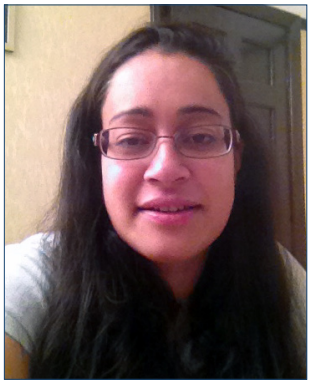
Insulin management: Treatment choices and comorbidities

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 first in a three-part mini-series, highlights how the development of comorbidities and an individual's preferences affect their glycaemic targets and management plan.



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Case presentation

DE is a 70-year-old man of White ethnicity. He was diagnosed with type 2 diabetes in 2020 after presenting with osmotic symptoms.

Weight: 78 kg

BMI: 24.1 kg/m^2

HbA$_{1c}$: 100 mmol/mol (previously 50 mmol/mol)

BP: 132/82 mmHg

Lipid profile: TC, 4.4; TG, 1.5; HDL, 1.4; LDL 2.4; non-HDL 2.8 mM/L

eGFR: >60 mL/min/1.73 m^2

ACR: Undetectable

QRISK3: 27.1%

Past medical history: Giant cell arteritis, 2005; osteoarthritis

Medications: Metformin 1 g twice daily, no reported side effects

Family history: Brother with type 2 diabetes

Social history: Nil alcohol intake; ex-smoker; lives alone; retired office manager

DE attended hospital with worsening symptoms of headache and scalp tenderness over a couple of months; he had a previous diagnosis of giant cell arteritis (GCA). There was no history of polymyalgia rheumatica, fevers or weight loss. Other symptoms of GCA may include jaw claudication and visual symptoms, such as diplopia and changes with colour vision (Mackie et al, 2020). GCA is a large-vessel vasculitis that affects older people and may result in blindness or stroke.

DE was seen in the ophthalmology department and was appropriately started on high-dose glucocorticoid treatment (60 mg prednisolone once daily).

After 5 weeks, DE presented to the GP surgery with polyuria, polydipsia and feeling generally unwell. There was a clinical suspicion of a hyperosmolar hyperglycaemic state (HHS), which can arise in older people with type 2 diabetes (French et al, 2019). Although HHS contributes to fewer than 1% of all diabetes-related admissions, mortality may be up to 15%. DE's blood glucose level was 20 mmol/L, and there were no urinary ketones on testing.

Self-management education and support

DE felt guilty for not reporting his symptoms sooner, despite having told his specialists his medical history. He had engaged with his diabetes reviews at the GP practice and had achieved good glycaemic control prior to this episode. DE was experiencing diabetes distress which is the negative emotional response that may result from coping with diabetes, in this case in relation to loss of control (Skinner et al, 2020). Diabetes distress can result in blood glucose being persistently above recommended levels and in increased all-cause mortality (Fisher et al, 2012; ElSayed et al, 2023).

The American Diabetes Association (ADA) refers to critical times to assess support and self-management (ElSayed et al, 2023). In this case, the critical times related to biopsychosocial complications and to transitions in life, such as a change in medical status and the need to intensify treatment.

"Pre-existing diabetes, as well as non-diabetic hyperglycaemia, are risk factors for hyperglycaemia with steroid therapy."

The prescriber of oral steroids should assess blood pressure and hyperglycaemia, especially in those that are at higher risk of developing complications, within the first 2 weeks of commencing treatment. Prednisolone may be reduced by 10 mg/week in individuals who are in remission on more than 20 mg daily. Tapering schedules should be individualised (Mackie et al, 2020).

It should, therefore, have been anticipated that DE's glycaemic control would need consideration. Mackie et al (2020) advocate that comorbidities relevant to the treatment of GCA, such as diabetes, should be evaluated soon after diagnosis, with review every 2–8 weeks during the first 6 months of treatment. Moreover, drug-induced hyperglycaemia increases the risk of microvascular and macrovascular complications, and of infections (Fathallah et al, 2015).

Achieving glycaemic control

Pre-existing diabetes, as well as non-diabetic hyperglycaemia, are risk factors for hyperglycaemia with steroid therapy. Whilst all oral glucose-lowering drugs can be used for severe hyperglycaemia, insulin is recommended for those with pre-existing diabetes or for those patients needing prolonged treatment (Elena et al, 2018).

Insulin therapy was chosen following an informed discussion using the NICE patient decision aid (NICE, 2022). DE's most important priority was to feel better and achieve his baseline glycaemic control, as he was concerned about disease progression and complications. The UK Prospective Diabetes Study motivates us to achieve early intensive glycaemic control to provide long-term protection against diabetes complications, including mortality (UKPDS Group, 1998; Holman et al, 2008). Consequently, to achieve an HbA_{1c} level of 53 mmol/mol, as per NICE guidance, treatment was intensified by using insulin.

It is important to address psychosocial aspects of disease as part of clinical management. Insulin initiation should, therefore, include patient education about the medication and how to administer it alongside follow-up plans. It should be recognised that a change in treatment regimen may cause diabetes distress.

DE was understandably concerned that intensification of treatment with insulin meant that his diabetes was worse. He saw this as his failure of not being able to manage with oral glucose-lowering therapies. It was important to acknowledge this element of diabetes distress, and to address how to cope with a changing treatment regimen.

Diabetes distress was managed by asking about DE's concerns, more specifically, how he was feeling about his health and how it was impacting daily living activities. By "normalising" the challenges of living with diabetes, a permissive approach to sharing difficulties was enabled. The use of validated questionnaires may be considered, and DE's symptoms of depression and anxiety were evaluated. Diabetes and depression are conditions that can exacerbate each other and can occur together up to twice as frequently when compared to background risk (Holt et al, 2014).

DE was not concerned about the possible side effects of insulin therapy of weight gain and hypoglycaemic episodes (NICE, 2022). His son lived locally, so there was support for administering insulin and for daily living activities. Driving was, however, important to DE's independence. DE was advised to inform the Driver & Vehicle Licensing Agency (DVLA) and his car insurer that his diabetes was being treated with insulin, as it was anticipated that this therapy may continue beyond 3 months because of the ongoing need for oral steroids (DVLA, 2024). He was also advised to test his blood glucose level 2 hours before the start of a car journey and every 2 hours after driving has started, as per the DVLA's requirements for insulin-treated drivers. Symptoms of hypoglycaemia were also discussed.

In a planned, proactive (rather than reactive) situation, DE could have been advised to check his blood glucose levels 4 times a day, before or after meals. If levels were consistently more than 12 mmol/L, then the treatment algorithm from the Joint British Diabetes Societies for Inpatient Care (JBDS-IP) (2023) could be followed, so that a short-acting sulfonylurea (e.g. gliclazide) could be added once daily, initially, to increase insulin release from the beta cells of the pancreas.

Morning administration of an intermediate-acting basal human insulin, such as Humulin I or

Insulatard, may be useful for a single dose of oral steroid in the morning (JBDS-IP, 2023). 10 units of basal human insulin are recommended, with a view to increasing this daily dose by 10%–20%, dependent on capillary blood glucose monitoring (Howard-Thompson et al, 2018; JBDS-IP, 2023).

Insulatard was added to DE's current metformin regimen. A basal analogue insulin may be considered if there is hyperglycaemia throughout the day and into the evening, being mindful of nocturnal and early morning hypoglycaemia (JBDS-IP, 2023).

Intermittently scanned continuous glucose monitoring (isCGM) was used to facilitate self-measurement, owing to the frequency of testing required and manual dexterity issues secondary to osteoarthritis (NICE, 2022). As DE's glucocorticoid therapy is reduced, it is anticipated that the insulin will be down-titrated.

Cardiovascular risk

Atorvastatin 20 mg was offered for the primary prevention of cardiovascular disease, as DE had a QRISK3 score of 27.1% (NICE, 2023). DE was normotensive at the time of consultation, but this should be reviewed more frequently whilst on glucocorticoid therapy. He was advised on diet and exercise, as well as how to seek psychological support if needed.

Monitoring

DE attended a telephone review with the diabetes specialist nurse every two weeks to assess his hyperglycaemia and blood pressure. As his glycaemic control improved, the frequency of reviews was reduced to monthly. This was done after discussion with DE and he had received safety-netting advice about when to seek medical advice.

Key messages

This case acknowledges how treatment choices may change as other comorbidities become relevant, and the need for person-centred targets. ■

Learning points

- Consider diabetes distress at each clinical contact, especially in the context of a change in medical status.
- Assess blood pressure and hyperglycaemia in individuals starting oral steroid therapy.
- Pre-existing diabetes and non-diabetic hyperglycaemia are risk factors for hyperglycaemia with steroid therapy.
- Counsel patients on the risks and benefits of treatment intensification.
- Advise about driving, referring to DVLA licensing requirements and driving responsibilities.

"He was also advised to test his blood glucose level 2 hours before the start of a car journey and every 2 hours after driving has started, as per the DVLA's requirements for insulin-treated drivers."

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