

Evaluation of the Commercial T₃ Radioimmunoassay Kits

M. INADA, S. KURATA, M. NISHIKAWA and M. OISHI

Endocrine Section, Department of Internal Medicine, Tenri Hospital, Tenri, Nara, Japan

Determinations were made of total T₃ concentrations in 18 sera of normal subjects by the four commercial kits (T₃ RIA Kit, T₃ RIA Mat, T₃ RIA Pac and Seralute). T₃ RIA Mat gave the lowest value (117 ± 23 ng/100 ml), whereas the highest value was obtained by Seralute (184 ± 34 ng/100 ml). T₃ RIA Kit and T₃ RIA Pac gave the mean value of 147 ± 23 ng/100 ml and of 164 ± 24 ng/100 ml, respectively. It was supposed that the discrepancies of normal T₃ concentrations obtained by these kits resulted from the differences of T₃ standards and from the methodologic differences of separation of B and F. The normal T₃ concentrations were determined by T₃ RIA Kit, in which the T₃ standards accompanied in T₃ RIA Mat were used, and the almost same values as those by the original T₃ RIA Kit were obtained. Moreover, the diminished values were obtained, even if the T₃ standards in T₃ RIA Kit were used

in T₃ RIA Mat. Thus, the findings indicated that the discrepancy did not result from the differences of T₃ standards in both kits. On the other hand, the diminished values were obtained by T₃ RIA Kit, in which B and F were separated by resin strips accompanied in T₃ RIA Mat. T₃ RIA Mat gave the almost same values as those by T₃ RIA Kit, when B and F were separated by charcoal method. Nonspecific bindings of ¹²⁵I-T₃ was almost 7% in both T₃ free serum and sample serum in T₃ RIA Kit, which used the charcoal method, whereas it was approximately 3% in T₃ free serum and 9.7% in sample serum in T₃ RIA Mat, in which B and F were separated by resin strip. Therefore, it was concluded that the differences between nonspecific binding in charcoal method and that in resin strip method caused the discrepancy of T₃ concentrations in T₃ RIA Kit and T₃ RIA Mat.

Clinical Evaluation of In Vitro and In Vivo RI Tests for Thyroid Function

M. FUKUCHI, A. KIDO, K. HYODO, M. MINAMIMOTO, K. TACHIBANA, K. ONOUE, A. NISHIKAWA, H. KITANI and K. NAGAI

Division of Nuclear Medicine, Hyogo College of Medicine

For recent developments of RI tests of thyroid function, it is possible to determine T₄-Resin Uptake, T₃ concentration, T₄ concentration, TSH levels and thyroid iodine uptake as the clinical routine tests.

In this studies, T₃-Resin Uptake, T₃ concentration, T₄ concentration and TSH levels were measured by commercial kits in 350 samples, and comparison of thyroid hormone levels with thyroid iodine uptake were examined in 57 patients with thyroid disorders in order to evaluate its clinical usefulness.

Results: (1) Coefficient of correlation on T₃-Resin Uptake and T₃ concentration were $r = +0.725$. Normal T₃ concentration but high T₃-Resin Uptake was shown in 38/199 samples and

low T₃-Resin Uptake was shown in 24/199 samples. Low T₃ concentration but high T₃-Resin Uptake was observed in 18/58 samples and normal T₃-Resin Uptake was observed in 28/58 samples. (2) Coefficient of correlation on T₃-Resin Uptake and T₄ concentration were $r = +0.774$. Normal T₄ concentration but high T₃-Resin Uptake was obtained in 58/195 samples and low T₃-Resin Uptake obtained in 14/195 samples. Low T₄ concentration but high T₃-Resin Uptake was shown in 11/82 samples and normal T₃-Resin Uptake was shown in 49/82 samples. (3) Coefficient of correlation on T₃ and T₃ concentration were $r = +0.81$. Normal T₃ concentration but high T₃ concentration was shown in 5/200 samples and low T₄ concentration was shown in 46/200 samples.

Normal T_4 concentration but high T_3 concentration was observed in 19/188 samples and low T_3 concentration was observed in 20/188 samples. (4) Normal T_3 -Resin Uptake but high TSH levels was obtained in 35/172 samples, normal T_3 concentration but high TSH levels was shown in 28/169 samples and normal T_4 concentration but high TSH levels was observed in 22/179 samples. (5) Good correlation was observed between thyroid

iodine uptake and thyroid hormone levels as coefficient of correlation on thyroid iodine uptake and T_3 -Resin Uptake were $r=+0.66$, and T_3 concentration were $r=+0.83$, and T_4 concentration were $r=+0.79$.

These results suggested that each RI tests for thyroid function was shown dynamic status of thyroid functions.

Radioimmunoassay of Thyrotropin as a Screening Test for Cretinism

K. MIYAI*, K. NISHI*, T. OURA**, T. TSURUHARA** and M. KAWASHIMA***

*Central Laboratory for Clinical Investigation, Osaka University Hospital

**Childrens Medical Center of Osaka City

***Osaka Kessei Laboratory, Osaka, Japan

Since 1974, we have screened for neonatal hypothyroidism using determination of TSH by means of double antibody radioimmunoassay. The mean \pm standard deviation of values for TSH was $9.0 \pm 11.3 \mu\text{U/ml}$ in 500 cord serum samples. Follow up studies in 8 subjects with high TSH levels (over $30 \mu\text{U/ml}$) indicate that these may give false positive values.

A method for measuring TSH in eluates of dried blood samples on filter paper like those used for screening test for phenylketonuria was evaluated and improved. A linear relationship between the volume of eluate and the TSH value, and good recoveries of endogeneous TSH (104%) and added TSH (89%) were obtained, indicating

that TSH in dried blood was extracted well by overnight elution and determined accurately by radioimmunoassay. Coefficient of variation was 3.4–20.7%. The TSH in dried blood samples on filter paper was stable at 4°C , 25°C or 37°C for 1 month. The TSH values of eluates were correlated with those of whole blood ($r=0.90$) and serum (0.81). Cases of primary hypothyroidism could be readily differentiated from normal subjects by this method even when eluates of their blood were combined with those of normal blood for assay of TSH. In a preliminary screening test on 15,000 randomly selected newborn infants, no cases of cretinism was found but 14 cases for "blind control" were consistently identified.

Serum Thyroid Hormone Levels in Liver Diseases

K. KITANI*, M. IUCHI** and K. SHIBATA***

*First Laboratory Clinical Physiology Tokyo Metropolitan Institute of Gerontology

**Medical Department Kofu City Hospital

***Hechst Japan

In order to obtain the information regarding the role of the liver on the thyroidhormone metabolisms in man, T_3 , T_4 , TSH levels (radioimmunoassay, Riagnost) and total thyroxine binding capacity (TBC) were measured in sera obtained from patients with various hepatic diseases. The patients were all positive for intradermal test for

schistosoma japonicum. Patients were classified according to the histology in the following groups, hepatitis (H), liver fibrosis (F), and liver cirrhosis (L). Serum albumin (g/dl as measured by immuno diffusion) was markedly reduced in L groups. H ($n=23$, 3.67 ± 1.14), F ($n=14$, 3.84 ± 1.11), L ($n=15$, 2.73 ± 0.74) Serum TBC (%), T_3 (ng/ml),