹

The prevention, screening and treatment of both traditional diabetic complications and geriatric syndromes should be integrated in a management plan to optimise the patient's overall health status and quality of life.⁹ In particular, malnutrition and sarcopenia with consequent muscle weakness and frailty should be prevented at all costs in both diabetic and non-diabetic elderly patients.⁹ Care of the elderly patient is best accomplished by following a comprehensive geriatric assessment strategy (Fig. 2).



Fig. 2. Domains to be evaluated in the comprehensive assessment of the geriatric patient.

Management

There is currently no evidence that improved diabetes control in elderly patients prevents the development of macrovascular complications, although a case for improved diabetes control and the prevention of microvascular complications can be made.⁷ Useful life-expectancy tables for patients suffering from type 2 diabetes have been developed.¹⁰ It must be cautioned that these tables were developed from data obtained from the ageing UKPDS population and cannot be extrapolated to frail elderly patients.

It is useful to distinguish between the older diabetic patient in 'good health' and frail patients affected by multiple pathologies ('unsuccessful ageing').⁹ Table I gives an indication of the overall life expectancy of elderly patients, while Table II provides treatment targets for two categories of elderly patients.

The 2009 SEMDSA guidelines⁶ for **glycaemic control** in patients with type 2 diabetes may be applied to the elderly, keeping the following pitfalls in mind:

Table I. Mean life expectancy in the UK¹¹

	Males	Females
At birth	77 years	81 years
At 60 years	20.5 years	24 years
At 70 years	13 years	16 years
At 80 years	7.5 years	9 years

- Age *per se* is not a contraindication to the use of metformin but is contraindicated in patients with renal impairment (serum creatinine >130 µmol/l), and severe coronary, cerebrovascular or peripheral vascular disease.⁷
- Use of a once daily sulphonylurea may assist overall adherence to antidiabetic treatment and benefit patients whose adherence is poor.⁹
- Glibenclamide should not be prescribed for newly diagnosed type 2 diabetes in older adults (>70 years) because of the marked risk of hypoglycaemia.⁹
- Glitazones must be avoided in most elderly patients owing to an increased risk of salt and water retention, heart failure and osteoporotic fractures.⁹
- Insulin therapy must not be delayed when indicated and should be started at a moderate dose of 0.25 - 0.35 U/kg/day. Although renal failure is a frequent indication for insulin therapy in the elderly, it is not without risk of hypoglycaemia and great care needs to be taken in such patients to avoid this risk.⁹
- There are no clear guidelines as to the frequency of home blood glucose monitoring in the elderly. The pharmacological profile of the agent used and the risk of hypoglycaemia should determine the frequency of testing.
- It is also important to note that optimal glucose control in the elderly may help to:⁹
 - maintain cognitive performance and improve learning and memory
 - minimise symptoms of mood disorder in patients with depression and assist in adherence to treatment
 - maintain functional status and possibly decrease the risk of falls.

Hypoglycaemic episodes severe enough to require hospitalisation or a visit to the emergency department are associated with an increased risk of dementia, especially if there is a history of multiple episodes.¹²

Table II. Glycaemic, blood pressure and lipid treatment targets for elderly patients⁷

	Older diabetic patient in good health	Frail older diabetic patient
Fasting blood glucose	5.0 - 7.0 mmol/l	7.0 - 8.9 mmol/l
HbA1c	6.5 - 7.5%	7.5 - 8.5%
Blood pressure	Threshold for treatment: BP ≥140/80 mmHg for longer than 3 months measured on at least three occasions during a period of lifestyle management advice	Acceptable BP: <150/<90 mmHg

The following are key messages with regard to **blood pressure lowering** in elderly patients with type 2 diabetes:⁷

- Treatment of hypertension in elderly diabetics should be part of a multifactorial intervention approach to minimise cardiovascular risk and to prevent diabetes-related complications.
- Strict control of blood pressure may be of greater therapeutic importance than glucose control to reduce cardiovascular risk.

The SEMDSA guidelines⁶ for **lipid lowering** in type 2 diabetes remain valid. The following points are worthwhile emphasising with regard to the elderly patient with type 2 diabetes:⁷

- Coronary heart disease remains the most common cause of mortality in this age group.
- Optimal management of blood lipids is essential to optimise vascular outcomes.
- Patients with diabetes and advanced age are under-treated as far as lipid goals are concerned.
- Statin therapy is well tolerated and can be safely used in elderly patients.
- Primary prevention – in patients without a history of cardiovascular disease a statin should be offered to those with an abnormal lipid profile if their 10-year cardiovascular risk is >15%.
- Secondary prevention (including stroke prevention) – a statin should be offered to patients with an abnormal lipid profile who have proven cardiovascular disease.
- Fibrate therapy is well tolerated and can be safely used when indicated in older patients with diabetes.

Complications

Over and above the conventional macro- and microvascular complications, elderly patients with diabetes are especially at risk of geriatric syndromes such as functional disabilities, falls and fractures, incontinence, depression and dementia, sarcopenia and malnutrition.⁹ These geriatric syndromes may go undetected for too long if a comprehensive approach is not followed. Because of a shortage of essential health care workers in the public sector, such as physiotherapists, dietitians, social workers, podiatrists, certified diabetes educators and pharmacists, comprehensive care (Fig. 2) for the elderly diabetic is

currently one of the most neglected areas in our health care system.

Risk factors for **foot ulceration** and lower limb amputation (Table III) may already be abundantly present in elderly patients with diabetes, especially those with co-morbidities and geriatric syndromes. The principles of prevention and treatment of foot ulcers in the elderly are the same as those in younger patients but may be much more difficult to achieve, e.g. many elderly patients cannot reach or see their feet.

Table III. Risk factors for diabetic foot ulceration⁷

- Previous ulceration
- Peripheral/autonomic neuropathy
- Peripheral vascular disease
- Diabetic nephropathy
- Diabetic retinopathy/visual loss
- Limited joint mobility/bony deformities
- Advanced age
- Poor foot wear
- Living alone/social deprivation
- Smoking and alcohol

The epidemiology of **diabetic retinopathy** in the elderly has been poorly studied.⁹ While diabetic retinopathy remains an important cause of visual loss in elderly patients with type 2 diabetes, other more important causes of severe visual loss include cataract, glaucoma and age-related macular degeneration.⁷ It is worthwhile emphasising that diabetes remains a strong risk factor for cataracts. A change in visual acuity of two or more lines on a Snellen chart may be the first indication of a macular problem.⁷ In elderly patients with miosis, using 0.5 - 1.0% tropicamide appears to be safe with a very low risk of inducing glaucoma. Unfortunately, the sensitivity of detecting diabetic retinopathy by screening with direct ophthalmoscopy often fails to reach the 80% threshold, even in the best of hands, making the referral of patients to an ophthalmology service essential.⁷

While **diabetic nephropathy** in type 1 diabetes is mainly a glomerular disease progressing through well-defined stages, type 2 diabetes-related kidney disease can result from another cause, especially hypertension.⁷ In a landmark study of patients with type 2 diabetes and chronic kidney disease it was found that diabetic retinopathy and albuminuria (micro- or macroalbuminuria) were absent in 30% of individuals with a glomerular filtration rate (GFR) of less than 60 ml/min/1.73m².¹³ The results of this study suggest that clinicians should measure serum creatinine levels and estimate GFR in addition to monitoring urine albumin excretion and fundoscopic changes to screen for kidney disease in patients with type 2 diabetes mellitus. The following key points are worthwhile emphasising:⁷

- Microalbuminuria is a strong risk factor for cardiovascular disease in the elderly. Treatment with an angiotensin-converting enzyme (ACE) inhibitor is particularly advantageous in elderly patients with type 2 diabetes and microalbuminuria, even in the absence of hypertension.
- Overt proteinuria is a strong risk factor for progression to kidney failure. It requires specific therapy with ACE inhibitors or angiotensin II receptor blockers.
- Although moderate renal insufficiency (GFR 30 - 60 ml/min) does not require specific therapy, doses of drugs mainly eliminated via the renal route may need to be adjusted.
- A protein-restricted diet may delay the progression of kidney insufficiency but may contribute to malnutrition and sarcopenia.

The number of patients suffering from various chronic diseases who develop end-stage renal disease is increasing.¹⁴ A considerable proportion of these patients are elderly and in need of **palliative care**. Unfortunately very little attention is given to palliative care for patients with non-cancerous diseases such as end-stage renal failure. The following symptoms are common in the final stages of a patient's life and may require special attention and skills: chronic pain, nausea, constipation, depression, dyspnoea, pruritus and delirium.

Prevention

Twenty per cent of subjects in the Diabetes Prevention Program (DPP) study were 60 years or older.¹⁵ In the study the advantage of

lifestyle intervention compared with placebo over a 3-year period to prevent diabetes was significantly greater in older compared with younger individuals (71% decrease in those ≥ 60 years versus 11% in the 25 - 44-year age group). Although metformin compared with placebo significantly reduced the incidence of diabetes in younger individuals it was not effective in older individuals.¹⁵ In the STOP-NIDDM trial acarbose compared with placebo decreased the development of diabetes by 30% after 3.3 years in older subjects (>55 years).¹⁶ It has also been shown that participation in self-selected exercise activities is independently associated with delaying the onset and progression of frailty in elderly subjects.¹⁷ Regular structured physical activity may therefore prevent or delay the onset of diabetes and frailty – two common and debilitating conditions in the elderly population.

Conclusion

It is a major challenge for health care workers responsible for the health of elderly patients to facilitate successful ageing in the growing diabetic population. Diabetes and its chronic complications impact negatively on successful ageing and every effort should be made to prevent the development of diabetes and frailty in the ageing population. Those who are already frail and subject to the burden of multiple chronic diseases and disability require special and skilled attention that is unfortunately not widely available in South Africa.

References available at www.cmej.org.za

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- Diabetes affects 21% of adults 65 years of age and older.
- The recommended diagnostic criteria for diabetes remain the same for all age groups.
- The clinical presentation of diabetes in the elderly may be insidious or atypical, and vague symptoms such as fatigue, weight loss and mood change are not uncommon.
- Annual screening for diabetes in asymptomatic but high-risk elderly patients should be considered as the detection rate is high.
- There is currently no evidence that improved diabetes control in elderly patients prevents the development of macrovascular complications, although a case for improved diabetes control and the prevention of microvascular complications can be made.
- It is useful to distinguish between the older diabetic patient in 'good health' and frail patients affected by multiple pathologies ('unsuccessful ageing').
- Over and above the conventional macro- and microvascular complications elderly patients with diabetes are especially at risk of geriatric syndromes such as functional disabilities, falls and fractures, incontinence, depression and dementia, sarcopenia and malnutrition.
- Risk factors for **foot ulceration** and lower limb amputation may already be abundantly present in elderly patients with diabetes, especially in those with co-morbidities and geriatric syndromes.
- Regular structured physical activity may therefore prevent or delay the onset of diabetes and frailty – two common and debilitating conditions in the elderly population.