Serum Insulin Secretion by Adult Malaysians

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Introduction

IT HAS RECENTLY been suggested that an excessive and prolonged secretion of insulin after oral glucose, often precedes the development of maturity onset diabetes (1,2), and that an over-secretion of insulin may also lead to coronary heart disease (3). It may therefore be possible to identify individuals and even populations (4) susceptible to diabetes and coronary heart disease by the determination of serum insulin.

We wish to report a comparison of insulin secretion in the three main racial groups in Kuala Lumpur.

Methods

All subjects were patients attending the General Hospital with minor complaints, mostly with skin disorders. After an overnight fast, venous blood was collected and each subject drank 50 g glucose dissolved in 200 mL water. Further venous blood samples were collected at 30 min intervals for two hours. Serum was separated from the fasting, 60 min and 120 min samples and stored at -30° for insulin determination by radio-immuno-assay (5). Blood glucose was measured immediately from all samples which were collected into fluoride containers using a Technicon Autoanalyzer and the neocuproine method (6).

Results

Table I shows the number of adults in each racial group with their ages and Quetelet indices. This index is recommended for the accurate assessment of obesity (7) and is calculated from (body weight in kg) . (height in m)$^{-2}$. It can be seen that the Chinese adults were significantly less obese than the Malays and Indians, which corresponds to data from 500 healthy adults visiting the General Hospital (8).

With the exception of obesity, all other significant differences detected follow the same trend with the Chinese occupying an intermediate position between high values for the Indians and low values for the Malays. Table I and Figure 1 show that during the glucose tolerance test, the Indians have the greatest and most prolonged rise in both serum insulin and in blood glucose concentration.

Discussion

The excessive sustained rise in serum insulin and blood glucose concentration shown by the Indians compared with the Malays cannot be explained by differences in age or obesity (9,10) since both the age and the Quetelet index was found to be higher in the Malay than in the Indian, whereas both age and obesity show small positive correlations ($r = 0.2$) with blood glucose and serum insulin.

The difference may be related to diet (4,8) and also to the greater prevalence of consanguinity in this Indian population, and it would be expected to be associated with a higher incidence of both coronary heart disease and diabetes in the Indian compared with the other racial groups.

This possibility is now being investigated.

Table I

The number of adults from each racial group with their age in years, the proportion of men, their Quetelet Index in kg . m^{-1}, fasting blood glucose concentration, changes in glucose during the oral glucose tolerance test in mg . dL^{-1}, area under the glucose curve in mg . hr . dL^{-1}, fasting serum insulin concentration, changes in insulin during the oral glucose tolerance test in μ- unit . mL^{-1}, area under the insulin curve in - unit . hr. mL^{-1}. The median is followed by the range in parenthesis and the significance of the differences was tested by the Kruskal-Wallis method.

	MALAY (M)	CHINESE (C)	INDIAN (I)
Number	9	7	11
Percentage of Men	78	57	73
Age	45 (21 to 55)	46 (21 to 57)	31 (25 to 52)
Quetelet Index (a)	25 (20 to 30)	22 (16 to 24)	23 (20 to 35)
Fasting Glucose	90 (80 to 110)	90 (90 to 100)	90 (70 to 100)
Maximum Change in Glucose (b)	+30 (+20 to +90)	+60 (+50 to +80)	+70 (+20 to +90)
Change in Glucose at 120 min (c)	..20 (..60 to 0)	..10 (..40 to +20)	+10 (..30 to +20)
Area under Glucose Curve (d)	20 (5 to 85)	50 (30 to 75)	70 (25 to 85)
Fasting Insulin	1 (0 to 8)	1 (0 to 10)	1 (0 to 10)
Change in Insulin at 60 min (e)	+15 (+2 to +30)	+18 (+5 to +50)	+22 (+8 to +60)
Change in Insulin at 120 min (f)	0 (0 to +6)	+2 (0 to +14)	+6 (0 to +16)
Area under Insulin Curve (g)	15 (1 to 33)	25 (5 to 50)	28 (15 to 65)

a) C <I + M : P<0.05
b) M<C + I : P<0.02
c) I C + M : P<0.02
d) M<C + I : P<0.01
e) Not Significant
f) I >C + M : P<0.01
g) M<C + I : P<0.01

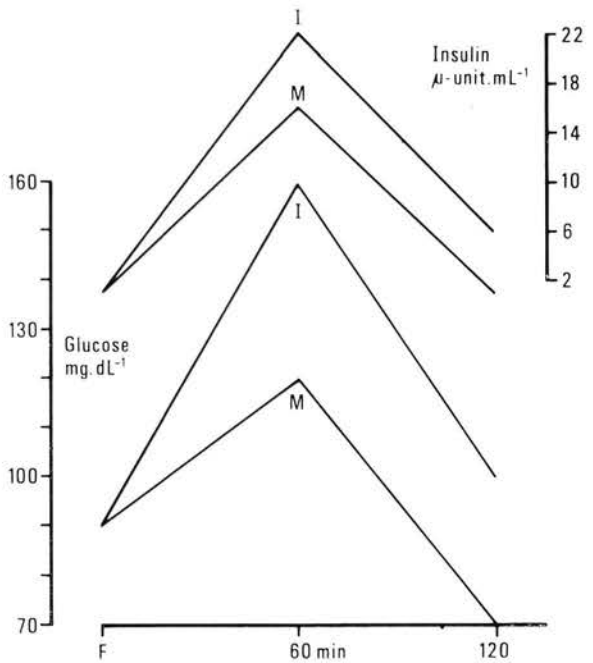

Figure 1

Serum insulin concentration and blood glucose concentration during a 50 g oral glucose tolerance test in the Malay (M) and Indian (I) adults.

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