ESTIMATION OF THE QUANTITATIVE RELATIONSHIP BETWEEN THE LEVELS OF NONESTERIFIED FATTY ACIDS AND FREE 11-HYDROXYCORTICOSTEROIDS IN THE PLASMA OF PATIENTS WITH DIABETES MELLITUS

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It has been reported that a quantitative relationship exists between the plasma levels of free 11-oxycorticosteroids (11-OCC) and nonesterified fatty acids [2]. This article presents a qualitative estimation of this relationship in investigation of the plasma from patients with diabetes mellitus.

METHODS

Thirty-two patients with moderately severe diabetes mellitus, taking an average of 40 units of insulin per 24 h, were studied. No complicating illnesses were observed during the period of study. Venous blood for analysis was taken at eight a. m. after a 12-h fast; 12 ml of blood were placed into a tube containing a drop of official heparin solution (Richter) and were slowly centrifuged. The quantity of nonesterified fatty acid (NEFA) in the plasma was measured by the method of Dole [3], the quantity of free 11-oxycorticosteroids by the method of Popens and Silin'sh [1]. The method of Snedecor was applied to the investigative material for statistical analysis [7].

RESULTS

The results of separate determinations and also the data concerning the quantitative estimation of the relationship between the parameters measured are presented in the figure. This relationship resembles a linear regression of the "quantity of nonesterified fatty acids to the quantity of 11-oxycorticosteroids" expressed as the equation:

$$Y = y + b(x - x),$$

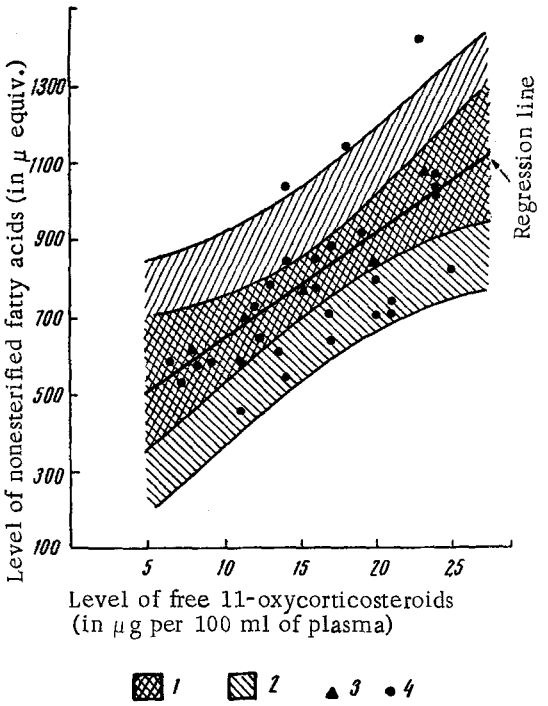
where y = 800.2 (micro equiv. NEFA), X = 15.5 (microg / 100 ml of plasma 11-OCC) and b = 26.8.

Statistical analysis shows high reliability of coefficient b ($P < 0.01$). Calculation of the limits of the slope of the linear regression give the following result:

$$12.9 < \beta < 40.7$$

The figure also represents the confidence interval for grouped means (limited by the two inside curves) and for the predicted results of separate observations (limited by the two outside curves) at $P < 0.05$.

The nonesterified fatty acids in the plasma (one of the energy sources under conditions of normal functioning of the organism) deserve particular attention in the metabolism of patients with diabetes, where the possibilities of glucose utilization are so limited. It is known, for example, that in diabetics these acids are oxidized in large amounts [5] although the utilization of single fatty acids (oleinic) may be lowered [4]. Physiological regulation of the plasma level of nonesterified fatty acids is a complex neuro-hormonal process, the details of which are still not



Confidence interval for grouped means and for predicted results of separate observations and line of regression ($P < 0.05$); 1) confidence interval for grouped means; 2) confidence interval for predicted results of separate observations; 3) grouped means; 4) results of separate observations.

fully known. In this process glucocorticoids play a "permissive" role, i.e., they are considered to be agents that condition the action of catecholamines on the plasma level of nonesterified fatty acids [6]. It is possible that free 11-oxycorticosteroids favor the "compensatory" increase in the plasma nonesterified fatty acids in the determinative phase of diabetes mellitus, when a discordance arises between the energy requirements of the organism and its capacity to use glucose as an energy source.

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