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Using Clinical Guidelines Designed for Older Adults With Diabetes Mellitus and Complex Health Status

Samuel C. Durso, MD

OLDER ADULTS WITH DIABETES mellitus exhibit striking functional and medical heterogeneity.¹⁻³ Some are physically and cognitively robust, while others are frail, have reduced functional ability, or have multiple comorbid illnesses. Those with diabetes may experience microvascular and macrovascular complications following years of metabolic derangement, while others with new-onset hyperglycemia may have few complications if any. In addition, older adults with diabetes are at increased risk for a number of geriatric syndromes or conditions (eg, cognitive impairment,^{4,5} depression,^{6,7} injurious falls,⁸⁻¹¹ polypharmacy,¹¹ urinary incontinence,^{12,13} and pain^{5,14}) that benefit from specific therapy or complicate the management of diabetes. This varied health status translates to a widely variable life expectancy.^{3,15-18}

Furthermore, older adults, like younger persons, express a variety of values and preferences for care that strongly impact their health care decisions. For some, maintaining functional independence and avoiding the financial, physical, and psychological burden of health care takes precedence over intense medical management and long-term preventive strategies.¹⁸⁻²⁰ Others prefer an aggressive approach to medical management and

Increasingly, adults are living to an advanced age. While many enjoy good health, nearly 50% of adults older than 65 years have 3 or more chronic medical conditions. Furthermore, within any age-sex cohort, older adults exhibit widely heterogeneous health status—ranging from robust to frail. This heterogeneity and individual medical complexity makes care for older patients particularly challenging and requires both careful medical judgment and a clear understanding of the patient's personal values and goals. Most current health care guidelines are disease-specific and do not address this complexity and heterogeneity, thus limiting their utility for guiding physicians in the care of older adult patients. The "Guidelines for Improving the Care of Older Persons With Diabetes Mellitus" are the first guidelines to specifically address this complexity and provide guidance to physicians who must prioritize therapies and goals for older adults with diabetes, comorbid medical conditions, and geriatric syndromes. By providing a rationale for prioritizing recommendations and the inclusion of geriatric syndromes that impact the patient's overall health and diabetic care, these guidelines may serve as a model for the development of other guidelines targeting older adults with complex health status.

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risk reduction. Therefore, the patient's general health status and goals of care provide important context that is critically important when prioritizing and balancing clinical recommendations for older adults with diabetes.

To be practical and patient-centered, clinical guidelines that address the needs of older adults with diabetes must address this complexity by going beyond recommending interventions that target disease-specific conditions. Ideally, they should provide guidance to clinicians for prioritizing medical treatments and preventive care by ranking these according to the impact the interventions are likely to have on the pa-

tient's overall health while explicitly acknowledging that patients' goals and preferences for health care may differ from guideline recommendations.

Although no guidelines achieve this ideal, the "Guidelines for Improving the Care of the Older Person with Diabe-

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tes Mellitus”¹¹ took an important step in this direction by providing a rationale for prioritizing and individualizing evidence-based clinical management of older adults with complex health status. In developing the guidelines, the California Health Care Foundation/American Geriatrics Society Panel focused on the heterogeneity of health status of the older adult diabetic population and asked (1) what are the major health threats to older diabetic patients and (2) how might physicians prioritize health care recommendations for patients at the extremes of health status and for those in between. The novelty of the guidelines lies in this holistic perspective and is at the crux of its utility when translating the recommendations into a patient-centered care plan.

For example, after considering the first question (what are the major health threats to older adults with diabetes) and examining the available evidence, the panel concluded that interventions that targeted cardiovascular risks were more likely to reduce morbidity and mortality than intensive management of hyperglycemia for most older adults with diabetes. Furthermore, the panel recommended including screening for and management of specific geriatric syndromes because of their increased prevalence and impact on the care of older adults with diabetes. Finally, the panel concluded that while high-functioning, motivated older adults with diabetes might benefit from most or all intensive therapies, it cautioned that frail older adults might experience increased burden or harm when attempting to manage complex regimens. Indeed significant language from the guidelines acknowledging this challenge of choosing between therapeutic and other care options has been cited and incorporated into subsequent care guidelines by the American Diabetes Association.²¹⁻²³

The panel recognized that many unanswered questions remain regarding how and when to prioritize interventions in individuals and how to stratify older adults according to their likelihood of risk

or benefit. Thus, while the guidelines provide general guidance for managing diabetes-associated risks and conditions in older adults within the extremes of health status, the guidance for applying these recommendations is necessarily general. When using the new guidelines, how should the physician proceed?

CASE PRESENTATIONS

Patient 1

A 75-year-old woman seeks primary care for diabetes, hypertension, elevated cholesterol, and painful osteoarthritis of her knees. She has had hypertension for 10 years, and 5 years ago she was discovered to have elevated fasting blood glucose levels without symptoms of hyperglycemia. She has no recognized microvascular or macrovascular disease and no symptoms related to hyperglycemia. Two years ago she was prescribed glyburide and began self-monitoring her blood glucose level. She has attended diabetic education classes and modified her diet and activity. She is a retired teacher and widow, lives in her own home, values her independence, and has little interest in therapies that would increase her medical costs or change her daily routine. Her medications include glyburide, atorvastatin, hydrochlorothiazide, acetaminophen, and aspirin. The review of her systems is positive for a recent fall and she is independent in her basic and instrumental activities of daily living. Her body mass index is 29 (calculated as weight in kilograms divided by the height in meters squared); her systolic blood pressure is 154 mm Hg and diastolic blood pressure is 76 mm Hg supine and is 132/70 mm Hg while standing without dizziness.²⁴ She has thoracic kyphosis, difficulty rising from a seated position, knee osteoarthritis, some difficulty transferring, and decreased sensation in her feet. Her cognitive function and mood are good. Her hemoglobin A_{1c} is 8.4%, fasting glucose level is 150 mg/dL (8.3 mmol/L), total cholesterol level is 200 mg/dL (5.2 mmol/L), low-density lipoprotein cholesterol level is 110 mg/dL (2.8 mmol/L), high-density lipoprotein cholesterol

level is 55 mg/dL (1.4 mmol/L), triglycerides level is 180 mg/dL (2.0 mmol/L), serum creatinine level is 1.2 mg/dL (106.1 μ mol/L), and urine microalbumin level is 50 mg/dL.

Patient 2

A 75-year-old woman has diabetes discovered 10 years ago when she was evaluated for dysuria and vaginitis. In addition, she has hypertension, hypercholesterolemia, and osteoporosis. Initially she adopted a diabetic diet and lost weight. Later, she required medication for control of hyperglycemia. She is a retired accountant and volunteers to help seniors with their finances. She walks 3.2 km daily and performs limited resistance exercise, maintains her target body mass index of 25, and takes the following medications reliably: insulin, lisinopril, atorvastatin, hydrochlorothiazide, aspirin, calcium and vitamin D supplements, and bisphosphonate therapy. She subscribes to a health newsletter and wants to optimize her chances for good long-term health. The review of her systems is negative. Her systolic blood pressure is 136 mm Hg and diastolic blood pressure is 84 mm Hg while sitting and is 130/80 mm Hg while standing. On funduscopic examination she has scattered hemorrhages and several microaneurysms. Sensory examination with a microfilament is mildly impaired but gait and balance are normal. Her creatinine level is 1.2 mg/dL (106.1 μ mol/L), fasting glucose level is 130 mg/dL (7.2 mmol/L), serum microalbumin level is 180 mg/dL, hemoglobin A_{1c} is 7.9%, total cholesterol level is 185 mg/dL (4.8 mmol/L), low-density lipoprotein cholesterol level is 110 mg/dL (2.8 mmol/L), high-density lipoprotein cholesterol level is 50 mg/dL (1.3 mmol/L), and triglycerides level is 120 mg/dL (1.4 mmol/L).

Patient 3

A 75-year-old woman with diabetes for 5 years has a history of myocardial infarction, New York Heart Association class III congestive heart failure, mild dementia, and urinary frequency and

incontinence. She is a former homemaker and is a widow who currently lives with her son. She is independent in her activities of daily living and makes her own health care decisions but requires assistance with finances, medications, and transportation. She takes lisinopril, furosemide, atorvastatin, glyburide, aspirin, and calcium and vitamin D supplements. She fears having another myocardial infarction. She also feels socially isolated because of her urinary symptoms and is afraid of losing her independence. She is frequently anxious, sleeps poorly, and is chronically constipated. Her systolic blood pressure is 148 mm Hg and diastolic blood pressure is 88 mm Hg while sitting and is 154/92 mm Hg while standing. Her body mass index is 30; she is euvolemic, has unsteady gait, and a generalized loss of muscular strength. Pelvic examination reveals a large amount of stool in the rectal vault. Funduscopic and sensory examination results are normal. Her Mini-Mental State Examination score is 23 of 30 items and her Geriatric Depression Scale score is 7 of 15 items (normal, 0-5). Her hemoglobin A_{1c} is 10%, total cholesterol level is 225 mg/dL (5.8 mmol/L), low-density lipoprotein cholesterol level is 130 mg/dL (3.4 mmol/L), triglycerides level is 250 mg/dL (2.8 mmol/L), high-density lipoprotein cholesterol level is 45 mg/dL (1.2 mmol/L), fasting glucose level is 170 mg/dL (9.4 mmol/L), serum creatinine level is 1.5 mg/dL (132.6 µmol/L), and serum microalbumin is 100 mg/L.

DISCUSSION

These 3 hypothetical patients illustrate the complexity of applying disease-specific clinical care guidelines to older adults with comorbid illnesses and geriatric syndromes. The 3 women are the same age and have diabetes but they differ significantly in their health and functional status and personal goals. Typically, guidelines that focus on a single disease or condition, such as diabetes or hyperlipidemia, fail to balance the risk attributable to the specific condition addressed in the guideline against

competing risks from common coexisting conditions.²⁵

Furthermore, disease-focused clinical care guidelines often fail to recognize explicitly the impact of prioritizing competing risks in light of the patient's personal health care goals. For instance, does the patient prefer to reduce risks of outcomes that are likely to affect independence in the short-term to risk reduction for conditions that are more likely to occur in the distant future? Is the patient more concerned with reducing the burden of medical care (eg, managing multiple medications, adhering to dietary restrictions) than with reducing risk of complications? Is the patient capable of managing complex medical and behavioral regimens and what impact will these regimens have on informal caregivers?

Attempting to manage all relevant illnesses or syndromes with equal vigor according to relevant clinical care guidelines may be impractical, harmful, and negatively impact the patient's quality of life. For some particularly frail individuals, fastidious management of multiple conditions may be unduly burdensome, costly, or lead to unwanted disease-drug or drug-drug interactions. As noted above, the "Guidelines for Improving the Care of the Older Person With Diabetes Mellitus" attempts to help clinicians develop a general framework for creating a patient-centered plan of care. How might one use the guidelines for the 3 hypothetical patients illustrated above?

Life Expectancy

After the clinician completes a thoughtful medical evaluation, a useful starting point is to assess life expectancy because this may help the physician to assess the probable benefits and risks of different therapeutic choices over the long-term. To accomplish this, it is useful to refer to the framework proposed by Walter and Covinsky¹⁵ for counseling older adults regarding the potential benefits and/or harms of cancer screening. They note that while the average life expectancy declines with advancing age, there is considerable varia-

tion in longevity for any given age-sex cohort after age 65 years. For example, on average 25% of women aged 75 years will be expected to live 17 years or longer, 50% will live approximately 12 years or longer, and 25% will live approximately 7 years or fewer.¹⁵

This variation in longevity reflects the range of frailty, disability, and comorbidity for women aged 75 years and that the average life expectancies may be somewhat lower among diabetic women.³ Walter and Covinsky suggest that while physicians cannot precisely determine a patient's life expectancy, they can make a reasonable determination based on the presence or absence of significant disability or illness and determine whether the patient is typical of patients in the upper or lower quartiles for average life expectancy or is more like the median for his/her age-sex cohort.^{15-17,26} For example, those with advanced stages of illnesses, such as congestive heart failure, chronic obstructive pulmonary disease, or renal failure, or those with significant impairments in their activities of daily living are likely to have a life expectancy that is in the lower quartile for their age-sex cohort. Those patients who perform physical activities robustly, such as walking several miles easily, and have an absence of severe medical illness would be typical of individuals in the upper quartile for their age-sex cohort. New prognostic tools using self-reported function and comorbid conditions will improve clinicians' ability to stratify older community-dwelling adults into varying risks of mortality.²⁷

Health Risks

A next step in translating the guidelines into recommendations for a patient is to determine the health risks of the patient. For older adults with diabetes, this includes macrovascular and microvascular disease but also common geriatric syndromes.

Data from randomized controlled trials provide the strongest support for intensive management of hypertension, lipid levels, and the use of aspirin for the prevention of cardiovascular morbidity and mortality. The panel

Box. Creating a Patient-Centered Care Plan for an Older Adult Using the “Guidelines for Improving the Care of the Older Persons With Diabetes Mellitus”

Estimate the patient's approximate life expectancy compared with the median for individuals of that age-sex cohort by considering the presence or absence of unusually good or poor health and function

Establish the patient's health care goals and preferences for treatment

Evaluate and manage geriatric syndromes consistent with the patient's goals and the impact that these may have on the management of other medical conditions

Help the patient to prioritize treatment options for diabetes mellitus and other medical conditions consistent with the patient's goals and treatment preferences and the magnitude and time to benefit in the context of the patient's overall health

Remember that for older adults with diabetes and an absence of significant medical illness or disability, intensive management of blood pressure and lipid levels and use of aspirin therapy have the greatest chance of benefit within 2 to 3 years

Consider intensive glycemic targets for older adults with a life expectancy of longer than 8 years and a low risk of hypoglycemia, and for those who have existing microvascular complications, who may benefit from intensive glycemic management in a shorter time frame

Frail older adults, those with a high burden of illness, difficulty adhering to therapy, significant risks from intensive management of macrovascular and microvascular risks, or a short life expectancy are more likely to benefit from symptom management and strategies to improve quality of life

noted that clinical trials demonstrate that the benefits of controlling blood pressure and lipid levels are realized in only 2 to 3 years. Glycemic control requires approximately 8 years to prevent microvascular complications such as retinopathy and renal disease in patients with new-onset diabetes, although possibly less if microvascular disease is present. The panel also noted that moderate glycemic control is associated with reduced symptoms of fatigue and polyuria, improved wound healing, and possibly improved cognitive function but available data suggest that improvement in “these shorter-term benefits [could probably] be achieved with less aggressive glycemic targets than those recommended in most of the national diabetes guidelines.”¹¹

In addition to considering the role of traditional components of diabetes care, the guidelines included recommendations for the screening and management of patients with multiple prescriptions, depression, cognitive impairment, urinary incontinence, injurious falls,

and pain. Not only are these conditions highly prevalent in older individuals with diabetes but their existence also may influence decisions regarding how to ideally manage glucose, blood pressure, and lipid levels. For example, the panel recommended screening for cognitive impairment during the initial evaluation period of 3 to 6 months or when significant declines in clinical status occur. It justified such screening because studies demonstrate that patients with type 2 diabetes are at increased risk for cognitive impairment, and the presence of diabetes may interfere with lifestyle modifications and medication adherence.

Patient Preferences

Finally, establishing the patient's preferences and goals for health care is an additional factor that must be considered when developing a diabetic care plan.²⁸⁻³⁰ Patients' health care goals and treatment preferences are highly variable and must be determined on an individual basis. For many older patients with diabetes, the predominant

goals are maintaining independence and activities of daily living, which are shaped by their experience and life circumstance.¹⁹ Furthermore, these same patients may view intensive therapy with insulin as particularly burdensome.²⁰ Patients also may disagree with physicians over the recommendations that are supported by the guidelines. In a study of patients with atrial fibrillation, of those who participated in decision making using a decision analysis tool, significantly fewer individuals chose anticoagulation than would have been recommended for treatment by the study guideline.³¹ Furthermore, conditions that are perceived to threaten independence may concern older patients more than conditions that risk mortality. In a quality of life survey of women aged 75 years or older who were at high risk of hip fracture, 80% would rather be dead than lose their independence and hip fracture was viewed as worse than similar measures of quality of life for breast cancer or myocardial infarction.³²

Based on these considerations, a clinician could take steps to translate the recommendations in the “Guidelines for Improving the Care of Older Persons With Diabetes Mellitus” into a patient-centered care plan for an older adult with diabetes (BOX). While there is no single correct way to manage the care of the 3 hypothetical patients presented above, the following approach illustrates an application of these steps derived from the guidelines.

Patient 1

Patient 1 lacks a major disability or an end-stage illness, yet she does not possess unusually robust function either, suggesting that her life expectancy is near the median for 75-year-old women or approximately 12 years. She has no symptoms of hyperglycemia and no evidence of retinopathy or nephropathy. However, she has evidence of sensory and autonomic neuropathy and lower extremity weakness, which threatens her balance. She learns that over 10 years, approximately 20% of diabetics will experience a myocardial infarction.

tion or death, and that the risk for blindness over that period is less than 5% and that the risk of end-stage renal disease is less than 2%.³³ Screening for geriatric syndromes reveals that she has at least a 10% or higher risk over the next 3 years for an injurious fall.³⁴ While she does not want to add medications or new health care practices, she is open to preventive strategies to improve her function and preserve her independence. Therefore, she is interested in an assessment of gait and balance, which may reduce her risk for an injurious fall by 14% to 27%.^{35,36} She plans to start taking calcium and vitamin D supplements and also will consider alendronate therapy if she is shown to have osteoporosis because it may reduce her risk of hip fracture by approximately 50% over 3 years.³⁷

Her physician acknowledges the value of intensive blood pressure control in patients with diabetes but worries that aggressive treatment might increase her risk of an injurious fall. The patient and physician agree to maintain her current level of blood pressure control and avoid worsening the postural blood pressure drop. The small absolute risk reduction in aggregate diabetic end points achieved with intensively controlling blood glucose level seems too small a benefit compared with the increased risk of hypoglycemia.^{38,39} The physician advises against tight glucose control and the patient agrees with this recommendation.

Considering these factors, the physician and patient agree to monitor her blood pressure carefully, continue her current lipid-lowering regimen, prescribe a gait and balance assessment, and screen for osteoporosis. Plans also are made for diabetic education. Finally, the patient will continue monitoring her blood glucose and try to maintain moderate glycemic control with a target hemoglobin A_{1c} of 8.0%.¹¹ Her physician will monitor the hemoglobin A_{1c} level every 6 months.

Patient 2

Patient 2 places a high value on maintaining her exceptional health. She ex-

hibits robust function and has no severe illness; therefore, she appears to be in the upper quartile of life expectancy of about 17 years. She is well versed in preventive health care and confirms her desire to maintain optimal control of her blood pressure, lipid levels, and glucose level as well as follow general prevention guidelines. Screening for the 6 geriatric syndromes is negative. She has questions about diet and self-management so arrangements are made for medical nutrition therapy counseling and a meeting with a diabetes educator. Given her better than average life expectancy, preferences, and motivation, she is a good candidate for intensive control of her blood pressure, lipid levels, and glucose level. While she understands that there are no data from clinical trials in older adults demonstrating that intensive glycemic control reduces microvascular complications, those with retinopathy might be more likely to benefit from intensive control than those without retinal disease.³⁹⁻⁴¹ Hypoglycemia is less of a concern to her. Therefore, she opts to intensify her medical regimen and achieve target average resting systolic and diastolic blood pressure below 130 mm Hg and 70 mm Hg, hemoglobin A_{1c} below 7%, and lipid levels consistent with the recommendations of the American Diabetes Association: high-density lipoprotein cholesterol level higher than 40 mg/dL (>1.0 mmol/L), triglycerides level lower than 150 mg/dL (<1.7 mmol/L), and low-density lipoprotein cholesterol level lower than 100 mg/dL (<2.6 mmol/L).^{11,42}

Patient 3

Patient 3 has both urgent and chronic medical needs that require staged management by an interdisciplinary team of clinicians. Her physician estimates her life expectancy to be less than 7 years. Although she and her son are concerned about her risk for a serious cardiovascular event, they agree that her overarching goal is to feel well and remain as independent as possible. A care plan will be predicated on these goals and continued patient and caregiver education.

A reasonable approach is to place first priority on the evaluation and management of depression and urinary incontinence. The aim is to improve her sense of well-being and function over the next 2 months. This will be critical to her participation in intensive gait and balance evaluation and therapy, which will be scheduled once the first 2 problems are improved. While her blood pressure control is not ideal, it does not pose an urgent risk. However, medication-induced hypotension and dizziness might increase her risk of an injurious fall. Dementia, heart disease, and diabetes contribute additional complexity to her care, although they are stable and do not require immediate evaluation or change in management. Management of any one of these problems requires care to avoid medication adverse effects (eg, anticholinergic drug effects) or other burden.^{43,44}

Appropriate laboratory evaluation is performed to assess renal function, electrolytes, and serum calcium, thyroid hormone level, and urinalysis to evaluate for reversible causes of urinary frequency and incontinence, constipation, and depression.

After laboratory tests confirm normal renal and thyroid function, serum calcium, and electrolytes, early steps in management include (1) relief of stool impaction and chronic constipation, which may improve urinary incontinence; (2) use of a selective serotonin-reuptake inhibitor (to minimize anticholinergic adverse effects) for treatment of depression; (3) careful adjustment of her antihypertensive medication to avoid postural hypotension and gradual lowering to a systolic and diastolic blood pressure target of below 140 mm Hg and 80 mm Hg over 3 months; and (4) moderate control of blood glucose to reduce symptoms of hyperglycemia. Follow-up over the next 6 to 8 weeks is scheduled to monitor response to therapy, adverse effects, and to reinforce education and goals. Once her immediate problems are improved, the physician will reassess her longer-term health goals for control of blood pressure, lipid levels, and glucose level. The

patient and her son are reassured that all of the problems that are important to them will continue to be monitored and addressed by the physician.

CONCLUSION

Medical decision making about patients with complex health status requires careful application of the best medical evidence combined with clinical judgment that is balanced by patient-specific information based on that individual's life circumstance and personal values. Physicians caring for older adults often confront this complexity and may turn to clinical care guidelines as a source that summarizes the best evidence and expert opinion for evaluation and management of conditions affecting their patients. Most clinical care guidelines for common conditions affecting older adults are disease-focused and do not provide guidance for prioritizing multiple medical conditions, including geriatric syndromes, that are common in older adults. Nor do most guidelines make explicit provision for addressing a patient's health care preferences when they differ from guideline recommendations. The "Guidelines for Improving the Care of the Older Person With Diabetes" recognize this complexity, prioritize important risks to older patients with diabetes, and provide guidance for application of its recommendations for patients at the extremes of health status. These recommendations should serve as a model for future guideline development. Clinicians also must be trained in complex decision making.

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