OBSERVATIONS

Delay in Diagnosis of Diabetes Is Not the Patient's Fault

Previous reports have suggested that onset of diabetes occurs 4–7 years before clinical diagnosis (1). However, it is not known whether delay in diagnosis reflects patient factors, such as lack of medical visits or glucose measurements, or provider factors, such as clinical inertia (2).

We reviewed the charts of 50 patients selected for delayed diagnosis at the Atlanta Veterans Affairs (VA) Medical Center. Date of first diabetes range hyperglycemia (D1) was defined by outpatient fasting plasma glucose (0630–1000 h) ≥126 mg/dl, random glucose (1001–1800 h) ≥200 mg/dl, 2-h post–oral glucose tolerance test (OGTT) glucose ≥200 mg/dl, or A1C ≥6.5%. Date of second diabetes range hyperglycemia (D2) was defined by having any two of these values or any value twice. The date of diagnosis was defined by initial use of ICD-9 code 250.xx at a primary care visit, any use of the code twice, and/or initial prescription of a diabetes drug—criteria establishing the disease (3). Inpatient values were excluded to avoid confounding by stress hyperglycemia.

The patients were all men, with average age 66 ± 10 years (mean ± SD). The delay between initial hyperglycemia (D1) and the diagnosis date averaged 3.7 ± 1.1 years, and the delay after D2 averaged 1.8 ± 1.7 years. During the delay from D2 to diagnosis (four patients had no D2), patients averaged 9 ± 11 outpatient plasma glucose and 2 ± 2 A1C measurements; for each patient 46% of the fasting plasma glucose values were >125 mg/dl, 20% of the random glucose values were ≥200 mg/dl, and 62% of the A1C values were ≥6.5%. During the delay after D2, patients averaged 8 ± 8 outpatient visits, of which 5 ± 4 were to primary care. Patients were seen by a wide range of various primary care physicians, nurse specialists, and physician assistants. In 60% of cases, the primary care provider's note mentioned hyperglycemia without a diagnosis or follow-up plan, and often subsequent notes would not mention glucose again despite continued elevations; 46% of patients had glucose levels >125 mg/dl entered into the note without mention of hyperglycemia. Only two patients had OGTTs (both with normal fasting but elevated 2-h glucose levels). Only five patients (10%) were recorded as missing scheduled appointments, and there was no documentation of patients missing blood tests.

Our review reveals that delay in diagnosis of diabetes cannot be attributed to patient nonadherence as a result of missing appointments or blood tests. To the contrary, there were multiple opportunities when a diagnosis could have been but was not made, suggesting provider factors (clinical inertia) as the cause of delay.

This review included only 50 male Atlanta VA Medical Center patients and therefore may have limited generalizability. However, the findings suggest that practitioners need to improve their response to glycemic indexes that indicate that diabetes is likely, particularly random plasma glucose ≥125 mg/dl (4) and A1C ≥6.5% (5). Although OGTTs were rare, abnormal results were followed quickly by a diagnosis, implying that elevated glucose levels may also be more likely to prompt diagnosis if tests are ordered for screening rather than routine chemistry. Further analysis of the basis for the delay in diagnosis may lead to better approaches to aid recognition of diabetes early in its natural history.

Lisa-Ann Fraser, md[1]
Jennifer Twombly, md, phd[2]
Ming Zhu, ms[3]
Qi Long, phd[3]
John J. Hanfelt, phd[3]
K.M. Venkat Narayan, md, mph[4,5]
Peter W.F. Wilson, md[6,7]
Lawrence S. Phillips, md[2,7]

From the [1]Division of Endocrinology and Metabolism, Department of Medicine, University of Western Ontario, London, Ontario, Canada; the [2]Division of Endocrinology and Metabolism, Emory University School of Medicine, Atlanta, Georgia; the [3]Department of Biostatistics and Bioinformatics, Rollins School of Public Health, Emory University, Atlanta, Georgia; the [4]Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, Georgia; the [5]Department of Medicine, Emory University School of Medicine, Atlanta, Georgia; the [6]Division of Cardiology, Emory University School of Medicine, Atlanta, Georgia; and the [7]Veterans Administration Medical Center, Decatur, Georgia.
Corresponding author: Lawrence S. Phillips, medlsp@emory.edu.

●●●●●●●●●●●●●●●●●●●●●●●

References

1. Harris MI, Klein R, Welborn TA, Knuiman MW. Onset of NIDDM occurs at least 4–7 yr before clinical diagnosis. Diabetes Care 1992;15:815–819
2. Phillips LS, Branch WT, Cook CB, Doyle JP, El-Kebbi IM, Gallina DL, Miller CD, Ziemer DC, Barnes CS. Clinical inertia. Ann Int Med 2001;135:825–834
3. Miller DR, Safford MM, Pogach LM. Who has diabetes? Best estimates of diabetes prevalence in the Department of Veterans Affairs based on computerized patient data. Diabetes Care 2004;27(Suppl. 2):B10–B21
4. Ziemer DC, Kolm P, Foster JK, Weintraub WS, Vaccarino V, Rhee MK, Varughese RM, Tsui CW, Koch DD, Twombly JG, Narayan KM, Phillips LS. Random plasma glucose in serendipitous screening for glucose intolerance: screening for impaired glucose tolerance study 2. J Gen Intern Med 2008;23:528–535
5. International Expert Committee. International expert committee report on the role of the A1c assay in the diagnosis of diabetes. Diabetes Care 2009;32:1327–1334