Interference of Elevated Fetal Hemoglobin on HbA_{1c} Measurements in Adult Type I Diabetic Patient

Measurements of HbA_{1c} are widely used to provide an index of average glucose control over the previous period of 8 wk (1). This routine analysis may lead to changes in diabetes treatment and improvement of metabolic control (2). An increase in fetal hemoglobin (HbF) levels has been reported in insulin-dependent (type I) diabetic patients with onset before 6 yr of age (3), suggesting a possible effect of insulin treatment on delaying transition from fetal to adult hemoglobin synthesis. Depending on the method used, HbF can falsely elevate the measured HbA_{1c} level (4). Here, we report the interference by elevated HbF in a 70-yr-old white type I diabetic woman.

Diabetes mellitus occurred in the patient at 35 yr of age and immediately required insulin therapy. Seven HbA_{1c} measurements made between 1984 and 1990 with cation-exchange microcolumn chromatography (Bio-Rad, Richmond, CA) indicated levels >14% (normal range 3.5–5.5%), whereas capillary and venous blood samples were <200 mg/dl. HbA_{1c} and HbF were determined by high-performance liquid chromatography (HPLC). With HPLC, HbF was found elevated at 8.8% (normal <0.5%). HbA_{1c} was at 8.3% with HPLC (normal range 4.3–6.1%) and 14.2% with microcolumn chromatography. Serum fructosamine (Hoffmann-La Roche, Basel) was also found increased at 315 μM (normal 180–285 μM). Total hemoglobin and erythrocyte indices were normal, and no mutant hemoglobins were individualized during electrophoresis.

In conclusion, increased HbF levels in adult patients with type I diabets mellitus may lead to misinterpretation of metabolic control. Methods of HbA_{1c} measurement in which HbF values do not interfere should be encouraged, especially in patients with excessive HbA_{1c} values obtained with ion-exchange chromatography. Although a genetic abnormality cannot be definitely excluded in our patient, this observation, if confirmed in a large number of adult patients, may suggest that some diabetic individuals present a late reactivation of HbF production.

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Lipoprotein(a) Levels in Black and White Children and Adolescents With IDDM

In their study of lipoprotein(a) levels in diabetic and control children, Levitsky et al. (1) reported the concentrations of low-density lipoprotein cholesterol (LDL-chol) and high-density lipoprotein cholesterol (HDL-chol). The METHODS section of the article does not describe the technique used for measuring or estimating LDL-chol. Levitsky et al. referred to a previous article (2) for the description of the determination of HDL-chol. However, no measurements of HDL-chol concentration were made in the article cited.

From the results provided (1; Table 2), I deduced that the Friedewald formula (3) was used to estimate the LDL-chol concentrations. For example, if we apply the Friedewald formula for their white diabetic group

$$4.21 - \frac{2.18}{5} - 1.33 = 2.44$$

we obtain the same result reported for LDL-chol. Unfortunately, the Friedewald formula must be adapted before it can be employed with measurements made in Système International (SI) units (4–9). The adaptation is necessary because the conversion factors from conventional to SI units for triglycerides and cholesterol are different. The concentration of triglycerides must be divided by 2.18 instead of 5. The correct mean concentrations of LDL-chol should be ~1.92 for the white control group, ~1.88 for the white diabetic group, ~2.13 for the black control group, and ~1.80 for the black diabetic group.

Because the mean triglyceride levels were not very different among the four groups, and thus the error was similar for each group, Levitsky et al.'s conclusion about an absence of difference in LDL-chol concentration between the groups is probably still valid.

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