

## Short-Term vs. Overnight Urine Collection for Screening of Urinary Albumin Excretion Rate

Elevated urinary albumin excretion rate (AER), or microalbuminuria, is a strong predictor of clinical diabetic nephropathy (1), which is the major cause of increased morbidity and mortality in type I (insulin-dependent) diabetes mellitus (2). Therefore, screening for microalbuminuria by sensitive methods, such as radioimmunoassay (RIA), is an essential part of the management of type I diabetes (3). There is debate about which measurement of AER should be used (4); 24-h, timed overnight, or first-morning (samples collected on rising) urine collection methods have been proposed as reliable (4). Although measurement of albumin content over 24 h is the definitive method for establishing the presence of abnormal albumin levels (5), 24-h urine collections are tedious to perform and are often unreliable, because they are subject to large errors in collection (4). Finally, most patients find it inconvenient and difficult to collect accurate and complete 24-h urine samples (3). Timed overnight urine collection, performed with the patient recumbent, is a simple procedure used by diabetic patients to monitor glucose levels (6) and has been proposed as an alternative procedure to 24-h collection, because it can reduce the variability in AER induced by physical exercise, changes of arterial pressure, and diet (4). Recently, a short-term urine collection over 1 or several h was proposed as acceptable (1,7). Searching for a suitable screening test for elevated AER in diabetic patients, we compared overnight AER values with those from 30-min urine collections.

Sixteen healthy subjects (mean age  $\pm$  SD  $27 \pm 2$  yr) and 67 ambulatory type I diabetic patients (aged  $29 \pm 10$  yr, duration of diabetes  $10 \pm 7$  yr,  $HbA_{1c}$   $7.5 \pm 1\%$ ), 5 of whom were microalbuminuric (AER  $> 15 \mu\text{g}/\text{min}$ ) (1), participated in our study. All were normotensive, with normal renal function and sterile urines. Each subject performed a timed overnight urine collection followed the next morning by a 30-min collection in the recumbent state. Before beginning the short-term collection, all subjects, who remained fasting and drank no fluids, again voided their bladders. To calculate the variability of AER between the two types of collections, 10 normal and 18 diabetic subjects underwent three successive overnight and three successive short-term collections. Both urinary AER evaluations were accomplished by an RIA method (8). Four (25%) of 16 normal subjects and 15 (22%) of 67 diabetic patients did not urinate after the 30-min recumbency. As expected,

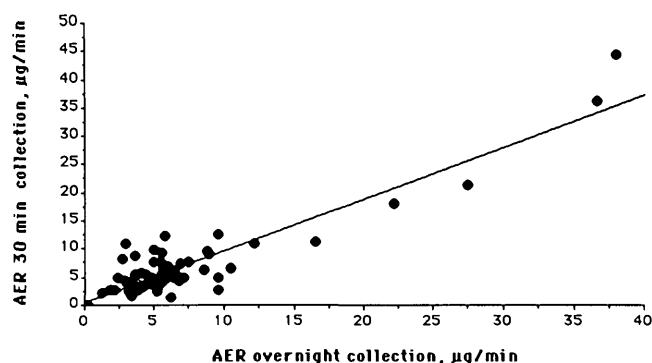


FIG. 1. Correlation between urinary albumin excretion rate (AER) measured by 30-min urine collection and overnight AER.  $y = 0.51 + 0.91x$ ;  $n = 64$ ;  $r = .905$ ;  $P < .001$ .

**TABLE 1**  
**Comparison of overnight and short-term urine collection**

Subjects (n)	Normal (12)	Diabetic (52)
Duration of overnight (min)	460 ± 40 (385–525)	429 ± 55 (300–540)
Urinary vol (ml)		
overnight	308 ± 102 (180–550)	334 ± 163 (120–1000)
short term	49.5 ± 38 (6–145)	42.1 ± 47 (9–260)
Urinary AER (µg/min)		
overnight	4.87 ± 1.7 (2.92–8.6)	7.6 ± 7.6 (0.2–38.0)
short term	4.83 ± 1.5 (1.5–6.8)	7.6 ± 7.7 (0.1–44.2)
C.V. of AER (%)		
overnight	39.4 (2.4–70)*	28.3 (1.8–41.3)†
short term	38.9 (1.6–77.3)*	40.6 (2–46.5)†

Data are expressed as means ± SD; ranges are reported in parentheses. AER, albumin excretion rate.

\*Normal (n = 10) and †diabetic (n = 18) subjects who performed 3 successive overnight and 30-min urine collections.

overnight urine volumes were 6- to 8-fold higher than short-term volumes in both groups (Table 1). Mean AERs from the two collections agreed closely in both normal (overnight, 4.87 ± 1.7 µg/min vs. 30-min collection, 4.83 ± 1.5) and diabetic (overnight, 7.6 ± 7.6 µg/min vs. 30-min collection, 7.6 ± 7.7; Table 1) subjects. A significant correlation ( $r = .905$ ,  $P < .001$ ) was found between the two different AER measurements (Fig. 1). The mean C.V. of AER was ~30–40% for both types of collections (Table 1).

Our data indicate that a timed, standardized urine collection of only 30 min, performed in the morning, in supine patients, may allow an AER evaluation virtually identical to that provided by the overnight collection. This modality of urine collection is employed usefully for AER screening in our metabolic unit by ambulatory diabetic patients who need periodic medical examinations. Patients who have problems urinating after 30 min usually complete the collection by prolonging their recumbency for 60 min.

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## Prediction and Immunosuppression of Type I Diabetes

Challenging current beliefs, especially with new data, is commendable. The ongoing research into prediabetes and attempts to induce remission is still in its infancy and is full of uncertainties. Thus, I was pleased to see a letter of challenge from Bell et al. (1) containing three case reports. However, as I read on, I was struck by the lack of substance of the three case reports, which presumably were included to support the assertive title.

Cases 1 and 2 are individuals who already have diabetes as well as susceptibility genes and who are positive for islet cell antibodies. Appropriate longitudinal studies in these patients would probably have shown them to be antibody positive and normoglycemic, i.e., prehyperglycemic insulin-dependent diabetic months or