# THYROID RELATED HORMONES AND TSH LEVELS IN NON-TOXIC DIFFUSE GOITRE

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In a continuing effort to study the levels of thyroid related hormones and TSH in various thyroid diseases[1,2], this study was undertaken to determine the levels of these hormones in patients with non-toxic diffuse goitres referred to the Centre from the Karachi region.

## PATIENTS, METHODS AND RESULTS

Three hundred and four patients with clinically proven, non-toxic diffuse goitre were investigated. Iodine uptake was performed according to a standard technique, i.e., 2 hour, 24 and 48 hours after oral administration of Radio Iodine. Serum thyroid hormones (T4 T3, FF4, and T3-uptake) and TSH were measured by RLA techniques[1,2] and results were compared with normal[3] Two types of kits were used, the simple and Amerlex RJA kits of Amershan International, U.K. The Amerlex kits were introduced with a modified assay method were more accurate, less time con-sliming and requires a smaller amount of serum. As the supply of simple RIA kits was discontinued, the Amerlex kits were used. As the nornial ranges of the kits were also different, the results have been analysed separately. The mean difference significance was determined by the students t- test and the coefficient of correlation by Karl Pearson's formula. There were 25(8%) males and 279 (92%) females, the ratio was 1:11. The mean age for males was 19.9 (± SE 1.2) and females 18.2 (± SE 0.4) with a range of 10 to 35 and 10 to 40 years respectively. Sixtynine per cent of the patientsbelonged to lower and 31% to middle socioeconomic groups. The majority (85%) of the patients belonged to Karachi, the remaining were from NWFP (8%), India (3.9%), Punjab (1.9%) and 1 from Baluchistan. The two, 24 and 48 hours iodine uptake was high in goitrous patients. There was no significant differencein the mean levelsbetweenthetwo sexes. The means for T4, FT4 and FF1 were significantly low as compared to controls. No significant changes were seen in the mean T3 and TSH levels, though they were slightly elevated (Table I).

**TABLE I. Thyroid Hormones and TSH Levels in Patients with Non-toxic Diffuse Goitre by Simple and Amerlex RIA.**

| | $T_4$(SIU) | $T_3$(SIU) | TSH(SIU) | $T_3$-Uptake(%) | $FT_4$(SIU) | FTI | $T_3/T_4$ |
|---|---|---|---|---|---|---|---|
| Simple RIA | | | | | | | |
| Goitrous males | *94.9±5.5 | 2.3±0.08 | 3.8±0.4 | 27.5±0.7 | – | **25.9±1.4 | 0.024 |
| | (119.4±4.0) | (2.3±0.09) | (3.3±0.4) | (29.9±0.9) | – | (34.7±0.8) | (0.019) |
| Goitrous females | *103.9±1.7 | 2.4±0.3 | 4.3±0.1 | 27.0±0.1 | – | *28.1±0.5 | 0.022 |
| | (115.1±4.1) | (2.3±0.1) | (4.3±0.5) | (28.2±0.7) | – | (32.5±1.6) | (0.019) |
| Amerlex RIA | | | | | | | |
| Goitrous males | **69.3±6.9 | 2.0±2.2 | *2.0±0.2 | 29.8±1.2 | *15.5±1.4 | 20.8±2.3 | 0.028 |
| | (103.6±3.9) | (1.7±0.06) | (1.3±0.1) | – | (20.7±0.4) | – | (0.016) |
| Goitrous females | *93.2±2.3 | 1.9±0.03 | 2.0±0.1 | 27.5±0.02 | *13.9±0.3 | 25.6±0.5 | 0.020 |
| | (104.2±3.5) | (1.7±0.1) | (2.1±0.2) | (28.7±0.9) | (18.3±1.3) | (28.7±1.8) | (0.015) |

Results are in Mean (±SE)
( ) Normal values
*$p<0.01$, **$p<0.001$.

The mean T3 fF4 ratio was high in patients indicating iodine deficiency in them. The ranges of various

hormones show that the minimum levels for T4, FF4 and FF1 were markedlylowin patients. SerumT3 and TSH levels were within the normal range, though their maximum levels were slightly higher than normal (Table II).

**TABLE II. Range of Thyroid Hormones and TSH in Patients with Non-toxic Diffuse Goitre.**

| | $T_4$(SIU) | $T_3$(SIU) | TSH(SIU) | $T_3$-Uptake(%) | $FT_4$(SIU) | FTI (SIU) |
|---|---|---|---|---|---|---|
| Simple RIA | | | | | | |
| Goitrous males | 56–146 | 1.7–3.0 | 0.4–8.8 | 21.9–32.0 | – | 18.1–45.0 |
| | (95–144) | (1.8–2.9) | (0.6–6.6) | (25.0–34.4) | – | (29.8–38.4) |
| Goitrous females | 59–162 | 1.1–3.1 | 0.0–10.6 | 20.5–34.8 | – | 14.5–46.7 |
| | (90–146) | (1.3–3.2) | (1.5–6.9) | (20.0–33.1) | – | (23.5–45.9) |
| Amerlex RIA | | | | | | |
| Goitrous males | 54–90 | 1.3–2.8 | 1.1–2.6 | 24.3–32.7 | 8.7–30.8 | 13.9–27.6 |
| | (77–136) | (1.1–2.0) | (0.0–2.7) | – | (18.0–23.9) | – |
| Goitrous females | 54–150 | 1.1–2.6 | 0.0–4.6 | 22.9–34.0 | 5.2–34.0 | 14.6–37.0 |
| | (83–134) | (1.0–2.4) | (0.3–4.2) | (22.3–33.4) | (10.2–28.7) | (19.2–36.7) |

( ) Normal range.

No significant correlation was found between T4/T3, T4/TSH and FT4/FTI.

## COMMENTS

Thyroid function tests are usually normal in simple goitre, however, a uniform pattern of results has not been reported[4-6]. Some workers report a fall in T4 onlywith no change in T3 or TSH[6-8], while others have found only an increase in mean An alteration of serum T3/T4 ratio in favour of T3 was also reported[7]. Our results are in agreement with other report[4-8] where a slight elevation in T3 and a depression of T4, with or without moderate elevationinTSH has been found in iodine deficiency goitre. It would appear that in different situations, the adaptive mechanisms to environmental iodine deficiency are manifested differently or in varying degrees. Possibly, the initial response is a rise in TSH and increased iodine uptake. Alterations in the pattern of secretion of T3 and T4 may follow as a later development. The increase in T3 may therefore be taken to result from a preferential secretion by the thyroid, so as to produce a compensated euthyroidism.

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