

Comparing the Triosorb T₃ Test with the Tetrasorb-125 T₄ Test and Clinical Usefulness of the T₇ Value

K. SENDA and T. IMAEDA

Department of Radiology, School of Medicine, Gifu University, Gifu

A comparison has been made between the accuracy of the Triosorb T₃ test, the Tetrasorb-125 T₄ test and their mathematical product (Triosorb test value \times Tetrasorb test value \div 100), the T₇ Value, an arbitrary figure in principle modified "free thyroxine" index described by Clark et al. The 3 parameters have been determined in total of 317 subjects (183 clinically euthyroid, of whom 15 were pregnant and 7 had nephrotic syndrome, 89 hyperthyroid and 23 hypothyroid).

The Triosorb and the Tetrasorb test values in various groups showed results approximately similar to those of other studies, and both except pregnancy and nephrosis showed relatively well correlation (coefficient of correlation: $r = +0.850$). In pregnancy, the Triosorb test values were usually lower though the Tetrasorb higher as compared with euthyroid, and in nephrosis, vice versa. Accordingly, the Triosorb or the Tetrasorb test alone may cause a erroneous diagnosis of thyroid status

in such subjects. It is considered the effect of alteration in the thyroxine binding protein (TBP).

The T₇ value which is assumed to be proportional to the concentration of free thyroxine in the serum is not thought to be affected by variations in the TBP. The T₇ Values in the various groups were: 1) euthyroid, 2.79 ± 0.777 (mean \pm SD); 2) hyperthyroid, 11.27 ± 3.959 ; 3) hypothyroid, 0.44 ± 0.256 ; 4) pregnancy, 2.91 ± 1.100 ; 5) nephrosis, 2.67 ± 0.579 . The values even in pregnancy and nephrosis were all but inside the normal range which was supposed to be in the range 1.20 to 4.60, and in hyperthyroid and hypothyroid outside. Overlap of the values between euthyroid and thyroid dysfunction were exceedingly fewer than above-mentioned two test.

The T₇ value may indicate the true thyroid status, and may be a more accurate diagnostic aid than the Triosorb and the Tetrasorb test value alone.

Clinical Evaluation for Free Thyroxine Index

M. INADA, H. KUZUYA, Y. KAZAMA and H. TAKAYAMA

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

(1) In 140 cases of hospital controls, 79 cases of untreated thyrotoxicosis, 217 cases of treated thyrotoxicosis, and 69 cases of untreated hypothyroidism, determinations were made of ¹³¹I-triiodothyronine resin sponge uptake (Triosorb) and of thyroxine in serum by competitive protein binding analysis (Tetrasorb). In addition, free thyroxine indices were calculated by means of following equation.

$$\text{Free thyroxine index} = \frac{\text{Tetrasorb} \times \text{Triosorb}}{1 - 0.6 \times \text{Triosorb}} \quad \text{(Miyake and Torizuka)}$$

(2) Patients with untreated thyrotoxicosis had elevated free thyroxine indices (17.23 ± 5.86 vs 3.47 ± 0.86 in the controls), whereas free thyroxine indices in those with hypothyroidism were diminished (0.78 ± 0.35 vs 3.47 ± 0.86 in the controls).

The values of Triosorb and of Tetrasorb in

untreated thyrotoxicosis and hypothyroidism differed less from control group than free thyroxine indices, according to analysis of variance ($P < 0.01$).

(3) Patients with treated thyrotoxicosis were divided into two groups. Patients in Group I were still in hyperthyroid state and those in Group II were in euthyroid state after treatment. Elevated free thyroxine indices were found in patients in Group I (10.83 ± 6.04 vs 3.51 ± 1.13 in the Group II). The values

of Triosorb and of Tetrasorb in patients in Group I differed less from Group II than free thyroxine indices, according to analysis of variance ($P < 0.001$).

(4) Striking correlation was evident in the plots of free thyroxine indices against free thyroxine values in serum (Magnesium precipitation method).

Thus, free thyroxine indices were most useful indicators of thyroid function.

Free Thyroxine Index— T_7 Value—in Normal Pregnancy

I. TATSUNO and S. KATO

*Department of Nuclear Medicine and Radiotherapy, National Kanazawa Hospital,
Kanazawa*

T_3 test was becoming routine in vitro test for thyroid function studies. Recently, T_4 test was recognized as a companion test to T_3 test. T_3 and T_4 test are mutually correlated to thyroid function in general. Mathematical product (T_3 in % $\times T_4$ in $\mu\text{g/dl} \times 1/100$), T_7 value, which is derived from free thyroxine index was presented by Abbott Laboratory. We have studied T_7 value in hyper-, hypo- and euthyroid. Result of normal range for T_7 value was 1.4 to 4.5 and T_7 value minimized the error with the interpretation of only one test and reflected more precise thyroid status compared with T_3 and T_4 test.

In pregnancy, thyroxine binding protein (TBP) is increased. The increase in TBP results in lowered T_3 and elevated T_4 and the thyroid status is quite difficult to evaluate.

We have investigated T_7 value in pregnancy. T_3 , T_4 and T_7 values were measured for 42 normal pregnant females of first, second and third trimester. In most of pregnant females, T_3 fell in the low range from about 4 months pregnant and T_4 tended to fall in the elevated range from 3–4 months pregnant. These levels were maintained to the end of pregnancy. Pregnant females falling outside the normal range for T_3 , T_4 and T_7 values were 80.9%, 59.5% and 7.1% respectively. Falling outside the normal range for T_7 value was remarkably improved compared with T_3 and T_4 . Mean T_7 value was 3.17 (STD ± 0.88) for 42 pregnant females.

From these results we arrived at the conclusion that T_7 value will be very important to evaluate true thyroid status in pregnancy.