Recently we reported that under certain conditions in vitro intrahematic glycolysis (IHG) during a standard oral glucose tolerance test (OGTT) in a group of prediabetic patients (offspring of diabetic couples) showed a significantly increased pattern when compared to a metabolically normal control group. In addition, the pattern produced in the former group was similar to that of a group of subjects with chemical diabetes. Furthermore, the in vitro IHG post-challenge increments in both experimental groups showed a rise that seemed greater than the decrease seen in the corresponding values in the control group. We decided to study in vitro IHG in other high-risk subjects (characterized by a weaker diabetic heredity), since, hypothetically, their patterns of in vitro IHG should be somewhere between the control and diabetic patterns.

The purpose of the present work was to explore this possibility with experimental data. It is also intended to add information on in vitro IHG in groups reported elsewhere.

MATERIAL AND METHODS

Some of the in vitro IHG data used to make up the groups described below (clinical material) were gathered, but not used, in a previously reported study. The control group has been increased to 20 individuals, and the diabetic group to 23. An OGTT was performed in every one of the subjects studied. Heparinized venous blood samples were collected and blood sugar determined immediately after withdrawal. Each assay was done in triplicate and the mean of these values used throughout. A micromethod of the Somogyi-Nelson procedure was employed for glucose assay. The glucose disappearance rate per gram of hemoglobin and hour of incubation was used as a measure of glycolysis. As a matter of routine we adopted the following protocol: 2 to 3 ml blood were drawn and immediately placed into heparinized 5 ml glass bottles. After mixing quickly, blood glucose was assayed in triplicate, and the bottles then hermetically sealed and rotated continuously in an oven at 37 °C. Two hours later, the bottles were removed and blood glucose was again determined in triplicate. The means of both 'before' and 'after' incubation triplicate determinations were obtained and the differences calculated. These differences in mg/100 ml were then converted into micromoles of glucose disappearance per gram of hemoglobin and hour of incubation. Hemoglobin was estimated by the cyanmethemoglobin method.

1. Control group

This group consisted of 20 volunteers recruited from among the medical staffs of our institute and a nearby hospital. The absence of a known diabetic heredity and of any of the so-called non-genetic indicators of the disease were prerequisites. The mean age was 28 ±
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The mean deviation from IBW was 10.3 ± 15 SD (no statistical difference from the controls). The weight of 8 subjects exceeded IBW by more than 20%. From this main group, we separated accessory groups described below.

b) Prediabetic group — Seven males and six females made up this group. All of them were offspring of diabetic couples and had a normal OGTT according to Conn and Fajans’ criteria. The mean age was 34.5 ± 17.5 SD (no statistical significance compared to controls). The mean deviation from IBW was 10 ± 13.5 SD (no statistically significant difference from the controls). The range was from — 18 to + 33, and the weight of 3 patients exceeded IBW by more than 20%.

c) Normal OGTT according to our own criteria — Twenty-three subjects who had a normal OGTT according to both Fajans’ and our own criteria were grouped apart. The mean age was 30.4 ± 15.6 SD (not significant). The mean deviation from IBW was 8 ± 13.4 SD. The weight of 3 patients exceeded IBW by more than 20%.

d) Group with normal OGTT according to our own criteria, and no clinical clues — From group c) were separated nine persons without any of the so-called nongenetic indicators of diabetes. The mean age was 30.8 ± 19.3 SD (not significant). The mean deviation from IBW was 6.6 ± 13.3 SD (not significant). The weight of only one of these exceeded IBW by more than 20%.

RESULTS

Tab. 1 gives the mean ± SEM of in vitro IHG for study group at each time interval. Column A shows the absolute values in pmol, while column B shows the difference in pmol between the value shown in column A and the corresponding fasting level. The following comparisons were made.

1. Significance of in vitro IHG at each post-challenge interval for each group

A statistical comparison was made for each group between each post-challenge value and its corresponding fasting level. Column A of tab. 1 shows the results of these comparisons, with significant p-values recorded below the appropriate figure. The black points on the curves in figs 1 and 2 are also indicative of