

HOSPITAL PHYSICIAN®

FAMILY MEDICINE BOARD REVIEW MANUAL

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The *Hospital Physician Family Medicine Board Review Manual* is a study guide for residents and practicing physicians preparing for board examinations in family medicine. Each manual reviews a topic essential to current practice in the specialty of family medicine.

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Type 2 Diabetes Mellitus

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Type 2 Diabetes Mellitus

Tsveti Markova, MD, FAAFP, and Faraz Pasha, MD

INTRODUCTION

Based on data from the 1999–2002 National Health and Nutrition Examination Survey (NHANES), 9.3% of persons aged 20 years or older (19.3 million, 2002 US population) had diagnosed or undiagnosed diabetes mellitus (DM).¹ For individuals born in the United States in 2000, the estimated lifetime risk of developing DM is 33% for men and 39% for women.² Current estimates indicate that type 2 DM accounts for 90% to 95% of all diagnosed cases of DM.³

DM was the sixth leading cause of death in the United States in 2002.² The complications of DM—including heart disease, hypertension, stroke, blindness, renal disease, and peripheral neuropathy—contribute significantly to the morbidity and mortality associated with the disease. The risk of death is roughly double in people with DM versus those without DM.³ The economic impact also is enormous, with total (direct and indirect) costs estimated at \$132 billion in 2002.⁴ In response to the clinical and economic burden of DM, national guidelines call for strategies to prevent DM whenever possible and to intervene aggressively with treatment for those who develop the disease.


Type 2 DM is a disease of complex pathogenesis. Genetics clearly play a role; there is 90% concordance in identical twins.⁵ Despite a multifactorial pathogenesis, all forms of type 2 DM are defined by fasting and/or postprandial hyperglycemia caused by 2 definable defects: subnormal response to insulin (insulin resistance) in key sites of glucose homeostasis and an insulin secretory defect preventing otherwise compensatory insulin hypersecretion. In addition, there is evolving evidence that environmental factors (obesity, physical inactivity, dietary fat consumption) affect insulin resistance and that gut-derived peptides (incretins) and adipocyte-derived cytokines (adipokines) influence insulin secretion and action. In prediabetes, impaired insulin action in muscle, adipose tissue, and the liver is offset by compensatory insulin hypersecretion. Over time, insulin hypersecretion, oxidative stress to the beta cell, and/or glucolipotoxicity may lead to beta cell exhaustion and, ultimately, failure. As beta cell function declines, normal

glucose tolerance declines as well, resulting in impaired glucose tolerance (IGT) and, eventually, type 2 DM.

The natural history of type 2 DM has been mapped on a population basis and in susceptible families to the extent that subtle early defects and phenotypes at risk for type 2 DM can be defined, making it possible to identify high-risk individuals who should be targeted for intervention. This manual uses 2 case examples to examine the rationale for early, aggressive action on behalf of patients at risk for DM and its complications.

APPROACH TO THE PATIENT WITH PREDIABETES

CASE 1 PRESENTATION

 A 58-year-old African-American woman presents to a new family physician for a routine check-up. Her last visit to a physician was 8 years ago and was unremarkable.

The patient has no significant past medical or surgical history, is taking no medications, and has no known allergies. She is gravida 1, para 1 and has been postmenopausal for 6 years. Review of systems is negative. Family history is significant for hypertension in both parents and for type 2 DM in the father. The patient is a secretary and does not get regular exercise. She denies smoking or alcohol or drug use. The patient is a widow who lives alone; she has 1 adult son, who is healthy.

The patient is obese, with a body mass index (BMI) of 31 kg/m². Blood pressure is 132/90 mm Hg, and heart rate is 72 bpm; cardiovascular examination is normal. The remainder of the physical examination is unremarkable.

- Should this patient be screened for type 2 DM?

SCREENING FOR DIABETES

Table 1 summarizes current DM screening recommendations from the American Diabetes Association (ADA)⁶ and the U.S. Preventive Services Task Force (USPSTF).⁷ Based on consensus opinion, the ADA recommends screening to detect prediabetes and DM in the following groups: (1) individuals aged 45 years