Decisions About Intensity of Glycemic Control Should Depend on Age and Functional Status

Reviewed by Michael Pignone, MD, MPH

STUDY

Huang ES, Zhang Q, Gandra N, Chin MH, Meltzer DO: The effect of comorbid illness and functional status on the expected benefits of intensive glucose control in older patients with type 2 diabetes: a decision analysis. *Ann Intern Med* 149:11–19, 2008

SUMMARY

Design. A decision analysis.

Subjects. Adults ages 60–80 years with diabetes.

Methods. The authors developed a simulation model to understand the magnitude of the potential benefits of intensive (target A1C < 7.0%) versus moderate (target A1C < 7.9%) glycemic control in older adults with diabetes (both new-onset and of different levels of duration) and a range of comorbid illnesses and functional limitations. The model parameters were drawn from available trials and cohort studies. Comorbidity and functional limitations were categorized using a previously validated framework and were used to model life expectancy. The potential benefits of intensive control were expressed in average quality-adjusted life-days gained. Diabetes-related complications (e.g., blindness, end-stage renal disease, amputation, and myocardial infarction) were assigned health values (utilities) based on previous studies. The model did not consider costs and did not account for decrements in quality of life or complications (e.g., hypoglycemia) from intensive treatment. Use of other cardiovascular risk-reducing therapies was considered, with the levels based on older survey data.

Results. The potential benefits of intensive glycemic control were relatively small (51–116 quality-adjusted life-days gained) and appeared to depend on age and the presence of functional disability. When life expectancy was < 5 years, intensive control produced little benefit, even under optimistic assumptions.

Conclusions. Decisions about intensive glycemic control in older adults should consider life expectancy, which can be assessed based on age and functional status. Older adults with limited life expectancy are unlikely to benefit from intensive control compared with moderate control.

COMMENTARY

The care of older adults with diabetes is challenging. The incidence of diabetes-related complications increases with age and duration of diabetes. However, the treatment-related adverse effects and competing causes of morbidity and mortality also become more common. Few trials have focused specifically on understanding the benefits and downsides of therapies in older adults. As a result, decisions about whether to implement interventions such as intensive glycemic control are often based on extrapolation from data collected mainly in middle-aged trial participants.

Achieving intensive glycemic control can be difficult and can require considerable resources and effort on the part of patients, providers, and health care systems. Therefore, the decision to pursue intensive control should depend on the magnitude of the potential net benefit.

Given the limited trial data, Huang et al. developed a simulation model to better understand the potential benefits of intensive glycemic control in older adults. They used available data from cohort studies and from the U.K. Prospective Diabetes Study[1] to examine the magnitude of benefits from intensive control for patients of different ages, durations of diabetes, and levels of functional ability. Not surprisingly, they found that the potential benefits of intensive control depended on life expectancy (derived from age and functional status)[2] and duration of diabetes. Those with limited life expectancy (< 5 years) would receive little benefit from intensive, compared to moderate, control. The potential benefits were larger for younger patients but did not differ greatly based on duration of diabetes.

The decision to express the model results in quality-adjusted life-days makes it difficult to know whether the potential benefits of intensive control make sense in patients with intermediate (5- to 10-year) life expectancies. Consideration of the costs of intensive (compared to moderate) glycemic control and calculation of a cost per quality-adjusted life-year gained would have helped clarify the yield of intensive

therapy and allowed comparison against other potential resource uses.

Several features of the model suggest that the estimates of potential benefit are optimistic and that the actual benefits may be smaller than described. First, the model assumes that intensive glycemic control reduces cardiovascular complications, which is controversial in light of the recent findings from the Action to Control Cardiovascular Risk in Diabetes study.[3] Assuming no cardiovascular reduction from better control reduced the potential benefits by > 50% across age-groups. Second, the model does not appear to account for treatment-related adverse effects (hypoglycemia) or the decrement in quality of life and increased patient time required to achieve intensive control. Third, the levels of use of other effective therapies were assumed to be low (e.g., 26% for ACE inhibitors) or were modeled indirectly (modeling of lipid levels from national survey data collected when statin use was less common). Assuming greater use of concurrent therapies would reduce the potential absolute benefits of intensive control.

Despite these limitations, the modeling work by Huang et al. represents an important advance in how we consider whether to aim for intensive glycemic control in older adults with type 2 diabetes. Further modeling, coupled with focused primary data collection and real-world testing of physicians' ability to use an age- and functional status–based life expectancy assessment, will help us better target intensive control to those most likely to benefit from it.

REFERENCES

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