Urinary Albumin and Retinol-Binding Protein in Diabetes, Robert Beetham,¹ Anne Silver,² and Anne Dawnay³ (¹ Dept. of Chem. Immunology, Westminster Hospital, Page St., London SW1P 2AR; and Depts. of ² Nephrology and ³ Chem. Pathol., St. Bartholomew's Hospital, London EC1A 7BE, U.K.)

To provide information on proximal renal tubular involvement in diabetic nephropathy, we have measured both retinol-binding protein (RBP) and albumin in urine from diabetics. A mid-stream specimen of urine was provided by virtually all 84 patients attending three successive diabetic clinics, regardless of age, degree of diabetic control, or type of diabetes. Albumin and RBP in the urine were measured by radioimmunoassays (1, 2), and output was related to creatinine concentration. Reference intervals for the albumin/creatinine ratio and RBP/creatinine ratio were those described previously for ages 17–65 (1, 2).

Values for albumin excretion vs RBP excretion are plotted for the 84 patients in Figure 1. A significant number of patients had both above-normal albumin and RBP excretion (including seven with albuminuria >30 mg/mmol of creatinine, suggesting a 24-h excretion of ≥200 mg); 17 patients had increased values for RBP with normal values for albumin, as opposed to only seven with the reverse.

Fig. 1. Urinary albumin and RBP excretion by 84 diabetic patients. Broken lines denote the upper limit of the two reference intervals.

This was a preliminary retrospective study in a group of unselected diabetic patients, with no data available as to age or drug ingestion. Nevertheless, our data make necessary a closer look at the premise that tubular function is normal in diabetic nephropathy (3). In view of the increased RBP excretion in pregnancy (4), we find it interesting that the specimen with the very increased RBP excretion but normal albumin excretion was from a pregnant patient.

References

Source of Error in the Assay of Urinary Orotic Acid, P. Kamoun, M. Coudé, C. Deprun, and D. Rabier (Dept. d'Investigation Métabolique des Enfants Malades, Hôpital des Enfants Malades, 149 rue de Sèvres, 75743 Paris Cedex 15, France)

Colorimetry of orotic acid in urine involves a series of chemical reactions after protein has been removed from the sample. Orotic acid is purified by rapid liquid–liquid column chromatography (1) and the dried residue of the chloroform–amyl alcohol eluate is used in the following procedures. Orotic acid is brominated to dibromobarbituric acid, which is then condensed to dimethylaminobenzaldehyde to form 5-(p-dimethylbenzylidene) barbituric acid (2). This colored product is extracted into an immiscible solvent and its absorbance determined. In the method of Kesner et al. (1) no blank was used.

We have performed 100 such assays of urinary orotic acid, but with use of a blank in which the bromide water is replaced by distilled water. In doing so, we encountered some compounds that also form colored derivatives with p-dimethylaminobenzaldehyde; the absorbance of the blanks ranged from 0.012 to 0.220 A (mean 0.063, SD 0.041). Adding 40 mmol of orotic acid to each urine sample before liquid–liquid chromatography gave a constant absorbance difference of 0.480 A. For 90 urines assayed by the method with the blank, the mean (±SD) urinary excretion of orotic acid was 1.48 ± 1.30 (range 0.1 to 5.0) mmol/mmol of creatinine; by the method of Kesner et al. it was 4.81 ± 2.84 (range 1.2 to 15.0) mmol/mmol of creatinine. We believe the values obtained by the latter method are overestimated, and we recommend use of the blank in this assay.

References

N-Acetyl-β-D-glucosaminidase Assay by the P-Nitrophenol Technique: Inhibitory Effects of Urine as Decreased by Gel Filtration and by Simple Dilution, Chew W. Lim (Dept. of Chem. Pathol., Wellington Hospital, Wellington, New Zealand)

N-Acetyl-β-D-glucosaminidase (2-acetamido-2-deoxy-β-D-glucoside acetamidodeoxyglucohydrolase, EC 3.2.1.30) activity in urines is a sensitive marker of renal injury (1). The simplest method for its measurement is probably by use of the p-nitrophenol derivative of N-acetyl-β-D-glucosaminide (2), but this method is interfered with by inhibitors (Method 1; sample/reagent ratio = 1/5), which may be removed by gel filtration (3, 4; Method II).

CLINICAL CHEMISTRY, Vol. 33, No. 5, 1987 713