

334

FREE TRIIODOTHYRONINE MEASUREMENT: COMPARISON BETWEEN SOLID-PHASE RIA & DIALYSIS METHOD. M. Hiraiwa, Y. Suzuki, H. Suzuki, and S-I. Shimoda. Dokkyo Univ. School of Medicine. Mibu, Tochigi.

It has been well documented that precise thyroid function was not estimated by total thyroid hormone measurement but by free thyroid hormone measurement. At present, free thyroxine (fT₄) was measured generally for clinical use according to the improvement of RIA kits but free triiodothyronine (fT₃) was not routinely measured. As we had a chance to use fT₃ RIA kit supplied by Corning Co., sera obtained from patients with thyroid disorders and healthy subjects were measured by RIA and standard dialysis method and fT₃ values obtained by these two methods were compared. Thirty eight patients with hyperthyroidism, 8 patients with hypothyroidism and 27 healthy subjects were employed at the present study. Other thyroid function studies were also performed. The results of thyroid functions in these three groups were as follows: fT₃: 18.4±5.5 pg/ml (HYPER), 1.0±0.9 pg/ml (HYPO), 3.9±1.3 pg/ml (EU), fT₄: 7.4±3.7 ng/dl (HYPER), 0.6±0.1 ng/dl (HYPO), 1.7±0.5 ng/dl (EU), TBG: 18.7±5.5 µg/ml (HYPER), 28.6±4.7 µg/ml (HYPO), 23.4±4.9 µg/ml (EU). Significant positive correlations were found between fT₃ and other thyroid functions (fT₄: r=0.7784, tT₄: r=0.8394, tT₃: r=0.9277, T₃U: r=0.7003). In the case of TBG, there was a negative correlation to fT₃ (r=-0.5525). The significant positive correlation was also found between fT₃ measured by RIA & dialysis (p<0.01, r=0.8520). Conclusively, fT₃ values obtained by RIA were useful for evaluating thyroid states because of its clear separation of thyroid disorders from normal controls and highly significant correlation to dialysis method.

335

THE MEASUREMENTS OF SERUM T₄, T₃, TSH AND T₃ UPTAKE BY YB RIA KIT.

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The measurements of serum T₄, T₃, TSH and T₃ uptake by YAMASA BD RIA kits were investigated.

The standard curves obtained for each T₄, T₃, TSH were as good as those by other kits. The coefficient of variation in intraassay was 7.5% for T₄, 5.3% for T₃, 2.6% for T₃ uptake and 7.7% for TSH. The coefficient of variation in interassay was 6.3%, 5.5%, 3.0%, and 10.9%, respectively. These values were as excellent as those in other kits.

The concentrations of serum T₄, T₃, TSH, and T₃ uptake were 8.9±1.5 µg/dl, 171±19 ng/dl, 2.6±1.2 µU/ml and 38.7±2.1% (mean±SD, n=25) in normal subjects, 20.5±4.4, 461±163, 0.03±0.1 and 47.7±2.9 (n=25) in patients with Graves' disease, and 2.0±2.0, 59.1±30.9, 116±74.1 and 34.4±2.5 (n=30) in patients with hypothyroidism, respectively. Results using YB kits showed strongly correlation with those using Eiken kits and Chugai kit. Correlation coefficients of T₄, T₃, TSH and T₃ uptake were r=0.988, 0.984, 0.961, 0.910, respectively.

The assay by YB kits is fast, accurate and easy to perform and clinically useful.

336

EVALUATION OF THYROID FUNCTION STUDY WITH THE ARIAI AUTOMATED RIA SYSTEM. K. Imazeki, K. Uno, M. Kawana, N. Arimizu, S. Uematsu, and T. Hotta. Chiba University School of Medicine. Chiba, National Narashino Hospital.

The present study was undertaken to examine in a completely automated RIA system "ARIAI" for measurements of in vitro thyroid function tests (T-3, T-4, TSH and T-3 uptake) in comparison with those of manual methods. The system uses solid phase RIA methods, in which antibodies are covalently coupled to surfaces of glass pellets (solid phase), combined in a small chamber. So the antibodies in the chamber can be repeatedly used through recycles among washing out, binding and eluting. The advantageous is minimized radioactive solid waste. The laboratory experiments with the ARIAI system showed so good results as those of manual methods concerning precision, recovery and dilution tests. The measurements with standard sera were significantly correlative with those of manual methods (r=0.913 in T-3, r=0.965 in TSH, r=0.903 in T-4 and r=0.899 in T-3 uptake) and those of Concept 4 (r=0.940 in T-3 and r=0.925 in T-4). The assays in normal subjects ranged 107.1-195.5 ng/dl in T-3, 6.21-10.93 µg/dl in T-4, below 2.37 µU/ml in TSH and 24.1-31.3% in T-3 uptake. The assays in thyroid disorders showed a good separation among hyper-, eu and hypothyroid. Those results indicated clinical usefulness and reliability of the ARIAI system.

337

THE MEASUREMENT OF THE CONCENTRATIONS OF SERUM T₄ BY TETRAZYME AND T₄ UPTAKE BY THYROZYME UPTAKE.

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The kits of Tetrazyme by Enzyme inhibitor immunoassay and Thyrozyme Uptake by Enzyme inhibitor assay (Abbott) were studied. These assays are based on the nature of enzyme inhibitor that lose activity after binding to protein. T₄ bound enzyme inhibitor loses its inhibiting activity after binding to anti-T₄ antibody or TBG. The enzyme activity uninhibited in this assay system is dependent on the amount of anti-T₄ antibody bound T₄, which is employed in Tetrazyme to measure serum T₄, and also dependent on TBG bound T₄, which is used in T₄ uptake. These assays were carried by Abbott VP autoanalyzer. Good correlations were observed between values for serum T₄ obtained by Tetrazyme and those by RIA, and between T₄ uptake and T₄ RSU. The rate of T₄ to T₄ uptake (FT₄I) obtained by these methods is consistent with free T₄ obtained by dialysis or RIA, and is a good index for thyroid function. It was only 15 minutes to carry out the measurement of 15 samples either by Tetrazyme or by Thyrozyme Uptake.

These results indicate that the measurements by both kits are simple and rapid without using isotope and that the results obtained by these kits reflect well thyroid function.