

The Dakota Diabetes Coalition is proud to offer a regular column on diabetes and related concerns every other Friday.



Dr. Johnson is a family practice doctor in Grand Forks with a special interest in diabetes -- and a special knack for writing. As a member of the Dakota Diabetes Coalition, he has generously made himself available to answer questions through our listserv. If you have comments, or questions for Dr. Johnson to address in future columns, please contact gailhand@q.com

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Take a practical, primary care approach

Diabetes in Long-Term Care Facilities

Type 2 diabetes has reached epidemic world-wide proportions, afflicting 190 million people globally, with that number expected to exceed 300 million by 2025 (ref). In long-term care facilities, approximately 25% of residents have diabetes, most of them type 2.

Treatment goals for these residents should take a number of things into account: life expectancy, cognition, established complications, polypharmacy, and other co-morbidities. Guidelines exist for management of diabetes in this population, but they do not have strength of evidence behind them as do guidelines for younger diabetes populations.

Naturally, treatment has to be individualized for the patient, based on these factors and the wishes of the patient and family members. Of course, patients in long-term care facilities should be evaluated by the diabetes team on admission, which would ideally include a physician, diabetes educator, dietitian, nurse and others who can perform timely ancillary services, such as eye examination.

Glucose Management

Current recommendations of the American Diabetes Association for diagnosis of diabetes apply to the long-term care population, as shown below.

Criteria for Testing for Diabetes Mellitus in Asymptomatic, Undiagnosed Individuals

1. Testing for diabetes should be considered in all individuals at age 45 years and older, particularly in those with BMI \geq 25, and if normal, should be repeated at 3-year intervals.
2. Testing should be considered at a younger age or be carried out more frequently in individuals who are overweight (BMI \geq 25) and:
 - Have a first-degree relative with diabetes;
 - Are members of a high-risk population, African American, Latino American, Native American, Asian American, Pacific Islander;
 - Have delivered a baby weighing > 9 pounds or have been diagnosed with gestational diabetes mellitus;
 - Are hypertensive (BP > 140/90 mm Hg);
 - Have a plasma HDL cholesterol < 35 mg/dL and/or a plasma triglyceride value > 250 mg/dL;
 - On previous testing, had impaired glucose tolerance or impaired fasting glucose;
 - Have a history of vascular disease;
 - Have polycystic ovary disease; or
 - Are habitually inactive.

Many patients admitted to a long-term care facility with diabetes are diagnosed with diabetes by the time they are admitted. But certainly screening should be considered for those with symptoms or those who are at risk. Likewise, screening in individuals with other co-morbidities, such as recurrent infections, should be considered.

Many factors associated with aging can affect glucose metabolism in older adults, shown in Table 1.

Table 1. Factors Affecting Glucose Metabolism with Age

Increased insulin resistance
Beta cell dysfunction
Changes in body composition: increased adipose tissue and reduced muscle mass
Impaired mobility
Comorbid health conditions
Medications that impair insulin sensitivity, release, or action
Alterations in food intake, timing, and composition
Genetic and ethnic influences
Psychosocial factors and exogenous stress

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These factors make selecting medication more complicated. Use of metformin, commonly used to treat type 2 diabetes, needs to be treated with caution if the older patient shows declines in renal function. Metformin is generally not recommended in patients older than 80.

More considerations

Other factors to consider before prescribing metformin include gastrointestinal side effects, and whether the patient has an infection, hypoxic conditions, or congestive heart failure or at risk for developing it. Although hypoglycemia is uncommon with metformin, lactic acidosis is a potentially fatal complication that can occur with a patient with infection, hypoxia, or congestive heart failure, CHF.

Sulfonylureas, which are also oral hypoglycemic agents, are commonly used in the elderly, primarily due to their low cost. However, there can be limitations with these medications in this elderly whose changing metabolism causes declines in renal and hepatic function. Note that profound hypoglycemia can occur with these agents. Dangerously low hypoglycemia can be difficult to detect in people with dementia and cognitive impairment. So use sulfonylureas cautiously, and monitor elderly patients closely, particularly if they are decreasing oral intake or have other declines in status.

Thiazolidinediones (TZD's, glitazones) are insulin-sensitizing agents that can be effective in the long-term care facility patient. Hypoglycemia with these agents is exceedingly rare, particularly as monotherapy, and may have some minor benefit with regard to lipids and endothelial function -- although there may be some differences within this class. Fluid retention and edema are well-known side effects of these medications, and they should be used with caution in instances where patients have liver and/or renal insufficiency.

TZD's are contraindicated in the New York Heart Association Class III or IV heart failure, and should only be used with extreme caution in people at risk for CHF, particularly if they are on insulin.

Monotherapy a safe route

A newer class of medications, the DPP-IV inhibitors, are also oral agents which may show promise in the elderly. As with metformin and TZD's, hypoglycemia with monotherapy is very rare. The action of these medications is to inhibit the breakdown of native Glucagon-Like Peptide 1. This results in glucose-sensitive insulin secretion, increased satiety, relative weight-neutrality, and overall decrease in blood glucose levels and A1C.

Generally, these are well tolerated medications, and can be renally dosed. Currently, the only agent in this class on the market is Sitagliptin (Januvia). Issues such as CHF and edema are not known to be observed with these drugs, and they are taken once a day.

The major limitation to oral diabetes agents in the elderly long-term care population is that at least part of their respective mechanisms of action are predicated on adequate insulin secretion by the pancreas. Since many of these patients will have been diagnosed with diabetes for a number of years, it's likely that a good portion of them will have diminished beta cell function, which requires insulin replacement.

Good old insulin

Older human insulins (NPH, Regular) are less costly, but are limited by variability in serum stability, absorption, and potential hypoglycemia. Newer analogue insulins cost more but appear to have these issues to a lesser degree. Insulin, when used properly, has a high degree of safety, and can be used in virtually every patient with diabetes.

In type 2 patients, a single daily injection of a basal analogue (glargine or detemir) insulin as monotherapy can be a very safe and cost effective choice for diabetes management. Hypoglycemia rates are low with these products, as they are relatively 'peakless' insulins. In a patient with dementia, whose signs and symptoms of hypoglycemia are more difficult to discern, this could be a very good management strategy. Additionally, these insulins are available in pen injector devices, which can increase accuracy of dosing. Safety benefits from pen devices include the use of 'auto-cover' needles to reduce needlestick injury (and subsequent cost), and the removal of multi-dose vials.

More sophisticated regimens can be considered in more functional patients, such as the addition of a rapid acting analogue (aspart, lispro, glulisine) to a

basal insulin for the coverage of meals/snacks, or an analogue pre-mix (Novolog 70/30, Humalog 75/25, Humalog 50/50) which give some of the benefits of analogue insulins, such as predictable action and can be used conveniently as BID or TID dosing. Patients beginning or altering any insulin program will require close monitoring initially, but once patterns have been established, the frequency of monitoring can be decreased. If a change in status is noted such as illness or decreased oral intake, monitoring can easily be increased to match the needs of the patient and to adjust insulin dosing accordingly.

Diabetes management in the elderly, particularly in long-term care facilities, often requires modifications in treatment goals and should be based on awareness of various co-morbid diseases and the normal physiological changes that come with aging.

Knowing appropriate medication treatments for people in these settings can reduce adverse medication outcomes, and better overall treatment for elderly people with diabetes.

[Best Medications in Long Term Care, Dr. Johnson's Column #21, May 2, 2008](#)
