

The Management of Diabetes in the Older Adult

1. Frailty and Diabetes

Frailty is a state of vulnerability which leads to a range of adverse outcomes including a decline in physiological reserve, mobility and an increased risk of falls. There are several ways to objectively define frailty, and we suggest using the Clinical Frailty Scale (CFS, see figure 1).¹ This is a commonly accepted model which is practical and easy to implement in routine practice. This guideline is generally aimed for people aged over 70 years and with a CFS ≥ 5 , based on the recommendations outlined by the Joint British Diabetes Societies for Inpatient Care (JBDS-IP)², Association of British Clinical Diabetologists (ABCD)³ and National Institute for Health and Care Excellence (NICE)⁴. One in six hospital beds are occupied by a person with diabetes and most of these are elderly patients. Such patients are well-established to have a greater length of hospital stay, morbidity and mortality than those without diabetes.⁵ Particular consideration of medications used to avoid clinical harm in this group is needed, given their greater risk.

2. Recommendations

- People with diabetes aged over 65 years should receive a risk factor evaluation for conditions and factors associated with risk of hospital admissions:
 - Poorly-controlled diabetes (see glycaemic targets below)
 - History of hypoglycaemia
 - Poor nutritional intake
 - Cardiovascular risk factors
 - Co-morbidities including recent disabling stroke or fracture
 - Polypharmacy with potential drug interactions
 - Unmet care needs and activities of daily living
 - Risk of hyperglycaemic emergencies such as diabetic ketoacidosis (DKA) or hyperosmolar hyperglycaemic state (HHS)
 - Risk of falls
- Individualised care plans detailing co-morbidities, presence of frailty or functional loss (including cognition), individualised agreed goals of treatment, medications, frequency of monitoring, target capillary blood glucose and HbA1c, blood pressure and serum lipid levels are helpful

- Older patients with diabetes particularly those with catheters should be regularly reviewed for urinary infections
- Assess the older person's ability, capacity and preference for self-management of diabetes (including blood-glucose testing and injection administration)
- Ensure that care routines such as the timing of medications with meals and blood glucose testing are managed to reduce risk of hyper or hypoglycaemia
- Discharge planning preparation needs to ensure that the older person, their carers and primary or community diabetes teams fully understand the care plan and any post-discharge medicines adjustments that may be required

Figure 1: Clinical Frailty Scale

CLINICAL FRAILTY SCALE			
	1	VERY FIT	People who are robust, active, energetic and motivated. They tend to exercise regularly and are among the fittest for their age.
	2	FIT	People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally , e.g., seasonally.
	3	MANAGING WELL	People whose medical problems are well controlled , even if occasionally symptomatic, but often are not regularly active beyond routine walking.
	4	LIVING WITH VERY MILD FRAILITY	Previously "vulnerable," this category marks early transition from complete independence. While not dependent on others for daily help, often symptoms limit activities . A common complaint is being "slowed up" and/or being tired during the day.
	5	LIVING WITH MILD FRAILITY	People who often have more evident slowing , and need help with high order instrumental activities of daily living (finances, transportation, heavy housework). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, medications and begins to restrict light housework.
	6	LIVING WITH MODERATE FRAILITY	People who need help with all outside activities and with keeping house . Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.
	7	LIVING WITH SEVERE FRAILITY	Completely dependent for personal care , from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).
	8	LIVING WITH VERY SEVERE FRAILITY	Completely dependent for personal care and approaching end of life. Typically, they could not recover even from a minor illness.
	9	TERMINALLY ILL	Approaching the end of life. This category applies to people with a life expectancy <6 months , who are not otherwise living with severe frailty . (Many terminally ill people can still exercise until very close to death.)

SCORING FRAILITY IN PEOPLE WITH DEMENTIA	
The degree of frailty generally corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.	In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting. In severe dementia, they cannot do personal care without help. In very severe dementia they are often bedfast. Many are virtually mute.

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Rockwood K et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489–495.

Clinical Frailty Scale App



3. Key areas of glucose management

Glycaemic targets

As with any person with diabetes, the target HbA1c should be individualised based on co-morbidities, frailty and patient wishes. Whilst NICE recommend a target HbA1c 48-58mmol/mol (6.5%-7.5%) in most people with diabetes, some people benefit from a relaxed glycaemic target (e.g. those with frailty, falls or reduced life expectancy). This is because tighter HbA1c targets are typically associated with polypharmacy and an increased falls and hypoglycaemia risk, resulting in a risk of harm. The JBDS-IP recommend relaxing the target HbA1c up to 70mmol/mol (8.5%) and random blood glucose targets 6.7-11.1 mmol/L in people with significant frailty (CFS ≥ 5). Often, the goal of treatment in people with diabetes and frailty is to achieve a good quality of life rather than tight glycaemic control. In practice this means avoiding diabetes-related emergencies such as hypoglycaemia, DKA and HHS using the least number of medications possible with the safest side-effect profile.

Medication choices

In older adults and those with frailty, cautious medication selection for treatment of diabetes is important, to minimise the risk of harm (which is greater in these patients) and to obtain the greatest benefit from the fewest medications. Similarly, as people with diabetes get older and typically acquire co-morbidity and frailty, clinicians should consider the need to de-escalate treatments which may cause harm, if appropriate. Frequently, such de-escalation happens following a hypoglycaemic event, but should occur proactively if the patients' glycaemic control is below their target thresholds. The factors which should be considered when deciding upon the use of different diabetes medication classes in people with diabetes and frailty are summarised in Table 1.

Avoidance of hypoglycaemia

Hypoglycaemia is often a significant concern in older adults with diabetes and is a major cause of harm and hospital admission in this group. Healthcare professionals caring for older people with diabetes should evaluate their risk of hypoglycaemia and use medications with the lowest risk of hypoglycaemia and other side-effects. The risk of hypoglycaemia is greater in those with some co-morbidities (e.g. chronic kidney or liver disease, dementia with variable eating) and naturally influenced by the nutritional state. People with diabetes and frailty should always have a glucose > 6.0 mmol/L and

HbA1c > 59mmol/mol (7.5%) to minimise the risk of hypoglycaemia. Patients who have a severe hypoglycaemic event or glucose/HbA1c levels below the recommended targets should have a comprehensive diabetes review to de-escalate therapies.

To minimise the risk of hypoglycaemia in older adults with diabetes:

- Offer a bedtime snack to reduce risk of nocturnal hypoglycaemia
- Monitor dietary intake, especially patients with variable eating habits such as those with dementia or some gastrointestinal conditions
- Hold some classes of diabetes medication (e.g. metformin, SGLT-2 inhibitors, sulfonylureas and insulin) if poor oral intake and below-target blood glucose.
- Aim target glucose 6.7-11.1 mmol/L and HbA1c > 59mmol/mol (7.5%). Seek GP or diabetes team input if concerned
- Monitor the patient's capillary glucose levels appropriately in accordance with their diabetes treatments (2-4 measurements daily, see COIN guidance)
- Always have a fully stocked hypo box on all hospital wards
- Support the carers of people with diabetes to recognise, diagnose and treat hypoglycaemia [**Community only**]
- Consider the need for district nurse support for glucose monitoring and/or delivery of injectable therapies if concerned [**Community only**].
- Use diabetes medications which are associated with the lowest possible risk of hypoglycaemia to minimise the risk of HHS or DKA

Table 1: Diabetes medication classes in people with diabetes and frailty

Drug Class	Examples	Advantages	Disadvantages	Comments
Biguanides	Metformin	Low risk of hypoglycaemia. Low cost. Generally well tolerated.	Limited use in CKD. Gastrointestinal upset.	Used until eGFR <30mL/min. Extended release has fewer GI side-effects.
Sulphonylurea	Gliclazide Glibenclamide	Low cost. Can be used in moderate-severe CKD.	High risk of hypoglycaemia.	Avoid if inconsistent eating (e.g. people with dementia). Consider discontinuing if also using insulin.
Thiazolidinediones	Pioglitazone	Low risk of hypoglycaemia. Can be used in CKD.	Contraindicated in heart failure, anaemia, fractures, bladder cancer. Low cost.	Can be useful if high insulin resistance.
Dipeptidyl peptidase-4 (DPP-4) inhibitors	Linagliptin Saxagliptin Sitagliptin	Low risk of hypoglycaemia. Well-tolerated. Can be used in CKD.	Modest HbA1c reduction. Medium/high cost.	Easily combined with basal insulin in a low complexity regimen
Sodium-glucose co-transporter-2 (SGLT-2) inhibitors	Canagliflozin Dapagliflozin Empagliflozin Ertugliflozin	Low risk of hypoglycaemia. Good efficacy. Improved CHF, CKD outcomes.	Risk of adverse events.	Risk of UTIs, thrush and DKA in elderly and long-standing diabetes
Glucagon-like peptide-1 (GLP-1) analogues	Dulaglutide, Liraglutide, Semaglutide	Low risk of hypoglycaemia. Once-weekly preparations.	Injectable. GI side effects & weight loss. High cost.	Monitor for weight loss and GI side effects. Dose adjust in CKD.
Insulin	Basal Premixed Basal-Bolus	No ceiling effect Numerous forms/regimes available	High risk of hypoglycaemia Carer training Frequent glucose monitoring	Basal-only regime improves management complexity and reduces risk of hypoglycaemia

4. Other medication for the control of cardiovascular risk factors

Blood pressure

A blood pressure target < 150/90mmHg is often appropriate in people with diabetes and frailty, dependency, risk of falls and/or postural hypotension. When considering dose escalation of anti-hypertensive therapy, consider the risks of falls and postural hypotension, measuring the lying and standing blood pressure when possible. Starting at a low dose with cautious up-titration is the safest approach with blood pressure and renal function monitoring. As per NICE guidance, the preferred first-line treatment is with angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs) given the cardio-renal benefits in people with diabetes. Anti-hypertensive escalation using thiazide-like diuretics or dihydropyridine calcium channel blockers may be needed. Down-titration or withdrawal of anti-hypertensive medications may be required in those with increasing frailty and dependence. Consider moving anti-hypertensive therapy to night time to reduce falls risk during the day.

Lipids

Elderly patients with diabetes are often at the highest risk of cardiovascular events, and pharmacotherapy to reduce this risk should always be considered. All people with diabetes should have an annual lipid profile. Once primary dyslipidaemia is confirmed, atorvastatin 20mg (or an alternative low dose statin) is reasonable. Whilst the use of statins is associated with muscle-related symptoms in up to 10% of patients, it is typically dose-dependent and so low dose treatment is appropriate in the majority of people.

5. References

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