Diabetes:
On the Case

Doug Klein, MD, CCFP, MSc
Presented at the Web Conference Program, September 2004

Diabetes is a common chronic disease in Canada. Data from the National Diabetes Surveillance Strategy indicate that 4.8% of the Canadian adult population has diagnosed diabetes.[1] Most of these patients are managed by their family physicians. Given the time constraints of a typical family practice, the complex management of diabetes can be challenging. The implementation of current guidelines must be undertaken in the context of the individual patient's circumstances.

CASE #1

- Matthew is a 35-year-old, Aboriginal male
- Sendentary lifestyle—body mass index: 35
- No known medical problems

What are Matthew's risk factors for diabetes?

Matthew has several risk factors for diabetes:

- His weight, inactivity and his racial background put him at high risk for diabetes.
- Many members of his family have been diagnosed with diabetes, including his mother and two sisters. A list of risk factors is listed in Table 1.[2]

How would you screen Matthew for diabetes?

The first initial step would be a fasting sugar, which subsequently was 6.2 µmol/L. The diagnosis of pre-diabetes and his strong family history, in addition to his habitus, puts him at high risk for insulin resistance. According to the 2003 diabetes guidelines, this man should receive an oral glucose tolerance test (OGTT).[2]

Several authors have debated the recommendation for extensive use of OGTT in diagnosing diabetes (everyone with a fasting sugar greater than 5.7 µmol/L plus one risk factor).[3] In this case, the OGTT came back at 9.0 µmol/L, or impaired glucose tolerance. Individuals with pre-diabetes are not at risk for the microvascular complications of diabetes, but are at risk for cardiovascular disease and the eventual diagnosis of diabetes.

CASE #2

- Sandra, 58, presents with questions about diabetes mellitus (DM)
- She has a strong family history of DM

What do you tell Sandra when she presents with questions about DM?
What is the evidence for pharmacologic pre-intervention?

Evidence is mounting on the possibility of preventing diabetes. Several studies have been conducted to test the effectiveness of lifestyle or medication management of preventing diabetes.

- In the Finnish diabetes prevention study, lifestyle modification, including diet/weight loss (target 5% weight loss) and exercise (30 minutes/day) resulted in a 58% relative risk reduction among overweight adults with impaired glucose tolerance.[4]
- In the Diabetes Prevention Program, treatment with metformin resulted in a 30% relative risk reduction for patients with impaired glucose tolerance.[5]
- New trials testing the efficacy of thiazolidinediones (TZDs) in preventing diabetes are expected in the near future.

Table 1

Type 2 diabetes risk factors[2]

- First-degree relative with diabetes
- Member of high-risk population (*e.g.*, people of Aboriginal, Hispanic, Asian, South Asian or African descent)
- History of impaired glucose tolerance or impaired fasting glucose
- Presence of complications of diabetes
- Vascular disease
- History of gestation diabetes mellitus
- History of delivery of a macrosomic infant
- Hypertension
- Dyslipidemia
- Overweight
- Abdominal obesity
- Polycystic ovary syndrome
- Acanthosis nigricans
- Schizophrenia

CASE #3

- Paul, 68, presents with fatigue
- At check-up, you order screening b/w
- Fasting blood sugar (FBS): 8.1 µmol/L
- A1C: 7.9%

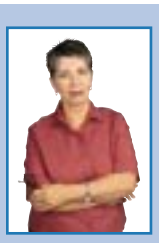
What would you do with Paul?

All individuals newly diagnosed with diabetes should be referred for a retinal exam, screening for retinopathy. The 2003 guidelines state this should be done by an experienced professional (regardless of professional designation).[2] Physical examination should check for evidence of hypertension, cerebrovascular disease, cardiac disease and peripherial vascular disease. This man should also be screened for evidence of other microvascular complications, including nephropathy and neuropathy. Other laboratory investigations would include a fasting cholesterol profile and a thyroid-stimulating hormone, as well as baseline alanine aminotransferase and creatinine kinase.

Dr. Klein is an Assistant Professor, Department of Family Medicine, and an Assistant Director, Continuous Professional Learning, University of Alberta, Edmonton, Alberta.

Management of Paul's diabetes should include an initial trial of lifestyle modification. If this is insufficient, monotherapy using an oral antihyperglycemic or insulin would be appropriate. In this thin gentleman, metformin may be less successful than for overweight patients due to less insulin resistance.

CASE #4



- Brenda, 52, was diagnosed with diabetes six months ago
- A trial of lifestyle was initiated
- FBS: 10.1 µmol/L
- A1C: 9.5%
- Blood pressure: 150/95 mmHg
- Total cholesterol: 6.92 mmol/L
- Triglyceride: 1.68 mmol/L
- Cholesterol: 1.76 mmol/L
- Low-density lipoprotein cholesterol: 4.40 mmol/L

FBS: Fasting blood sugar

What do you recommend for Brenda's sugars?

Individuals with a hemoglobin A1C > 9% should be initiated on two medications from different classes.[2] These medications could be metromin plus a sulfonurea or a TZD. A recent review has supported the use of TZDs in combination with metformin.[6] Other medical conditions may influence the decision.

What other medications should Brenda be taking?

With her elevated blood pressure, Brenda should be on an angiotensin-converting enzyme inhibitor with a goal of therapy of blood pressure less than 130/85 mmHg. Her high cholesterol should be treated with a low-dose aspirin (81 mg/daily) and a statin cholesterol medication.

How often should Brenda's sugars be tested?

Many patients ask their physician this exact question. The ideal answer is four times per day. For patients with Type 2 diabetes, I recommend testing before meals and before bedtime. Once these sugars are in good control, testing after meals may reveal postprandial hyperglycemia. For several patients, the idea of checking one's sugar four times per day is neither realistic nor appropriate. Two possible options include rotating checking times each day (one day at breakfast and supper and the next day at lunch and bedtime) or checking four times per day, twice a week.

cme

References

1. Health Canada: Diabetes in Canada. 2nd ed. Ottawa, ON: Centre for Chronic Disease Prevention and Control, Population and Public Health Branch, Health Canada; 2002. Available at: http://www.hs-sc.gc.ca/pphb-dgsp-sp/publicat/dic-dat2/english/01cover_e.html. Accessed November 7, 2003.
2. Canadian Diabetes Association Clinical Practice Guideline Expert Committee. Canadian Diabetes Association 2003 Clinical Practice Guideline for the Prevention and Management of Diabetes in Canada. Canadian Journal of Diabetes 2003;27(Suppl 2):S1-152.
3. Lyon AW, Larsen ET, Edwards AL: The impact of new guidelines for glucose tolerance testing on clinical practice and laboratory services. CMAJ Canadian Medical Association Journal 2004; 171(9):1067-9.
4. Tuomilehto J, Lindstorm J, Eriksson JG, et al. Prevention of Type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. New England Journal of Medicine 2001; 344(18):1343-50.
5. Knowler WC, Barrett-Conner E, Fowler SE, et al: Reduction in the incidence of Type 2 diabetes with lifestyle intervention or metformin. New England Journal of Medicine 2002; 346:393-403.
6. Noble J, Baerlocher MO, Silverberg J: Management of Type 2 diabetes mellitus: Role of thiazolidinediones. Canadian Family Physician. 2005; 51:683-87.