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## HIGHLIGHTS FROM MEDICAL GRAND ROUNDS

### DIABETES IN THE ELDERLY: STUDIES DISPEL COMMON MISCONCEPTIONS

**D**IABETES IN THE ELDERLY is common, often not diagnosed, and often not treated well. Some have suggested that diabetes is so prevalent in the elderly that nothing can be done to prevent it. Others argue that given the reduced life expectancy of the elderly, the development of diabetic complications is not a concern and that optimal management is not necessary. These and other misconceptions, some based on legitimate concerns and others based on lack of familiarity with the implications of recent findings, can inhibit effective care for older patients with diabetes. A rational approach to treatment will improve patients' quality of life and reduce long-term complications. Several new medications now provide more options for treatment.

#### COMMON MISCONCEPTIONS

**MISCONCEPTION:** Diabetes primarily affects the young and middle-aged.

**FACT:** The prevalence of diabetes rises substantially with age. As many as 20% of people older than age 65 may have diabetes, which may be undiagnosed in half of them.<sup>1</sup>

**MISCONCEPTION:** Glucose intolerance is an inevitable consequence of aging and therefore should not be treated.

**FACT:** Even though carbohydrate intolerance is common in the elderly, it is not normal. Average

blood sugar values do increase with age in the United States, as does the prevalence of diabetes. In aboriginal cultures, diabetes is much less common than in the United States. In one study, when Australian aborigines who had diabetes while living in cities (where they were relatively sedentary and consumed a Western diet high in calories and fats) returned to their ancestral homeland (where they were much more physically active and consumed fewer total calories, more complex carbohydrates, and less fat), their weight, fasting blood glucose, and postprandial blood glucose levels decreased markedly.<sup>2</sup>

**MISCONCEPTION:** The relatively short life expectancy in elderly people makes the long-term consequences of chronic hyperglycemia irrelevant.

**FACT:** Diabetes compromises survival, even when it develops in the eighth decade of life.<sup>3</sup> Mortality from acute complications of diabetes is clearly age-dependent: 3% in those under age 50, vs as high as 41% for those over age 80.<sup>4</sup> Older patients are also likely to develop complications much faster than younger patients. Although background retinopathy does not progress faster in older than in younger patients, vision-threatening retinopathy does, as do macroangiopathy, (coronary artery disease, peripheral vascular disease), neuropathy, and nephropathy.<sup>5</sup>

**MISCONCEPTION:** Treating elderly diabetic patients does not make any difference.

**FACT:** Good control does matter. In a small study in Japan, the rate of retinopathy was clearly related to level of hemoglobin A1c.<sup>6</sup> Recovery from stroke is reduced if the blood sugar level is high.<sup>7</sup>

Good control is also essential for quality of life. For example, poor control leads to frequent urination, falls (when the patient gets up at night to go to the bathroom), dehydration, and incontinence. Pain perception increases with blood sugar concentration.

■ Highlights from Medical Grand Rounds present take-home points from selected Cleveland Clinic Division of Medicine Grand Rounds lectures.

**TABLE**  
PROPOSED GUIDELINES FOR TREATING DIABETES IN ELDERLY PATIENTS

Initial fasting blood sugar level (mg/dL)	Start with	Add if needed*
120–140	Observation and diet (if postprandial blood sugar < 200 mg/dL) Or acarbose and diet (if postprandial blood sugar > 200 mg/dL)	Acarbose
140–200	Acarbose (if not obese)  Or sulfonylurea and diet (if obese)	Insulin or sulfonylurea or metformin  Acarbose or metformin
200–300	Insulin (if not obese)  Or sulfonylurea and diet (if obese)	Metformin or acarbose  Insulin or metformin or acarbose
> 300	Insulin (in hospital if symptomatic)	Metformin or acarbose

\*The goal of therapy in this age group is to reduce the fasting blood sugar level to less than 140 mg/dL, or the 2-hour postprandial blood sugar level to less than 200 mg/dL.

Patients often report that arthritic pain, for example, is much improved when they achieve near-normal glucose levels.

**MISCONCEPTION:** The risk of hypoglycemia outweighs the risk of hyperglycemia, especially in the older, nursing-home patient.

**FACT:** In one study, we found that even very frail, nursing-home residents could achieve good control without hypoglycemia.<sup>8</sup> In another study, the most important determinant of hypoglycemia was the magnitude of the fluctuation in blood sugar, not the blood sugar level itself or the hemoglobin A1c level.<sup>9</sup>

**MISCONCEPTION:** Most older patients with non-insulin-dependent diabetes are obese and need to lose weight.

**FACT:** This may not be true in older people, in whom weight loss is common. The problem of being underweight is much more pronounced in the nursing-home population. Twenty-one percent of patients in one study were clearly malnourished.<sup>8</sup>

**MISCONCEPTION:** Older patients are less capable than younger patients of monitoring their blood glucose levels.

**FACT:** We recently compared the ability of younger and older patients to test their blood glucose, and found very little difference between the

age groups. However, there was a great difference among the different monitors available, and some were simply not reliable.<sup>10</sup>

#### TREATING DIABETES IN THE ELDERLY

##### Individualizing treatment

In general, management of diabetes should be individualized according to clinical status, expectations, involvement in care, and goals of therapy. But overall, one can make estimates of what to do

on the basis of blood sugar levels (*Table*).

Intrinsic and extrinsic factors, poverty, ability to prepare food, socialization, and ability to chew all affect management and must be addressed. Dietary recommendations should be kept simple and realistic. If a patient has a reasonable body weight, I do not recommend any substantial changes in food habits. General concepts include more fiber, less fat, and, for patients with hypertension or congestive heart failure, low salt.

Physical activity should be encouraged, within reason. However, because many elderly patients have subclinical coronary artery disease, they need a complete medical evaluation, perhaps including stress testing, before attempting an exercise program. Any enjoyable exercise activity is fine, provided they start slowly.

Education should focus on specific issues, and it should have some reinforcement with it. One should follow up with phone calls, and make sure a family member is involved.

##### Using alternatives to sulfonylureas

Two new oral agents provide alternatives to the sulfonylureas. Acarbose, an alpha-glucosidase inhibitor, slows the breakdown of complex carbohydrates. It is an antihyperglycemic agent, not a hypoglycemic agent. The most common side effect, loose stool, may be beneficial in older patients who are prone to constipation.

Metformin, which decreases hepatic glucose production and promotes glucose uptake, has a considerable number of contraindications that limit its use in the elderly: renal failure, congestive heart failure, hypoxemia, and chronic obstructive pulmonary disease. However, if a patient is relatively healthy, one may consider using it in low doses (< 1.5 grams/day).

### Monitoring therapy

Daily blood glucose monitoring helps in titrating doses of insulin and avoiding hypoglycemic events. Hemoglobin A1c levels should be measured every 3 months. There is no place for urine glucose testing in any patient, and especially in the elderly, in whom the renal threshold for sugar is increased. We do, however, recommend urine ketone testing at home: if ketones appear, the patient should see a physician.

### REFERENCES

1. **Harris ML.** Epidemiology of diabetes mellitus among the elderly in the United States. *Clin Geriatr Med* 1990; **6**:703-719.
2. **O'Dea K.** Marked improvement in carbohydrate and lipid metabolism in diabetic Australian aborigines after temporary reversion to traditional life-style. *Diabetes* 1984; **33**:586-603.
3. **Panzram G, Zabel-Langhennig R.** Prognosis of diabetes mellitus in a geographically defined population. *Diabetologia* 1981; **20**:587-591.
4. **Carroll P, Matz R.** Uncontrolled diabetes mellitus in adults: experience in treatment of diabetic ketoacidosis and hyperosmolar nonketotic coma with low-dose insulin and uniform treatment regimen. *Diabetes Care* 1983; **6**:579-585.
5. **Knuiman MW, Welborn TA, McCann VJ, Stanton KG, Constable IJ.** Prevalence of diabetic complications in relation to risk factors. *Diabetes* 1986; **35**:1332-1339.
6. **Morisaki N, Watanabe S, Kabayashi J, et al.** Diabetic control and progression of retinopathy in elderly patients: five-year follow-up study. *J Am Geriatr Soc* 1994; **42**:142-145.
7. **Pulsinelli WA, Levy DE, Sigsbee B, Scherer P, Plum F.** Increased damage after ischemic stroke in patients with or without established diabetes mellitus. *Am J Med* 1983; **74**:540-544.
8. **Mooradian AD, Osterweil D, Petrasak D, Morley JE.** Diabetes mellitus in elderly nursing home patients. A survey of clinical

There is no evidence that intensive therapy will prolong life, but prolonging life is not the only goal in geriatrics. More important is quality of life: patients feel much better when their blood sugar is under control. Whether achieving euglycemia makes additional improvement in quality of life is not known. The Diabetes Complications and Control Trial (DCCT) showed that small reductions in hemoglobin A1c made a big impact on preventing complications, but additional reductions in hemoglobin A1c brought only modest additional gain in quality of life, and the risk of hypoglycemia increased.<sup>11</sup> A reasonable hemoglobin A1c goal is 8% or less.

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9. **Cox DJ, Kovatchev BP, Julian DM, et al.** Frequency of severe hypoglycemia in insulin-dependent diabetes mellitus can be predicted from self-monitoring blood glucose data. *J Clin Endocrinol Metab* 1994; **79**:1659-1662.
10. **Bernbaum M, Albert SG, McGinnis J, Brusca S, Mooradian AD.** The reliability of self blood glucose monitoring in elderly diabetic patients. *J Am Geriatr Soc* 1994; **42**:779-781.
11. **The DCCT Research Group.** The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993; **329**:977-986.

### SUGGESTED READING

- Coniff RF, Shapiro JA, Seaton TB.** Long-term efficacy and safety of acarbose in the treatment of obese subjects with non-insulin-dependent diabetes mellitus. *Arch Intern Med* 1994; **154**:2442-2448.
- Motley JE, Mooradian AD, Rosenthal MJ, Kaisal FE.** Diabetes in elderly patients: Is it different? *Am J Med* 1987; **83**:533-544.
- Reed RL, Mooradian AD.** Treatment of diabetes in the elderly. *Am Fam Pract* 1991; **44**:915-924.