Management of Diabetes in Older Adults: Heterogeneity and Goals of Care

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The management of type 2 diabetes mellitus in older individuals presents a specific challenge to clinicians because of the significant medical, cognitive, and functional heterogeneity that exists within the elderly population. Few diabetic guidelines have been designed to address the specific needs of older individuals, despite the observation that diabetes often negatively impinges on common geriatric syndromes. This article hopes to present a framework that physicians may use when treating older individuals with diabetes, highlighting the judicious use of evidence-based practice while remembering issues that are integral to the care of older individuals, such as functional status, quality of life, and patient preference.

Goals of Care

Many goals of care in elderly individuals with diabetes are similar to those in younger individuals, and include the control of hyperglycemia, the prevention of disease-related complications, and the preservation of health and function.[1] However, the benefits to be gained by the strict adherence to diabetic guidelines and evidence-based recommendations must be balanced with the potential for harm that can be created by unduly aggressive medical management in the frail elderly. Attention to frailty is important when considering management strategies since it implies an increased vulnerability to illness and iatrogenesis, a consequence of pre-existing medical and functional deficits accumulated with advancing age.

Because of the significant heterogeneity seen in the elderly diabetic population, no single treatment guideline can be used in all patients, and each patient should be evaluated and treated within the context of his or her own medical comorbidities, life expectancy, and functional goals.[2] Life expectancy can be difficult to assess, but it can be approximated by using tools that consider a patient's burden of medical comorbidities and functional status. Estimating life expectancy and evaluating quality of life are important in helping patients define their own treatment goals. Healthy patients with a longer life expectancy may value intense medical effort to prevent disease complications and prolong longevity, while frail, functionally dependent elderly may value a conservative strategy that controls symptoms and maximizes quality of life without providing optimal protection from adverse disease outcomes. For example, aggressive glycemic control precipitating hypoglycemia in a frail individual may lead to cognitive dysfunction from neuroglycopenia, producing symptoms of confusion and memory impairment. Likewise, hypotension as a result of overly aggressive blood pressure lowering could lead to orthostatic presyncope, falls, and mobility impairment.

Screening for Geriatric Syndromes

The care of older diabetic patients requires specific attention to common geriatric syndromes that can be exacerbated by medical comorbidity and medical treatment itself. Cognitive impairment, depression, falls, and urinary incontinence are all more common in older individuals with diabetes compared with the general elderly population.[1,3]

Cognitive impairment can lead to difficulties in diabetes self-management, potentially resulting in noncompliance or medication error.[4] Screening for cognitive impairment should be undertaken at the initial diabetes presentation, as well as at any stage of functional deterioration. Several validated standardized tools exist for cognitive screening, including the Folstein Mini-Mental State Examination (MMSE). If cognitive impairment is identified, caregivers should be provided with support and diabetic education so that care can be safely supervised.

Elderly individuals with diabetes are also at an increased risk for depression, which, if undetected, can impair function and quality of life.[5] Screening tools, such as the Yesavage short form Geriatric Depression Scale (GDS), can be helpful in identifying individuals with depression. The presence of vegetative symptoms in the form of sleep or appetite disruption can be used to support the diagnosis. Screening for depression should be undertaken at initial diabetes presentation, as well as at any stage of functional deterioration because of the often atypical presentation of depression in the elderly.[1]

Falls in the elderly are a significant harbinger of morbidity, mortality, and loss of independence. Older adults with diabetes are at an increased risk for falls because of diabetes-related factors including visual impairment from retinopathy, peripheral and autonomic neuropathies, and hypoglycemia.[6] Screening for falls should include a medication review to identify psychotropics and sedatives, inquiring about previous falls and performance of the timed Get-Up-and-Go test. Abnormalities on screening should prompt further evaluation and a determination of clinical interventions that may decrease the likelihood of falls and reduce fracture risk.[1]

Older female individuals with diabetes are at an increased risk for urinary incontinence because of a tendency for glycosuric polyuria, neurogenic bladder, and urinary tract infections (UTIs).[7] Attention to

factors that exacerbate incontinence, such as UTIs, constipation, or deleterious medication side effects, is important to mitigate the functional impairment caused by urinary incontinence.

Prevention of Vascular Complications

Many trials and systematic reviews performed in younger populations support good glycemic control and vascular risk factor reduction to prevent diabetic complications.[8] However, attempts to treat all potential risk factors with equal aggression may lead to complicated treatment regimens and polypharmacy, resulting in medication nonadherence and a decrement in quality of life.[9] Prioritizing medical intervention in the elderly diabetic population can be helped by the observation that 8 years are required before the benefits of glycemic control are realized in preventing microvascular disease, whereas only 2–3 years of blood pressure and lipid-lowering therapy are required to prevent macrovascular end points.[1] For this reason, diabetic guidelines directed at older individuals emphasize interventions that attenuate macrovascular risk factors, such as blood pressure control, lipid-lowering agents, and acetylsalicylic acid (ASA) therapy, rather than the pursuit of strict glycemic control.

Current recommendations instruct that all elderly individuals with diabetes should be offered ASA therapy of 81 mg/d if there are no contraindications.[1] Likewise, all patients with diabetes who continue to smoke should be counselled for smoking cessation.[1] Antihypertensive agents should be offered to individuals with hypertension, starting at low doses and titrating upward slowly to avoid hypotension and potentially resultant falls. Further, a guideline-based blood pressure goal of <130/80 mm Hg may be acceptable for healthy individuals, but it is likely too aggressive for the frail elderly; a target blood pressure of 140/90 mm Hg is more appropriate.[1,10] Because elderly individuals are at an increased risk of orthostatic hypotension, which may not be evident on routine sitting blood pressure measurement, postural vital signs should be taken when titrating antihypertensives.

Many classes of antihypertensive agents, such as diuretics, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers, beta-blockers (BBs), and calcium channel blockers (CCBs) have comparable efficacy in reducing cardiovascular end points.[10] Therefore, the choice of antihypertensive agent should be made by taking into account individual comorbidity that may be favourably or negatively impacted by drug-disease interactions. For example, patients with pre-existing renal dysfunction or diabetic proteinuria may derive a renoprotective benefit from angiotensin blockade, but they should be carefully monitored for worsening renal dysfunction and hyperkalemia. CCBs should not be used as first-line agents in patients with systolic heart failure as they have not been shown to improve mortality, as have ACE inhibitors and BBs.

Elderly patients with diabetes should be offered lipid-lowering agents, especially in the presence of other cardiovascular risk factors or overt dyslipidemia. Target lipid levels, extrapolated from younger populations, are a low-density lipoprotein level of ≤2.0 mmol/L and a total cholesterol/high-density lipoprotein ratio of <4.0.1 The use of statins has been shown to be relatively safe in the elderly,[11] but one should monitor for muscle complications as they can lead to pain and mobility restriction. The frequency of lipid checks in the elderly is unclear but could be considered every 1–2 years, and more often if therapy is being titrated.

Glycemic Control and Treatment Agents

Aggressive glycemic control is given a lesser emphasis in the elderly than in younger patients, especially in frail individuals where the risk of hypoglycemia with intensive therapy could outweigh the potential benefits. Therefore, while healthy independent individuals may be appropriately managed with a guideline-based glycosylated hemoglobin (A1C) target of ≤7.0%, a more liberal A1C target of 8.0% has been recommended in individuals who have a shortened life expectancy, a tendency to fall, or functional limitation.[1,3] This liberalization is of special importance given recent uncertainties about optimal A1C levels: a recent large clinical trial demonstrated that excessive A1C lowering was associated with increased hypoglycemia and mortality.[12] The frequency of A1C checks is unclear but should occur at least every 6 months and more frequently if therapy is being actively titrated.

After evaluating goals of care, the choice of diabetic treatment agent should be made by considering patient comorbidities as well as agent-specific side effect profiles.[3] Biguanides, including metformin, are relatively safe in the elderly because of a low risk for hypoglycemia. However, their use can be limited by gastrointestinal upset, especially in individuals that have a pre-existing nutritional risk. Further, because of the potential for lactic acidosis, metformin should be avoided in patients with a glomerular filtration rate (GFR) of <30 mL/min and used only with caution in individuals with a GFR of 30–50 mL/min.[3] Sulphonylureas are usually well tolerated but carry the definite risk of hypoglycemia and associated mortality. This risk is particularly increased in elderly individuals with poor nutritional intake or impaired renal or hepatic function. Thiazolidinediones are well tolerated and are not associated with hypoglycemia, but they are associated with fluid retention and an increased risk of congestive heart failure, which may limit their use in elderly individuals with cardiac comorbidity. Further, increasing evidence indicates that thiazolidinediones decrease bone density and increase fracture risk in women, a potentially significant limitation to their use in the elderly. The use of alpha-glucosidase inhibitors, such as acarbose, is commonly limited by significant gastrointestinal side effects and diarrhea.

Because insulin carries the highest risk of hypoglycemia of any diabetic therapy,[1,3] it is generally reserved for patients who are limited in their use of oral hypoglycemic agents because of comorbidities or side effects. The safe use of insulin requires intact cognition, vision, and dexterity to safely monitor blood glucose and draw up appropriate dosages. The use of once-daily, long-acting insulin or prefilled syringes may help simplify the use of insulin in the elderly, improving compliance and safety. The specifics of insulin therapy are beyond the scope of this article.

Conclusion

The care of older individuals with diabetes can be challenging and rewarding because of the many medical, functional, and psychosocial complexities that must be evaluated to adequately individualize care. Interventions that maximize quality of life often supersede the strict

adherence to evidence-based guidelines, and all interventions should be analyzed to ensure they are in keeping with the overall health status and goals of care of each patient.

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Case Review

Late Complication of Plombage Surgery

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Prior to the advent of effective chemotherapy for tuberculosis, collapse therapy was performed as a curative measure.[1] Complications as a result of this intervention can occur decades after the initial procedure.[1–8] We describe here a man who presented with late complications of a plombage performed 53 years earlier. Computed tomography (CT) of the thorax revealed air filled pockets within the plombe that is likely secondary to bronchopleural fistulization. The patient's symptoms resolved with multiple courses of antibiotics, possibly due to the closure of a fistula and the resultant resolution of infection.

Case Report

A 75-year-old male ex-smoker presented to the emergency department because of profound weakness, weight loss, and confusion. He had a history of tuberculosis, for which he was treated initially with para-aminosalicylic acid, rifampin, and streptomycin in the early 1950s. After spending 2 years in a sanatorium, responding poorly to chemotherapy, he underwent thoracoplasty with a partial resection of the left upper lobe, and plombage.

He described progressive shortness of breath and a cough productive of increasing amounts of nonpurulent sputum. His voice had become hoarse. He had lost about 13.5 kg over the previous 4 months. Samples of sputum and bronchoalveolar lavage material were sent for cytological examination, Gram stain and culture, Ziehl-Neelsen stain, and culture for acid-fast bacillus, which were all repeatedly negative, except for one positive culture for *Streptococcus constellatus*. The patient received a