Diabetes Mellitus at an Elderly Age

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- In Germany in 2010, the prevalence of diabetes in the age group 80 years and older was 34 % in women and 32 % in men.
- Age-typical functional limitations and high vulnerability create a special need for action that goes beyond blood glucose control and the management of cardiovascular risk factors or diabetes typical complications.

- Maintaining quality of life and avoiding hypoglycemia are the primary therapeutic goals.
- The HbA1c value is less important in advanced age for therapy decisions and should also be evaluated from the point of view of presumed life expectancy.
- The focus is on preventing hypoglycemia. Lower HbA1c or pre- and postprandial values should only be targeted in therapies without a risk of hypoglycemia.

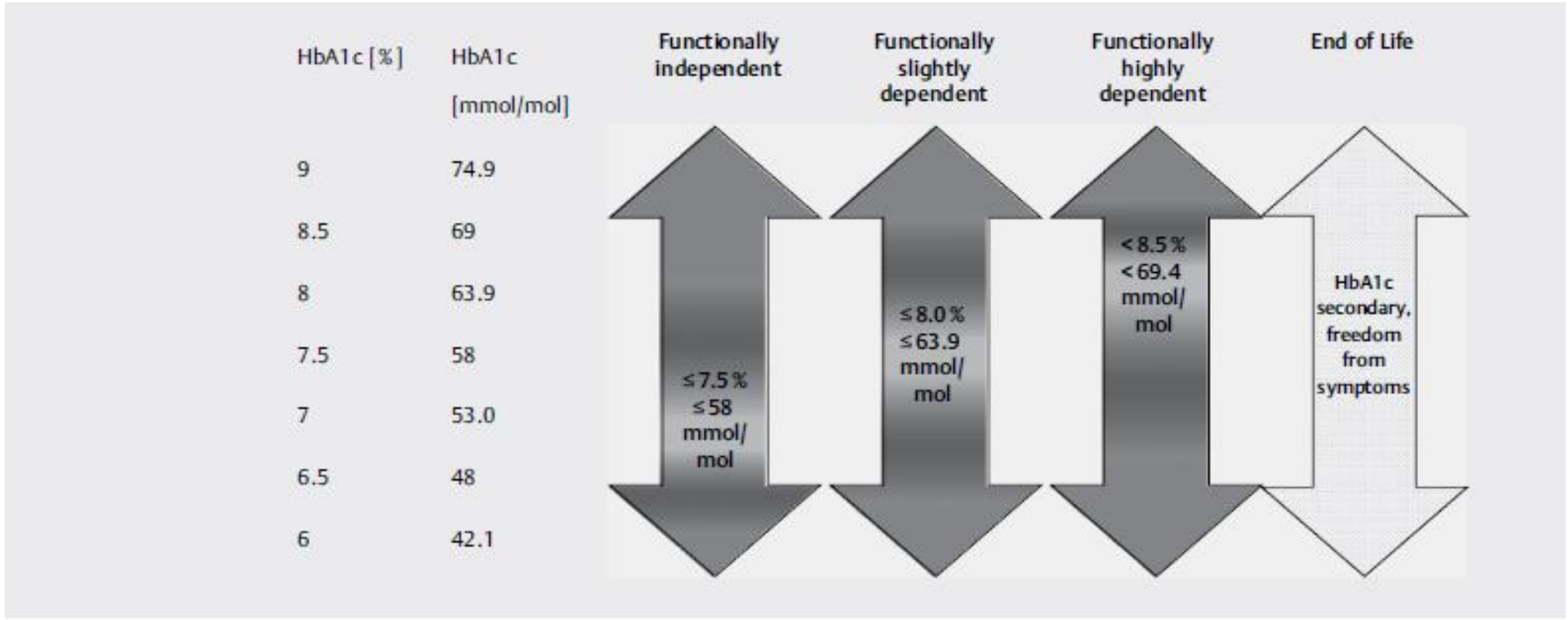
▶ **Table 1** Classification into functional groups.

Patient group	Patient description
Functionally independent	Elderly people with diabetes mellitus and good functional status. Patients with low co-morbidity, possibly low cognitive impairment and good compensation possibilities
Functionally slightly dependent	Elderly people with diabetes mellitus and limited functional status. Patients with multimorbidity, functional and cognitive limitations and geriatric syndromes
Functionally highly dependent	Elderly people with diabetes mellitus and extremely limited functional status or terminally ill people. Patients with multimorbidity, geriatric symptoms, pronounced functional and cognitive limitations and the presence of diseases with limited life prognosis, e. g. terminal heart, kidney or malignant diseases
End of Life	People who are on their deathbed

▶ **Table. 2** Target corridors for elderly people with diabetes.

Patient group	Reasoning	HbA1c	Blood glucose before meals	Blood pressure (HYVET target values apply for 80 + year olds)
▪ Few concomitant diseases ▪ Cognitively not restricted (functionally independent patients)	▪ Life expectancy > 15 years ▪ Advantages of an intensive therapy can be experienced	6.5–7.5 % (47.5–58.5 mmol/mol)	▪ 100–125 * mg/dl ▪ 5.6–6.9 mmol/l	▪ Over 80 years old: < 150 mmHg ▪ 60–80 years old: < 140 * mmHg (ESC/ESH)
Very old or multimorbid or slightly cognitively impaired patients (functionally slightly dependent patients)	▪ Life expectancy < 15 years ▪ Benefits of an intensive therapy cannot be experienced ▪ Increased risk of hypoglycemia and falls	≤ 8.0 % (63.9 mmol/mol)	▪ 100 * –150 mg/dl ▪ 5.6–8.3 mmol/l	< 150 mmHg
Patients who are dependent on nursing care or cognitively severely restricted (functionally highly dependent patients)	Limited life expectancy	< 8.5 % (69.4 mmol/mol)	▪ 110–180 mg/dl ▪ 6.1–10 mmol/l	Individual therapy decision that takes into account the overall context of the patient (as there is no target value evidence)
End of Life	Individually with the goal of freedom of symptoms			

* Lower blood glucose limits apply only during hypoglycemic therapy.



▶ **Fig. 1** HbA1c corridors according to functionality under strict avoidance of hypoglycemia.

Hypoglycemia

- Hypoglycemia is the second most common cause of drug-related emergency admissions of elderly people.
- The risk of hypoglycemia increases with diabetes duration and is higher in elderly people with diabetes.
- The threshold for the perception of low blood glucose levels decreases with age. however, brain dysfunction already occurs at higher levels. In addition, the symptoms of hypoglycemia can take on a different form.
- Severe hypoglycemia is much more common in depression, cognitive impairment, kidney and heart failure and treatment with a beta-blocker. They are most common in treatments with prandial insulin, a basal insulin or insulin secretion.

Hypoglycemia

- There is increasing evidence that hypoglycemia promotes the development of cardiovascular events and dementia in advanced age.
- **prevention of hypoglycemia is a primary therapeutic goal**

Hypertension

- Elderly patients benefit from effective blood pressure reduction.
- There is only insufficient evidence for antihypertensive treatment in frail patients over 80 years of age, so that this therapy should be individualized.
- Due to frequent comorbidities and polypharmacy, special attention should be paid to known adverse drug reactions in elderly patients.

Dyslipidemia

- In elderly patients with diabetes as well as very high risk (e. g. CHD, severe kidney damage or one or more CV risk factors and/or organ damage) a target LDL cholesterol of < 1.8 mmol/L (< 70 mg/dL) or a LDL cholesterol reduction= 50 % should be aimed for.
- In elderly patients with diabetes without functional limitations (without other CV risk factors and without organ damage) a target LDL cholesterol of < 2.5 mmol/L (< 100 mg/dL) should be aimed for.
- Statins should be used as first-line therapy to lower LDL cholesterol.

Multi-medication

- Prescription of more than five drugs increases the probability of occurrence of undesirable, clinically-relevant side effects interactions (e. g. severe hypoglycemia, comorbidity) and reduces patient adherence.
- The treatment regimen should be based on the patient's wishes, current quality of life and selfcare abilities.

Therapy

- Non-drug treatments are also the basis of treatment for elderly people with diabetes.

Training

- Elderly people with diabetes should also participate in structured diabetes training.

Movement and tendency to fall

- Medications
- Visual acuity
- Education
- strength training

Nutrition

- The consequences of malnutrition are serious in advanced age. Elderly people who are overweight or obese should avoid strict dietary restrictions due to the risk of malnutrition.

Medical therapy

- Acarbose, glitazones, sulfonylureas and glinides are considered by the majority to be less suitable

Metformin

- Metformin is also to be used as a drug therapy of first choice for elderly patients.
- Metformin can be prescribed up to a glomerular filtration rate of > 30 ml/min in a maximum dose of 1000 mg, divided into two single doses

DPP-4 inhibitors

- DPP-4 inhibitors can be used in elderly patients as first line
- Advantages can be seen in particular with regard to therapy adherence (low frequency of administration required),risk of hypoglycemia, weight neutrality and higher degree of renal failure.

GLP-1 agonists

- GLP1 agonists can be used in elderly patients in individual cases.
- Advantages can include: low risk of hypoglycemia and weight loss
- for liraglutide and dulaglutide: reduced cardiovascular morbidity and mortality

SGLT-2 inhibitors (gliflozin)

- SGLT-2 inhibitors can be used in elderly patients as first line. The start of therapy with dapagliflozin is not recommended after the age of 75 years; for empagliflozin a limit of 85 years applies.
- Advantages can include: lowering of blood glucose levels without personal risk of hypoglycemia and reduced cardiovascular morbidity and mortality, avoidance of hospitalization due to heart failure as well as a nephroprotective effect in patients with type 2 DM.
- During use, increased risks, e. g. for urogenital infections, polyuria and deterioration of renal function as well as the (rare) occurrence of (normoglycemic) ketoacidosis should be noted.

Insulin

- Insulin therapy should be started if lifestyle changes and/or oral antidiabetics do not achieve the individualized therapy goal or oral antidiabetics are no longer effective due to contraindications or if polypharmacy can be reduced.
- The choice of insulin therapy depends primarily on the patient's wishes, cognitive and fine motor skills as well as the social environment and the therapeutic goal.
- When insulin or insulinotropic drugs (especially sulfonylureas) are administered, sufficient food intake should be ensured to avoid hypoglycemia.
- To avoid lipohypertrophy, the (varying) injection site should be determined in a rotation plan.

Insulin

- Short-acting insulins:

For safety reasons, all short-acting insulins can be given after the start of a meal without an injection-to-meal interval or in the case of loss of appetite or dementia.

- Long-acting insulins:

The rate of nocturnal hypoglycemia is lower among analogue basal insulins with a normoglycemic therapy target than among NPH insulins.

Provided that the patient consumes regular meals and exercises, mixed insulins can be used if fewer injections and blood glucose tests are desired.

Insulin degludec can be injected at variable injection times, which makes it easier to administer e. g. by nursing services.

Reference

Zeyfang, A., Wernecke, J., & Bahrmann, A. (2021). Diabetes Mellitus at an Elderly Age. *Experimental and clinical endocrinology & diabetes : official journal, German Society of Endocrinology [and] German Diabetes Association*, *129*(S 01), S20–S26. https://doi.org/10.1055/a-1284-602

Thank you