

Evaluation of Direct Saturation Analysis Using Radioactive Triiodothyronine

N. SAWAZAKI, K. MIYAI, Y. KATAYAMA, K. KOZAWA and Y. KUMAHARA

*The Central Laboratory for Clinical Investigation, Osaka University
Medical School, Osaka*

Four methods of direct saturation analysis using radioactive triiodothyronine, (a) Thyopac-3, (b) Res-O-Mat T₃, (c) Trilute and (d) Triosorb test were evaluated.

In (a), radioactivity in the supernatant reached plateau after incubation for 10 min. During incubation, the temperature (22 and 30°C) and the rotation speed (13 and 50 r.p.m.) had no effects on T₃ value.

In (b), incubation time and temperature had a slight effect on T₃ index (0.005/5 min and 0.008/1°C respectively).

In (c), the retention % did not change

with different eluting speed (3-8 min) but increased at the higher temperature.

The values in normal subjects, hyperthyroid and hypothyroid patients were (a) 84-124, 58-92, 102-148, (b) 0.87-1.05, 0.59-0.89, 0.94-1.38 (c) 31.2-62.2%, 62.4-81.6%, 20.8-35.2% and (d) 26-39%.

There were higher correlations between (a) and (d), (b) and (d) and (c) and (d). The standard deviations of duplicates were (a) 1.1-1.3 and (b) 0.014-0.047. Coefficients of variations were (a) 2.4% (b) 4.2% and (d) 4.7%.

Comparative Investigation by the Measurement Method of Thyroxine in Blood by Protein Binding Capacity

F. KINOSHITA

Department of Radiology, Ohkubo Municipal Hospital, Tokyo

A. KUBO

Department of Radiology, Keio University Hospital, Tokyo

A comparative investigation was carried out concerning the measurement of thyroxine in blood of the same patients by using Tetrasorb method and simpler Resomat-T₄ method.

1) A comparative investigation was made regarding the measurement results by both two methods, in 135 euthyroid cases, 102 cases of hyperthyroidism, 18 cases of hypothyroidism, and 124 cases with other diseases of the thyroid gland. In case of euthyroid, Tetrasorb method showed 9.5 ± 2.2 $\mu\text{g}/\text{dl}$, and Resomat-T₄ method 9.0 ± 2.0 $\mu\text{g}/\text{dl}$. In case of hyperthyroidism, the former method revealed 23.9 ± 5.8 $\mu\text{g}/\text{dl}$, and the latter 20.7 ± 5.9 $\mu\text{g}/\text{dl}$. The cases of hypothyroidism indicated 2.2 ± 1.2 $\mu\text{g}/\text{dl}$ by Tetrasorb method, and 2.4 ± 1.2 $\mu\text{g}/\text{dl}$ by

Resomat-T₄ method. The results of both two methods were almost similar. It was estimated that Resomat method had a tendency to indicate lower value than that of Tetrasorb method.

2) When the normal values were assumed to range from 5 to 15 $\mu\text{g}/\text{dl}$ by Tetrasorb method and also from 5 to 14 $\mu\text{g}/\text{dl}$ by Resomat method, the former method showed 95%, and the latter 96% in the range of this value in 135 euthyroid cases. The distribution by both methods was about the same around 9-10 $\mu\text{g}/\text{dl}$ by both two methods. In case of 102 hyperthyroidism cases, 95% showed more than 15 $\mu\text{g}/\text{dl}$ by Tetrasorb method, and 94% did more than 14 $\mu\text{g}/\text{dl}$ by Resomat method.

In case of 18 hypothyroidism patients, less than $5 \mu\text{g}/\text{dl}$ was present in 94% by the former, all cases by the latter method.

3) The correlation between the two methods was as follows; $r=+0.73$ and $P<0.01$. A significant correlation was evident.

4) A simultaneous measurement was made

with every examination by using Monitrol I ($8.3 \mu\text{g}/\text{dl}$) and Monitrol II ($16.4 \mu\text{g}/\text{dl}$), standard serum of known thyroxine contents. The results of both methods were compared with each other, and showed correct amounts of thyroxine.

Comparison of Thyroid Gland Scintiphoto Using $^{99\text{m}}\text{Tc}$ -Pertechnetate and ^{131}I -Iodine

T. KITAHARA, H. MUNESHIKA, T. HISHIDA and M. KIGA

Department of Radiology, School of Medicine, Showa University, Tokyo

Thyroid gland image using $^{99\text{m}}\text{Tc}$ -pertechnetate and ^{131}I -iodine were compared in 62 patients. ^{131}I -iodine of $50 \mu\text{Ci}$. to $150 \mu\text{Ci}$. was administered and scintiphoto was obtained at 24 hours after oral administration. Then $^{99\text{m}}\text{Tc}$ -pertechnetate of 1mCi . to 5mCi . was administered and scintiphoto was obtained at 30 min. after injection.

Results:

1) $^{99\text{m}}\text{Tc}$ -pertechnetate and ^{131}I -iodine

scintiphoto usually gave equivalent results.

2) Scintiphoto could be obtained sooner because of high doses of $^{99\text{m}}\text{Tc}$ -pertechnetate owing to its life as well as its stay in the gland and good images were obtained on high or hypothyroidism.

3) Radiation doses to the gland of $^{99\text{m}}\text{Tc}$ -pertechnetate may be greatly decreased compared with ^{131}I -iodine.

Hemesynthetase Activity and Ferrokinetics in Hyperthyroidism

S. TOMITA, A. SATOH, M. KANO, S. KAWATSU and Y. KOMATSU

The First Department of Internal Medicine, Hirosaki University School of Medicine, Hirosaki

Hyperthyroid patients and rats with thyroid induced hyperthyroidism were used for measure of hemesynthetase activity and ferrokinetics.

Procedure:

1. Hemesynthetase activity was measured in bone marrow cells by counting radioactivity of ^{59}Fe incorporation into hemin in the incubation mixture of the enzyme preparation, protoporphyrin, and the isotope (modification of Labbe's method).

2. Plasma iron clearance was determined by measuring the rate of decline of radioactivity in blood (0.2ml . in rat, 1ml . in human) obtained 5, 60, 120, and 180 min. after intravenous injection of ^{59}Fe ($0.2 \mu\text{Ci}$ in rat, $10 \mu\text{Ci}$ in human). The degree of incorporation of iron into red blood cells, or iron utilization, was determined after intravenous injection of ^{59}Fe . Each blood sample was obtained on intervals 1, 5, 10 days, and radioactivity was counted by well-type scintillation