

The Relation between Thyroid Function and the Changes of Blood Sugar and Blood Insulin on Arginine Tolerance Test

H. SUZUKI, Y. TAKEMURA, Y. YOSHIE and S. KOBAYASHI

*First Department of Internal Medicine, School of Medicine, Gunma University,
Maebashi*

Sugars and amino acids are representative insulin secretion stimulants, and blood sugar and blood insulin after administration of arginine showed considerably specific changes in the patients with hyperthyroidism together with the hyperthyroid patients received anti-thyroid therapy, and hypothyroid patients.

1) Blood sugar:

0.5 g of arginine per kg of a body weight was dissolved in 200 ml of physiological saline and dripped intravenously for 30 min. The blood sugar in normal patients drew biphasic curve having the maximum after 15 min and the minimum after 45–60 min. In the hyperthyroid patients the blood sugar increased very slightly and rather dropped in some one. The blood levels after 15 min were 16.7 ± 1.7 mg/dl in normal patients, 5.1 ± 3.1 mg/dl and -5.0 ± 1.4 mg/dl in hyperthyroid patients having T_3 resin sponge

uptake less than 50% and more than 50% respectively. When their thyroid function was improved by anti-thyroid agents, the blood sugar level 15 min after administration of arginine was 11.3 ± 3.5 mg/dl, showing almost the same reaction with normal patients.

2) Blood insulin:

Blood insulin determined by radioimmunoassay (double antibody method) drew almost the same curve with blood sugar, increasing 13.0 ± 0.3 uU/ml in normal patients after 15 min, 8.4 ± 1.9 uU/ml and 2.6 ± 2.9 uU/ml in the hyperthyroid patients having T_3 resin sponge uptake less than 50% and more than 50% respectively. The blood insulin after 15 min increased 33.4 ± 7.8 uU/ml when hyperthyroidism was improved by therapy. Hypothyroid patients showed remarkable increase of the blood level.

Radioimmunoassay of Pancreatic Glucagon

Y. GOTO, Y. SEINO and H. IMURA

Third Department of Internal Medicine, School of Medicine, Kobe University, Kobe

H. SAKURAI and H. KURAHACHI

Second Department of Internal Medicine, School of Medicine, Kyoto University, Kyoto

In the previous meeting, we have reported a sensitive radioimmunoassay of glucagon utilizing talc to separate free from bound fractions. Since a specific antiserum to pancreatic glucagon

has recently become available, we performed experiments to evaluate usefulness of this antiserum as well as clinical application of radioimmunoassay of glucagon.

The antiserum (No. 30K unger) cross-reacts minimally with plasma obtained from a totally-pancreatectomized patients and with an acid-ethanol extract of dog intestine which is supposed to have high concentration of glucagon-like immunoreactivity (GLI). Because of the easy fragility of circulating blood glucagon, blood samples was placed immediately after drawal in chilled tubes containing EDTA and 1000 U trasylol/ml of bolld and were centrifuged at 4°C.

In healthy normal males, plasma glucagon levels were 92.5 ± 11 pg/ml at basal fasting state

and exhibited biphasic rise in response to arginine infusion, with two peaks within 10 minutes and around 45 minutes after the start of infusion. When plasma glucagon was measured with an antiserum cross-reacting with GLI, increment over basal level following the infusion of arginine was almost identical to that measured by a pancreatic glucagon-specific antiserum, although absolute value was different. Radioimmunoassay of plasma glucagon using two antisera (specific and non specific) is a useful tool to investigate release mechanism of pancreatic glucagon and GLI.

Analysis of ACTH Radioimmunoassay (RIA) Kit

M. YOSHIMURA, T. HACHIYA, K. SHIOMI, T. MIYAZAKI and Y. OCHI

*Second Department of Internal Medicine, Kyoto Prefectural University of Medicine,
Kyoto*

ACTH RIA Kit was manufactured recently by Radiochemical Centre in England and was supplied through Kaken Chemical Co., LTD to requestor. Using ACTH Kit, ACTH extraction process and RIA procedure are necessary for sensitive assay of ACTH. In extraction of ACTH, glass particles which is supplied from Kit adsorbes ACTH from plasma sample, and the ACTH is desorbed from the glass surface with aqueous acetone. Using ^{125}I -ACTH, extraction percentage of ^{125}I -ACTH from plasma to aqueous acetone was analysed in different amount of plasma, and decreased extraction percentage was noticed following the increased amount of plasma. No effect of incubation period of ^{125}I -ACTH with plasma before extraction was noticed. In these extraction procedure, 2 ml of sample showed approximately 70% of extraction however 8 ml of sample showed 40% of extraction.

The standard curve of ACTH extracted from 5 ml of plasma with ACTH standard was higher in bound percentage as compared with one extracted from 2 ml plasma with ACTH standard. In these standard curve the lowest sensitivity of assay was less than 50 pg of ACTH.

In RIA procedure, the effect of incubation time and temperature on RIA was checked in different time and temperature, however indicated time or temperature in Kit was profitable for RIA against other incubation time or higher temperature. Decreased sensitivity or RIA standard curve was noticed in small amount of antiserum (0.05 ml). Clinically, insulin tolerance test was carried out with four normal volunteers and four patients of graves' disease. ACTH and Growth hormone increased in its plasma level following the decrease of blood glucose after insulin injection. The reproducibility of ACTH data is good in assay using Kit.