

Meet Eleanoa

Learning Outcomes

- Selection of glucose lowering medications in patients with chronic kidney disease
- Approach to recurrent hypoglycaemia
- Assessment of diabetes related microvascular complications and their management
- Individualising glycaemic treatment targets depending on patient wishes, comorbidities and hypoglycaemia risk



VISIT ONE

Eleanoa is a 74-year old female who has recently attended your practice after moving to Australia from Fiji. She has type 2 diabetes (diagnosed 12 years ago) complicated by chronic kidney disease. She saw a nephrologist many years ago when was first diagnosed.

Eleanoa's daughter Kelly is concerned about her mother having multiple episodes of hypoglycaemia especially during the day when she is home alone. She reports five episodes of hypoglycaemia a week. Eleanoa has recently reported reduced awareness of hypoglycaemia, becoming symptomatic only at a BGL of 3.0 mmol/L. Several episodes have required assistance from Kelly. Eleanoa was hospitalised last week after a hypoglycaemic episode caused a fall resulting in a Colles' fracture of her left arm. She does not drink alcohol or smoke. Eleanoa does not drive.

Current medications

Metformin 1 g twice daily
 Gliclazide MR 120 mg daily
 Perindopril 4mg daily
 Aspirin 100 mg daily
 Previously statin induced myositis

Allergies

Nil known drug allergies

Examination

Blood pressure 145/85 mmHg with no postural drop
 Weight 85 kg Height 168 cm, BMI 30 kg/m²
 Peripheral neuropathy in stocking distribution to ankle when tested with a 10g monofilament. Pedal pulses present.
 Nil evidence of ulceration.

Investigations

HbA_{1c} 48 mmol/mol (6.5%)
 Hb 120 g/L
 Urine albumin/creatinine ratio (ACR) 25 mg/mmol (confirmed on repeat testing)
 eGFR 42 ml/min/m²

What are the management issues for this patient?

- Recurrent severe hypoglycaemia and safety when home alone
- Management of recurrent hypoglycaemia
- Metformin in the context of reduced renal function
- Individualising glycaemic treatment targets depending on patient wishes, comorbidities and hypoglycaemia risk
- Diagnosis and management of microvascular complications
- Optimal blood pressure control
- Consider evaluation for autonomic neuropathy given longstanding diabetes with peripheral neuropathy in a frail elderly patient with falls
 - > Lying and standing BP and refer for further testing if required
- Management of diabetic neuropathy, prevention of foot ulcers
- Assess and manage osteoporosis/renal bone disease

What is your management plan?

1. Patient's age, medical co-morbidities, frailty and recurrent hypoglycaemia with injuries suggest that an HbA_{1c} target of 64 mmol/mol (8%) would be appropriate.
2. Reduce dose of metformin to 1g, given renal impairment.
3. Stop gliclazide.
4. Start DPP-4 inhibitor at dose appropriate for renal function.
5. Titrate anti-hypertensive therapy as tolerated.
6. Referral to dietician and diabetes educator (team care planning) to review diet and self-management of diabetes, particularly prevention and management of hypoglycaemia.
7. Complete complications screen with ophthalmology review.
8. Refer to podiatry for assistance with nail care and provision of appropriate footwear. Advise patient of the importance of daily foot examination given neuropathy.
9. Advise use of a safety alert alarm.

VISIT TWO

Eleanora is now comfortable with managing hypoglycaemia following her education session with the diabetes educator. The hypoglycaemia has stopped and hypoglycaemia awareness has returned. However, her renal function has declined further with eGFR now 35 ml/min/m².

Eleanora is adamant that she will not consider dialysis. She is awaiting review by the renal team at the local hospital to exclude other causes of kidney disease and to optimise management. Eye review indicates non-proliferative diabetic retinopathy.

Current medications

Metformin 1 g daily
Linagliptin 5mg daily
Perindopril 4mg daily
Aspirin 100mg daily

Examination

Blood pressure 140/80

Investigations

HbA_{1c} 57 mmol/mol (7.4%)

What are the management issues for this patient?

- Investigation of declining renal function
- Consideration of alternative glucose lowering agents in the context of increasing renal impairment

What is your management plan?

1. Continue to monitor renal function on a three-six monthly basis.
2. Metformin should be ceased when eGFR falls below 30 ml/min/1.73m².

Referral criteria for specialist renal care may include:

- eGFR <30 ml/min/1.73m² (Stage 4 or 5 Chronic Kidney Disease (CKD) of any cause)
- persistent significant albuminuria (UACR ≥30 mg/mmol)
- a sustained decrease in eGFR of 25% or more OR a sustained decrease in eGFR of 15 ml/min/1.73m² within 12 months
- CKD with hypertension that is hard to get to target despite at least three antihypertensive agents.

Clinical manifestations of Diabetic Autonomic Neuropathy

Cardiovascular

Resting tachycardia
Exercise intolerance
Orthostatic hypotension
Silent myocardial ischemia

Gastrointestinal

Oesophageal dysmotility
Gastroparesis diabeticorum
Constipation
Diarrhea
Fecal incontinence

Genitourinary

Neurogenic bladder (diabetic cystopathy)
Erectile dysfunction
Retrograde ejaculation
Female sexual dysfunction (e.g., loss of vaginal lubrication)

Metabolic

Hypoglycaemia unawareness
Hypoglycaemia-associated autonomic failure

Sudomotor

Anhidrosis
Heat intolerance
Gustatory sweating
Dry skin

Pupillary

Pupillomotor function impairment (e.g., decreased diameter of dark-adapted pupil)
Argyll-Robertson pupil

Additional resources

Cheung NW, Conn JJ, d'Emden MC, et al. Position statement of the Australian Diabetes Society: individualisation of glycosylated haemoglobin targets for adults with diabetes mellitus. *Med J Aust* 2009; 191: 339-344.

Shorr RI, Ray WA, Daugherty JR, Griffin MR. Individual sulfonylureas and serious hypoglycemia in older people. *J Am Geriatr Soc* 1996; 44: 751-755.

Kidney Health Australia. Chronic kidney disease (CKD) management in general practice, 3rd edition. Melbourne: Kidney Health Australia. 2015.