

Type 2 diabetes and hemoglobin A_{1c} targets

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Clinical question

What are reasonable hemoglobin A_{1c} (HbA_{1c}) targets for patients with type 2 diabetes mellitus?

Bottom line

While many patients safely attain HbA_{1c} levels at or just below 7%, for older patients with long-standing diabetes, multiple comorbidities, and high risk of hypoglycemia, reasonable targets are 7% to 8% or higher.

Evidence

Intense management of blood glucose in type 2 diabetes was examined in 10 meta-analyses.¹

- Patients varied by age, comorbidities, medications, etc, making evidence interpretation and application difficult. Five reasonably sized trials fall into 2 groups:
- Patients in their 50s newly diagnosed with diabetes with few comorbidities randomized to 1 glucose-lowering therapy or diet control, followed for about 17 years (outcomes reported as 10-year rates).
 - UKPDS 33 (N=3867): sulfonylurea or insulin (HbA_{1c} 7.0% vs 7.9%).²
 - Reduction in death (NNT=29; P=.007) and myocardial infarction (MI) (NNT=36; P=.01).³
 - UKPDS 34 (N=753): metformin (HbA_{1c} 7.4% vs 8.0%).⁴
 - Reduction in death (NNT=14; P=.002) and MI (NNT=16; P=.005).³
- Patients with established diabetes in their 60s with more comorbidities receiving multiple glucose-lowering therapies for intense versus conventional therapy.
 - ACCORD⁵ (N=10251): 3.5 years, HbA_{1c} 6.4% versus 7.5%.
 - ADVANCE⁶ (N=11140): 5 years, HbA_{1c} 6.5% versus 7.3%.
 - Veterans⁷ (N=1791): 5.6 years, HbA_{1c} 6.9% versus 8.4%.
 - Intense management led to prevention of visual deterioration (NNT=60) and loss of light-touch sensation (NNT=49)⁸; no benefit in CV outcomes⁵⁻⁷ except reduced nonfatal MI in 1 study (NNT=100)⁶; worsening mortality⁵ (NNH=96) and hospitalization⁶ (NNH=48); and weight gain (1 in 8 gained ≥10 kg⁵) and hypoglycemia (severe⁵; NNH=15).⁵⁻⁷

Context

- Cohort data indicate that
 - in patients with established diabetes, HbA_{1c} of 7.5% might have the lowest mortality⁹; and

- in elderly patients requiring assistance, HbA_{1c} levels less than 7% had the highest risk of worsening function and HbA_{1c} levels of 8% to 9% had the lowest risk.¹⁰
- Macrovascular complications are more common than end-stage microvascular end points.^{2,11}

Implementation

New guidelines^{12,13} recommend less stringent targets (eg, 7.1% to 8.5%) in patients with shorter life expectancy, increased comorbidities, increased functional dependency, and high risk of hypoglycemia or other adverse events. In elderly patients with diabetes with HbA_{1c} of 7.0% or lower, reduction of diabetic medications for modest HbA_{1c} control addresses risk of hypoglycemia, polypharmacy, falls, functional decline, adverse cardiovascular outcomes, and mortality. First steps include reducing insulin or sulfonylureas to minimize hypoglycemia risk, or reducing thiazolidinediones to minimize heart failure or fracture risk. As targets and therapy are individualized, HbA_{1c} targets of 7% or lower as quality indicators should be reconsidered.

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