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Goals of Glycemic Control in Frail Older Patients with Diabetes

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More than 40% of adults with diabetes in the United States are older than 65 years¹ and many of these older individuals are frail with functional deficits that limit their ability to live independently.² In 2004, an estimated 324,000 Americans with diabetes were living in nursing homes (NHs)³ and a similar number of frail older persons with diabetes who qualified for NH care lived in the community through formal and informal caregiver support.⁴ However, large randomized trials that examined the effect of glycemic control on outcomes generally have excluded frail older persons. The limited evidence base has led to considerable uncertainty regarding the appropriate level of glycemic control with different guidelines recommending different targets. For example, although guidelines generally agree on a target Hemoglobin A1c level of <7% for most adults, for frail older patients, the American Geriatrics Society recommends A1c <8%,⁵ the Veterans Affairs and Department of Defense recommends A1c 8–9%⁶ and the American Diabetes Association recommends “less stringent glycemic goals” but does not specify what those goals should be.⁷

The appropriate glycemic target for frail older patients is uncertain because the goals of glycemic control differ between frail older patients and healthier younger patients. For otherwise healthy younger adults, the primary goal of glycemic control has been appropriately focused on decreasing devastating vascular complications such as stroke and retinopathy. These complications are often the result of decades of poor glycemic control and studies suggest that approximately 8 years of tight glycemic control are necessary before decreases in vascular outcomes occur.⁵ However, most frail individuals over age 65 have many competing risks for mortality, which result in a life expectancy less than 8 years² and make vascular outcomes less important. For example, the median life expectancy of new NH residents is less than 2.5 years,⁸ suggesting that the overwhelming majority of NH residents are unlikely to benefit from the decreased rates of vascular complications from tight glycemic control.

In frail individuals, tight glycemic control often leads to substantial burdens, including dietary restriction, frequent finger sticks, insulin injections, polypharmacy and increased risk of hypoglycemia. Each of these burdens may lead to further complications. For example, dietary restriction may lead to poor oral intake and weight loss; finger sticks and insulin injections may lead to agitation in cognitively impaired older patients; and polypharmacy in patients with type 2 diabetes has been associated with decreased medication compliance and increased falls. Further, the goals of care for frail older patients often focus on quality of life and symptom management and many of the interventions required for tight control may not be consistent with those goals. Thus, for frail older patients, tight glycemic control imposes

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immediate, substantial burdens with little chance that they will survive long enough to benefit from the lower rates of vascular complications.

Although tight glycemic control is unlikely to benefit frail older patients through decreased rates of vascular complications, moderate glycemic control may provide other important benefits. These benefits include decreasing symptomatic hyperglycemia, improving cognition, and possibly decreasing incontinence.^{5, 9} The level of glycemic control necessary to obtain these benefits appears to be substantially higher than the level required to minimize vascular risk in otherwise healthy younger patients,⁵ suggesting that the most relevant benefits of glycemic control for frail older patients may be achieved with moderate control rather than tight control.

Furthermore, diabetes is associated with numerous geriatric syndromes common in all frail older persons, including functional decline, falls and depression.^{5, 9} It is unclear whether the increased risk of these geriatric syndromes results from poor glycemic control or is a complication of diabetes treatment. For example, falls may be worsened with poor glycemic control and worsening diabetic neuropathy.⁹ Conversely, falls may be worsened with tight glycemic control and episodes of hypoglycemia.¹⁰ Further research is needed to clarify whether falls and other common geriatric syndromes (such as depression, incontinence and functional decline) are associated with poor control or aggressive treatment so that clinicians can choose a treatment strategy that minimizes the risk of these geriatric syndromes.

The most appropriate glycemic target for an individual frail older patient depends on 2 factors: the degree of frailty and the outcomes that are most important for that patient. Older patients with diabetes span a broad spectrum in terms of their frailty and life expectancy. For healthier older persons with an extended life expectancy, a glycemic target similar to that for younger healthier patients may be most appropriate. For more frail older persons with a limited life expectancy, a less aggressive glycemic target would be more appropriate. For example, a 75-year-old patient with diabetes, no comorbidities and no functional deficits would likely be best served with an A1c target between 6.5 – 7.5%. Conversely, for a patient with major comorbidities, such as heart failure or cognitive impairment and a relatively short life expectancy, the most appropriate A1c target may be 8 – 9%. Thus, frailty and life expectancy can guide the initial determination of the most appropriate glycemic range for a given patient.

After considering overall frailty and life expectancy, it is also important to consider the outcomes of greatest importance to an individual patient. For example, a woman who is becoming more socially isolated because of urinary incontinence should have a glycemic target that minimizes incontinence while avoiding hypoglycemia. A man with a history of falls and diabetic neuropathy should have a glycemic target that minimizes the risk of recurrent falls. However, there is little evidence on the relationship between glycemic control and these outcomes in frail older persons. Until evidence becomes available, clinicians need to rely on an individual patient's previous history (e.g. was the patient's incontinence worse previously with poor glycemic control?) and data from the healthier patients studied in clinical trials to guide their glycemic targets. By considering individual older patient's frailty, life expectancy and specific outcomes most important to the patient, clinicians can provide patient-centered care that appropriately balances the burdens and benefits of glycemic control.

In otherwise healthy younger patients with diabetes mellitus, the goal of minimizing long-term vascular complications has appropriately been the primary factor in determining glycemic targets. For frail older patients, the goal of minimizing shorter-term geriatric syndromes and maximizing quality of life should be the primary factors in determining

glycemic targets. Research is required to determine the relationship between these shorter-term outcomes and glycemic control to support the development of evidence-based geriatric glycemic targets.

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