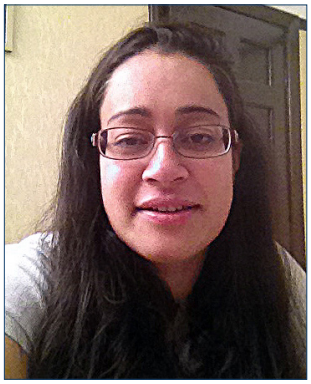
Insulin management: Treatment choices and frailty

The initiation and management of insulin therapy for diabetes is complex, requiring the consideration of many social, clinical and psychological factors. This case scenario, the second in a three-part mini-series, highlights how an older person's cognitive decline and metabolic phenotype may affect their glycaemic targets and management plan.



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Case presentation

KH is a frail, 82-year-old man of White ethnicity. He was diagnosed with type 2 diabetes in 1993 and has dementia.

Weight: 70 kg

BMI: 22.4 kg/m^2

HbA$_{1c}$: 45 mmol/mol (61 mmol/mol in January 2023)

BP: 138/90 mmHg

eGFR: 60 mL/min/1.73 m^2

ACR: Below limit of detection

Past medical history: Advanced dementia; paroxysmal atrial fibrillation

Medications: Metformin 1 g twice daily; gliclazide 80 mg twice daily; Toujeo (insulin glargine) 8 units. Rivaroxaban; omeprazole; memantine; risperidone; mirtazapine

Family history: Unknown. NOK, son

Social history: Lives in care home; frail; no alcohol intake; ex-smoker

KH was refusing his oral medication for over a week. His carer was also concerned that the frequency of his blood glucose testing was too high and was causing undue distress.

Blood test investigations were requested. After a review of his home blood glucose readings, the home was advised to test at least once a day in the morning, if KH accepted this.

This advice was based on his previous history of hypoglycaemic episodes. It has been established that symptoms of hypoglycaemia decline as we age, owing to a blunted autonomic response (Sinclair et al, 2022). In older adults with diabetes, therefore, hypoglycaemia can present with atypical symptoms, such as falls or confusion.

As KH lacked the capacity to self-care and self-medicate, education and support for carers was key.

Assessing glycaemic control

It was noted that KH's HbA$_{1c}$ was 61 mmol/mol at the start of the year, with a drop to 45 mmol/mol in 3 months. This was thought to be a reflection of his deteriorating dementia and reduction in oral intake. Given his advancing dementia and frailty, the target HbA$_{1c}$ was relaxed to <69 mmol/mol, as part of active de-escalation of treatment (Strain et al, 2021). The new target considered that KH was unlikely to achieve longer-term risk-reduction benefits by having lower blood glucose levels. He was also at increased risk of hypoglycaemia (especially with insulin being used), falls, cardiovascular disease and, possibly, of progression of dementia (NICE, 2022). The American Diabetes Association (ADA, 2022) advises that insulin deficiency and progressing renal insufficiency may be risk factors for hypoglycaemia in the elderly.

It was planned to discontinue insulin, reduce the dose of gliclazide to 40 mg twice daily and metformin to 500 mg twice daily. Following this change, the home was advised to accept blood glucose readings of 15–20 mmol/L.

After further review 3 months later, his HbA$_{1c}$

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was 60 mmol/mol. Gliclazide was, therefore, discontinued and metformin reduced to 500 mg once daily, with a view to stopping this, if needed. The aim should be to avoid hypoglycaemia and symptomatic hyperglycaemia, whilst reducing the burden of glycaemic medication in individuals with a limited life expectancy and in the severely frail, if clinically appropriate (ADA, 2022).

The conditions of diabetes and depression can exacerbate each other, which may in turn impact on dementia (Holt et al, 2014). Moreover, if glucose levels are persistently much higher than recommended, there can be an increased risk of cognitive decline in older adults with diabetes (Bordier et al, 2014). Minimising hypoglycaemic episodes in type 2 diabetes is important, as these may confer an additional risk (Bordier et al, 2014; Strain et al, 2021).

Sinclair and Abdelhafiz (2020) state that with advanced age and frailty there may be an increase in visceral fat and a reduction in body muscle mass. Depending on body weight and the relative loss of muscle mass, together with a relative increase in visceral fat, they refer to a sarcopenic obese frail phenotype (with increased visceral fat and, therefore, increased insulin resistance) and an anorexic malnourished frail phenotype (with muscle loss and reduced insulin resistance). In the former, it is proposed that weight-limiting hypoglycaemic medication is used to reduce cardiovascular risk. In the latter, insulin therapy may be considered because of its anabolic effect.

Frailty and cardiovascular risk

Frailty may be defined as a state of reduced physiological reserve in multiple organ systems, which then may cause an increased risk of vulnerability to stressors (Biessels and Despa, 2018). Frailty is more prevalent in older adults. With increasing age, frailty may encompass cognitive impairment, a reduction in cardiopulmonary function and sarcopenia, as well as psychosocial aspects of disease. In people living with diabetes, there is an increased risk of sarcopenia when compared with those without diabetes. Moreover, frailty may be worsened in the context of diabetes (Sanz-Cánovas et al, 2022).

Diabetes is a risk factor for vascular dementia and may cause further cognitive decline in Alzheimer's disease (Katon et al, 2010). This may be related to tissue damage secondary to hyperglycaemia, micro- and macrovascular complications, insulin resistance and oxidative stress. Biessels and Despa (2018) refer to the discernment of different stages of diabetes-related cognitive decline, with more severe stages, particularly mild cognitive impairment and dementia, occurring in older people. This means that screening for memory concerns at annual reviews is helpful.

Hypertension is a risk factor for frailty, as well as for cardiovascular diseases such as atrial fibrillation and stroke (Guasti et al, 2022). A blood pressure target of <150/80 mmHg in adults aged ≥80 years was associated with a 36% risk reduction of stroke and a 41% risk reduction of fatal and non-fatal cardiovascular events in the Hypertension in the Very Elderly Trial (HYVET; Beckett et al, 2008). KH's blood pressure was below this threshold, and he was not on any antihypertensives.

The family were keen for a polypharmacy review to help reduce pill burden by de-prescribing, where clinically appropriate (Katon et al, 2010; Peron et al, 2015). Indeed, polypharmacy may be considered to be a comorbidity.

The benefits of primary prevention of cardiovascular disease were less likely to be applicable to KH, as his life expectancy was likely to be less than 5 years. Atorvastatin had, therefore, previously been discontinued (ADA, 2022). Following a conversation with KH's son, it was agreed to stop rivaroxaban for atrial fibrillation, after discussion about the risk of bleeding with the medication and the increased risk of stroke if discontinued. This meant that the dose of omeprazole, which had been prescribed to reduce the bleeding risk, was gradually reduced then stopped. Memantine and mirtazapine were switched to oro-dispersible formulations.

Decisions about stopping medication can be made for pragmatic reasons, such as to reduce the risk of falls or the pill burden, while scoring systems may be used to support such decision-making.

Key messages

This case acknowledges the importance of a person-centred approach in an elderly frail individual, such

Learning points

- Avoid hypoglycaemia and symptomatic hyperglycaemia whilst reducing the burden of glycaemic medication in patients with a limited life expectancy and in the severely frail, if clinically appropriate.
- With advanced age and frailty, there may be an increase in visceral fat with a reduction in body muscle mass.
- Frailty may be defined as a state of reduced physiological reserve in multiple organ systems.
- Diabetes is a risk factor for vascular dementia and may cause further cognitive decline in Alzheimer's disease.
- Screening for memory concerns at diabetes annual reviews is recommended.
- Glucose-lowering treatments should be evaluated in the context of hypoglycaemia and cardiovascular risk, as well as effect on body weight.

that the risks and benefits of following guidance are considered (Sinclair et al, 2022). Glucose-lowering treatments should be evaluated in the context of hypoglycaemia, cardiovascular risk and their effect on body weight. It is important to consider life expectancy, as it may be relevant to the continuation of medication that is being used to confer a prognostic benefit. Furthermore, avoiding harm, such as falls risk and symptoms of hypo- or hyperglycaemia, is relevant. Lifestyle management advice should be put into the context of frailty status, and management should consider clinical and psychosocial evaluation (ADA, 2022). ■

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