

Physicians' Practices in Screening for the Development of Diabetic Nephropathy and the Use of Glycosylated Hemoglobin Levels

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OBJECTIVE — To compare outpatient screening of diabetic patients for nephropathy and measurement of glycosylated hemoglobin (GHb) levels to published American Diabetes Association (ADA) guidelines.

RESEARCH DESIGN AND METHODS — We reviewed charts from 157 diabetic patients followed for 27 months at the University of Washington's primary care clinics. The number of screening urinalyses, 24-h urine measurements, and GHb measurements were obtained. From these values, the frequency of screening tests, normalized by patient-year, could be compared with the ADA guidelines.

RESULTS — Forty-two percent of the patients received at least one urinalysis, and 5% had 24-h urine measurements. There were 0.48 urinalyses and 0.05 24-h urine measurements per patient-year. Of 14 type I diabetes patients, 5 had a urinalysis and 1 received a 24-h urine measurement. At least one GHb was measured for 85% of patients, and there were 1.66 GHb measurements per patient-year. Only 29% of patients received GHb concentrations as recommended by ADA guidelines.

CONCLUSIONS — Diabetic patients at this institution are not screened for nephropathy and do not receive GHb measurements according to the ADA guidelines. Because of recent advancements in the treatment of diabetic nephropathy and the results of the Diabetes Control and Complications Trial (DCCT), further efforts are needed for educating primary care physicians about standards of care for patients with diabetes.

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Received for publication 20 July 1993 and accepted in revised form 7 July 1994.

ADA, American Diabetes Association; GHb, glycosylated hemoglobin; IMC, internal medicine clinic; FMC, family medicine center.

The American Diabetes Association (ADA) guidelines recommend an annual urinalysis to detect overt proteinuria and a measurement of urine protein for all type II diabetic patients and for type I diabetic patients beginning 5 years after the onset of diabetes or after puberty (1). There are a variety of acceptable methods to quantitate urinary albumin excretion (2–4), although the 24-h urine collections appear to be the most sensitive (4).

The ADA also recommends the measurement of glycosylated hemoglobin (GHb) levels semiannually for type II diabetic patients who are not receiving insulin but who have good control and quarterly for all other patients (1). The use of routine GHb measurements during the past 10–15 years has been an important addition for the management of diabetes.

Because the vast majority of diabetic patients in the U.S. receive their medical care from primary care physicians, there has been recent interest in assessing physician practice behaviors and attitudes for managing patients with diabetes (5, 6). This study was designed to compare the current screening practices of diabetic nephropathy by primary care physicians at the University of Washington to the ADA guidelines.

RESEARCH DESIGN AND METHODS

A retrospective chart review of diabetic patients followed at the University of Washington primary care clinics from 1 January 1990 to 1 April 1992 was performed. Internal medicine clinic (IMC) diabetic patients were identified by reviewing all patient charts for this time period and selecting those identified as having diabetes from the progress notes. Charts of 758 patients were reviewed, and 84 patients with diabetes were found. Only general internists saw patients in the IMC. Diabetic patients followed at the family medicine center (FMC) were obtained from a computerized record system. In these 27 months, 8,179 patients were seen in the FMC, and

Table 1—Characteristics of patients followed by primary care physicians

Population	n	Age (years)	Duration diabetes (years)	Duration in study (months)	% Men	% Type II	% GHb
Total	157	58.7 ± 14.4	7.7 ± 7.9	15.9 ± 8.5	37	91	11.2 ± 3.3
IMC	65	61 ± 13.8	8.9 ± 8.0	15.6 ± 8.7	40	95	10.2 ± 3.1
FMC	92	57.0 ± 14.5	6.9 ± 7.8	16.9 ± 7.8	35	85	11.5 ± 3.4

Data are means ± SD. Nondiabetic range for GHb is 5.0–7.0%.

143 patients had a diagnosis of diabetes recorded in the computer. A total of 70 patients (IMC and FMC) were excluded for the following reasons: unable to locate chart (15 patients), did not actually have diabetes (computerized as “rule-out diabetes mellitus”) (14 patients), received their diabetes care elsewhere (14 patients), insufficient data in the chart (8 patients), had “borderline diabetes” (9 patients), had gestational diabetes (7 patients), had cystic fibrosis (2 patients), and had chronic renal failure (1 patient).

Charts were reviewed for demographic data and practice patterns. Urinalyses with gross bacteriuria or those obtained for symptoms of a urinary tract infection were excluded because they were not ordered for screening purposes. A urinalysis was considered abnormal if any amount of protein from trace to 4+ was detected. A 24-h urine collection is the only method available for the detection of microalbuminuria and quantification of proteinuria at this institution.

Statistical analyses were performed with StatView II (Abacus Concepts, Berkeley, CA). χ^2 tests were used to compare groups with dichotomous data. When comparing groups with continuous data, Mann-Whitney *U* tests were used uniformly because *F* tests indicated nonequal variances between some groups. *P* < 0.05 was used as the level of significance throughout.

RESULTS— The population data are shown in Table 1. Approximately 50% of these type II diabetic patients were using oral agents, 33% were using insulin, and 8% were using diet as diabetes therapy. The remainder either changed from oral

agents to insulin therapy during the study or their method of therapy could not be determined from the chart (9%).

Only 14 patients in this population had type I diabetes, and 11 of these patients were seen in the FMC. The 14 patients had an average age and duration of diabetes of 35.1 ± 10.5 years and 16.4 ± 8.6 years, respectively. This is both a younger age (*P* = 0.001) and longer duration of diabetes (*P* = 0.0068) than the total population. The GHb for this group was 11.6 ± 2.4% (normal, 5.0–7.0%).

The mean number of tests per patient-year of the study for the total population and various subpopulations is shown in Table 2. The number of urinalyses per patient-year was generally less than half of the one per year recommended by the ADA. The percentage of patients who have not had a urinalysis as a function of the time they were followed in clinic is shown in Figure 1. Even in patients who have been followed for >2 years (and therefore should have received two urinalyses), 50% have not had even one. Indeed, for patients followed for >2 years, only 15% received both urinalyses.

Twenty-four-hour urine measurements, the only test for microalbuminuria available at this institution, were obtained

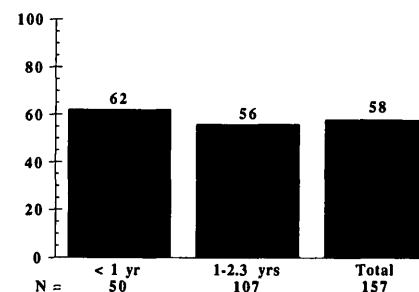


Figure 1—Percentage of patients not receiving any urinalyses during the study. The total group and subgroups (based on the time they were followed in the clinic) are shown on the x-axis with the number of patients in each group shown below. <1 yr, patients followed for 1–11 months; 1–2.3 yrs, patients followed for 12–27 months; Total, entire study population.

in 5% of patients. Most (five of seven) of these were obtained after an abnormal urinalysis, so screening for microalbuminuria was not being performed. Clinic notes did not describe any patient asked to collect a 24-h urine sample except for those seven who did so. Although 37% of patients who received a urinalysis had proteinuria present, and 15% of the population had proteinuria ≥2+, only 13% of patients with an abnormal urinalysis subsequently received a 24-h urine measurement.

The number of GHb measurements recommended by the ADA varies between semiannually for type II diabetic patients who are not receiving insulin but who have good control and quarterly for all other patients. GHb measurements were obtained at an overall rate of 1.66 per patient-year, which can be compared with the ADA guidelines in Table 3. For the population as a whole, only 29% of

Table 2—Screening results for patients seen by primary care physicians per patient-year

Population	Patient-years	Urinalysis	24-h urine	Minipanel	GHb	Visits
Total	209	0.48	0.05	2.23	1.66	8.08
IMC	85	0.69	0.07	3.53	2.15	6.91
FMC	124	0.33	0.02	1.35	1.32	8.33

Minipanel includes electrolytes, blood urea nitrogen, creatinine, and glucose.

Table 3—Frequency and percentage of measurements of GHb

	Months (average duration)				
	0–5 (3.4)	6–11 (8.2)	12–17 (14.4)	18–23 (20.3)	24–27 (26.7)
Diet or oral agent (n = 97)					
ADA recommendation	≥1	≥1	≥2	≥3	≥4
Frequency meeting guidelines	11 of 19 (58%)	7 of 11 (64%)	6 of 15 (40%)	6 of 23 (26%)	7 of 29 (24%)
Insulin (n = 46)					
ADA recommendation	≥1	≥2	≥4	≥6	≥8
Frequency meeting guidelines	1 of 5 (20%)	2 of 6 (33%)	0 of 8 (0%)	0 of 14 (0%)	1 of 13 (8%)

Fourteen patients whose therapy was changed from diet or oral agent to insulin were not included in this analysis.

patients had GHb levels measured as recommended.

CONCLUSIONS— This review of screening practices in primary care clinics at the University of Washington demonstrates that patients receive substantially less screening for nephropathy than is recommended by the ADA. The majority of patients never had a screening urinalysis, and screening for microalbuminuria is not actually being performed.

There are a variety of methods to measure renal function and albuminuria (2–4). Decisions regarding preference of methods are dependent on community, physician, and patient acceptability. Certainly, a 24-h urine collection is the most burdensome of the available options. Nevertheless, none of the patient charts make any mention of the physician asking to have a 24-h urine measurement. The 24-h urine collection is also the only method available at this institution for measurement of microalbuminuria, quantification of proteinuria, or creatinine clearance.

It could also be argued that these data are difficult to interpret since they were collected so close to the ADA recommendations in 1989. However, routine assessment for proteinuria was recommended in the early 1980s (7,8). Indeed, assessment of proteinuria did not improve during the latter months of the

study (Fig. 1). The low frequency of screening for microalbuminuria identifies a need for further physician education.

Recently, attention has been focused on the attitudes and practice behaviors of primary care physicians in their role of providing care to diabetic patients. Jacques et al. (9) conducted a 1989 telephone survey of physicians in Pennsylvania and noted a physician-reported rate of obtaining GHb levels to be 1.8 per year for patients with type I diabetes and 1.4 per year for patients with type II diabetes. Our rates were similar to those reported in Jacques et al.'s study. More recently, a questionnaire survey of primary care physicians to assess their attitudes and behaviors toward tight control of blood glucose in patients with type I diabetes found that GHb testing was severely underused (6).

This study clearly demonstrates a deficiency in screening for the development of nephropathy and the measurement of GHb according to the ADA guidelines. However, it does not explain why this deficiency exists. Most likely, it may be a problem of physician awareness and/or education. ADA practice guidelines are published in sources not routinely read by primary care physicians. The results of this study, in addition to other reviews of physician practice patterns (5,6,9), make it quite clear that major efforts for physician education need implementation.

In summary, diabetic patients seen in primary care clinics at this institution do not receive screening for nephropathy and do not have GHb levels measured according to the ADA guidelines. Efforts should now be made to educate physicians about standards of care.

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