

## F. Thyroid, Parathyroid

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EFFECT OF SERUM PROTEIN CONCENTRATION ON FREE T4 VALUE MEASURED BY RIA. N.Shinoda, K.Matsumura, T.Nakagawa and M.Taguchi. Central Clin.Lab. and Dept. of Radiology, Mie University Hospital. Tsu, Mie.

Various free T4 RIA Kit were investigated on the effect of serum protein concentration on the measured value. Free T4 value as measured with a series of different sample volume was constant in Gamma Coat Two-Step Kit. This result is theoretically explainable by mass law equation and consistent with that obtained from equilibrium dialysis study. Free T4 value by Liquisol Kit showed a slight change decreasing as sample volume decreased in any of the sera from various clinical status. Amerlex Kit and Gamma Coat One-step Kit showed similar but more pronounced changes. These variations in the free T4 value in the latter 3 Kits were attributed to the effect of tracer-binding by serum protein, because free T4 values in hormone-free serum showed very similar changes. In Gamma Coat One-step Kit tracer-binding by albumin was actually demonstrated by electrophoretic study. Sephadex column chromatography also revealed the tracer-binding by the protein in the supernatant after B.F. separation which affected the bound fraction of the antibody. These tracer-binding by protein was considered to be the cause of occasional unaccountable values for free T4 by RIA.

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ACUTE CHANGES OF THYROID FUNCTION FOLLOWING PARTIAL THYROIDECTOMY FOR THYROID CANCERS OR ADENOMAS. J.Takamatsu, I.Mozai, S.Morita and K.Kuma. Osaka Medical College, Takatsuki and Kuma Hospital, Kobe.

Thyroid function indices were measured in acute phase of post thyroidectomies for 9 cancers and 14 benign adenomas. Blood samples were drawn 1,6,18,24 hours, 2,3,4 days and one month after surgery in each patient.

Following partial thyroidectomy, serum total T4 increased one hour after surgery and remained elevated during 4 days' observation. However, it fell to normal level one month after surgery, which means that the increase in T4 was a transient phenomenon. T3 uptake did not alter during the observation. Serum TBG concentration did not show significant changes. Serum T3 level decreased following surgery and became normal one month later. In contrast, serum reverse T3 rose transiently. Serum free T4 level measured by Gamma-coat RIA kit showed transient elevation, which was more remarkable than free T4 index calculated by T3 uptake X T4 or T4/TBG. Serum Thyroglobulin concentration also increased sharply with concomitant rise of free T4. Activities of Thyrotropin receptor antibody did not show detectable following surgery.

The present study indicates that the transient increase of serum free T4 was not caused by a production of thyroid stimulating antibodies but derived from a leakage of thyroid hormone into the circulation.

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SERUM FREE T3 IN THYROIDAL AND NONTHYROIDAL ILLNESSES : A COMPARISON BY EQUILIBRIUM DIALYSIS, FREE T3 INDEX, AND T3/TBG RATIO. H.Taguchi, K.Hagiwara, and N.Konno. Hokkaido Central Hospital for Social Health Insurance, Nakanoshima, Sapporo.

We measured and compared the methods for measuring free T3 (FT<sub>3</sub>) by equilibrium dialysis, free T3 index (FT<sub>3</sub>I), and T<sub>3</sub>/TBG ratio in 40 normal subjects, 26 hyperthyroid patients, 36 hypothyroid patients, 16 pregnant women (3rd trimester), 5 low TBG subjects, and 24 subjects with nonthyroidal illnesses (NTI). Both FT<sub>3</sub>I and T<sub>3</sub>/TBG correlated significantly with FT<sub>3</sub> (r=0.98 and 0.92, p<0.001, n=147). When each group was analyzed separately, FT<sub>3</sub>I and T<sub>3</sub>/TBG were still significantly correlated with FT<sub>3</sub>, except in the NTI with low T<sub>3</sub> where r were 0.18 and 0.04 respectively (n=14, NS). Both FT<sub>3</sub>I and T<sub>3</sub>/TBG values agreed well with FT<sub>3</sub> in hyper- and hypothyroidism. In euthyroidism with abnormal TBG, FT<sub>3</sub>I agreed well with FT<sub>3</sub>. However, T<sub>3</sub>/TBG gave a falsely higher FT<sub>3</sub> when TBG was low, and a falsely lower FT<sub>3</sub> when TBG was high. In NTIs with normal T<sub>3</sub>, both FT<sub>3</sub>I and T<sub>3</sub>/TBG agreed well with FT<sub>3</sub>, but FT<sub>3</sub>I and T<sub>3</sub>/TBG values were all subnormal in NTIs with low T<sub>3</sub>, where FT<sub>3</sub> by equilibrium dialysis ranged from normal to subnormal. These data suggest that 1) both FT<sub>3</sub>I and T<sub>3</sub>/TBG ratio may be equally useful for an assessment of FT<sub>3</sub> level in hyper- and hypothyroidism, whether treated or untreated, 2) FT<sub>3</sub>I may be superior to T<sub>3</sub>/TBG in euthyroidism with abnormal TBG concentration, 3) neither FT<sub>3</sub>I nor T<sub>3</sub>/TBG ratio may be valid for an indirect measure of FT<sub>3</sub> in nonthyroidal illnesses with low T<sub>3</sub> concentration in serum.

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EFFECT OF CONCOMITANT FASTING AND COLD OR HOT EXPOSURE ON SERUM THYROID HORMONE LEVEL. M.Tanno, H.Yamada, T.Muraki, H.Tabuchi, H.Murata, K.Chiba, M.Asatsu, R.Chida, Y.Onodera, and K.Someya. Tokyo Metropolitan Geriatric Hospital, Tokyo. and St.Marianna University School of Medicine, Kanagawa-Ken.

On the present study we examine the effect of fasting together with cold or hot exposure on thyroid hormone level in rats. At 23°C rats fasting for 5 days, serum thyroid hormone levels decreased than fed rats averaging 3.6±0.5ug/dl for T4, 47±11ng/dl for T3, 1.4±0.3ng/dl for free T4 and 39.6±5.1pg/ml for reverse T3, respectively. At 15°C rats fasting for 5 days, serum free T4 level significantly increased than that of 23°C fasting, while serum T4 and T3 did not increased significantly. At 30°C rat either fasting together or not, serum thyroid hormone of both group markedly decreased than control rats. These experiment provide additional evidence that thyroid gland and peripheral metabolism of thyroid hormone response to variety situations such as cold or hot exposure and to fasting with various serum hormone concentration.