

Introduction

Diabetes and Aging



A critical need exists to more fully address geriatric conditions and related outcomes in diabetes. Currently, 30% of older adults meet the criteria for diabetes diagnosis,^{1,2} and a 4.5-fold increase in those aged 65 years and older with diabetes has been projected from 2005 to 2050.^{3,4} In this issue, we address the next frontier in treating diabetes by focusing on the following prevalent geriatric conditions and outcomes that disproportionately affect older adults with diabetes: obesity and body composition changes, polypharmacy, atherosclerotic cardiovascular disease, physical function limitations and disability, osteoarthritis, falling, depression, poor cognition, and obstructive sleep apnea. Professional groups, such as the American Geriatric Society (AGS), the American Diabetes Association (ADA), and the European Diabetes Working Party for Older People, have recently acknowledged the issues surrounding older adults with diabetes, and several have graded current evidence for diabetes management.^{5–7} However, the guidelines are often vague and discretionary.⁸ Evidence-based recommendations for treating clinically complex older adults with diabetes are lacking, particularly for those aged 80 years and older, which are the fastest growing segment of the population.^{9,10}

The epidemiology of traditional diabetes complications (eg, cardiovascular disease, neuropathy, etc.) is well-described⁵ and has been reviewed by the *Clinics in Geriatric Medicine* previously.¹¹ In 2008, the highest incidence rates for most diabetes complications were in those aged 75 years and older, followed by the 65 to 75-year-old group, and with lowest rates in those aged 35 to 64.¹² Incidence rates for end-stage renal disease in diabetes were similar among those aged 65 to 74 (319.7/100,000) and 75 years and older (317.7/100,000), but more than double the rate of those aged less than 45 years (151.1/100,000).¹² Furthermore, those aged 75 years and older were approximately twice as likely to visit the emergency department compared with younger age groups with diabetes.¹²

Risk factor control is essential for the prevention of diabetes complications. The proportion of United States adults with diabetes meeting the guidelines for control of risk factors such as glycemia, blood pressure, and lipid levels is between 33% and 49%.¹³ For diabetes management in older adults, three primary classifications of health status exist to guide treatment goals: (1) those that are relatively healthy; (2) those with complex medical histories where self-care may be difficult; and (3) those with significant comorbid illness and functional impairment.⁶ Recommendations have been made suggesting that older adults with diabetes and life expectancy of less than 2 to 3 years do not have risk reduction of macrovascular complications with management of blood pressure or lipid levels within guidelines and those with life expectancy of less than 5 or 8 years do not have risk reduction of complications or, specifically microvascular disease, respectively, with strict glycemic control.¹⁴ However, life expectancy is challenging to predict so many years in advance. The Health and Retirement Survey, a large, nationally representative sample of older adults in the United States, found that those with diabetes that are relatively healthy and even those with

self-management difficulty have 91% and 79% respective 5-year survival probabilities and likely would benefit from diabetes management.^{15,16} In fact, for all age groups and health status groups, survival probabilities were greater than 50% with the exception of those aged 76 years and older with either dementia, two or more activities of daily living impairments, or long-term residence in a nursing facility.^{15,16}

Despite the increased morbidity and mortality with diabetes that exist,⁵ great strides have been made in reducing traditional diabetes complications in recent decades. Trends show improvement in control of risk factors, such as glycemia, blood pressure, and lipid levels,^{13,17} particularly evident in older age groups, and decreased overall mortality rates,^{18,19} even though these are still elevated compared with adults without diabetes. These trends indicate the time has arrived to put a greater focus on geriatric conditions and outcomes in diabetes.

Treatment of diabetes in older adults requires special consideration given the high likelihood of multiple comorbid conditions and potential alterations in metabolism requiring dosage adjustments. In addition to disability in activities of daily living (see Table 1 in the article by de Rekeneire and colleagues elsewhere in this issue) and mobility limitation that are higher among older versus younger adults with diabetes,¹² many older adults have vision, hearing, or manual dexterity issues that may decrease their ability to follow complex dosage regimens or self-management plans. Older adults with diabetes take many medications²⁰ requiring vigilance for the individual with diabetes and their caregivers (see the article by Peron and colleagues elsewhere in this issue). Shared decision-making with the patient, the patient's family, and caregivers is also important. Providers' concern for overtreatment may result in undertreatment of diabetes and other risk factors for diabetes complications. Therefore, patient-centered, individualized medication regimens need to consider cognitive status, life expectancy, risk for hypoglycemia, and the presence of comorbid conditions or complications.

Current guidelines for diabetes treatment do stress the patient-centered approach;^{21,22} however, the scarcity of data from clinical trials in older adults limits an evidence-based approach to treatment. In addition, guidelines are disease-focused and provide little guidance on prioritization or coordination of treatment for those with multiple chronic conditions.^{23,24} Hypoglycemia is necessary to consider, whether recognized or unrecognized.²⁵ For example, hypoglycemia may increase the risk of falls and fall injuries (see the article by Vinik and colleagues elsewhere in this issue). Strategies such as less strict A1C goals and insulin analogue therapies may assist in improving overall glycemic control and in decreasing the risk of hypoglycemia.²⁵ Clearly, safe and effective treatment approaches are necessary to increase adherence, effectiveness, and promote prevention of diabetes-related conditions and outcomes in the growing cohort of older adults with diabetes.

The geriatric conditions and outcomes reviewed in this issue were selected because of the potential to incorporate evaluation, prevention, and treatment of these comorbidities into common clinical practice, with the goal of improving the health and quality of life for older adults with diabetes. Fracture is one example of a geriatric outcome that is now widely accepted to have a higher risk in diabetes.^{26–28} This evidence on higher fracture risk has resulted in current ADA recommendations to assess “fracture history and risk factors in older patients with diabetes and recommend BMD testing if appropriate for the patient's age and sex.”⁵ In addition to fracture, several current guidelines also note depression, cognitive impairment, obstructive sleep apnea, fatty liver disease, cancer, low testosterone in men, periodontal disease, hearing impairments, and falls as common comorbid conditions with a grade B rating, which is secondary to the strongest A rating for evidence based on “large well-designed clinical trials or well-done meta-analyses.”^{5,7,29} This issue on Diabetes and Aging addresses

several of these plus other common comorbidities that warrant similar initiatives and recommendations. As our population ages with a tremendous burden of diabetes, future directions may include improved and more specific recommendations by relevant professional organizations and well-designed studies to address remaining questions with strong clinical evidence.

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