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PHYSIOLOGICAL MEASUREMENTS IN FEMALE PATIENTS WITH THYROID DISORDERS

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ABSTRACT

PHYSIOLOGICAL MEASUREMENTS IN FEMALE PATIENTS WITH THYROID DISORDERS

Endemic goitre in Sri Lanka is widely prevalent in the endemic belt which extends throughout the Western, Sabaragamuwa, Southern, Central and part of the Uva provinces; ie the whole of the south-western sector of Sri Lanka.

Female goitrous patients attending the thyroid clinics at the Nuclear Medicine Unit, Peradeniya, between 9.00 am and 10.00 am each day were examined and investigated. They were categorized according to their biochemical status - Total Thyroxine (TT₄), Total Triiodothyronine (TT₃) and Thyroid Stimulating Hormone (TSH) concentrations, into the following four groups - "Euthyroid", Raised TSH only, Hypothyroid and Hyperthyroid groups. Their ages ranged from 14-73 years.

In the "euthyroid" group (simple goitre group with normal thyroid hormone levels), the gland was assessed according to the classification endorsed by the WHO and the International Council for the Control of Iodine Deficiency Disorders (ICCIDD), and categorized into 3 grades according to goitre size.

The tests included measurements of TT₄ and TT₃ by standard RIA (radioimmuno assay) techniques and TSH levels by the IRMA (immunoradiometric assay) method. 2 hour and 24 hour radioiodine uptakes, following the administration of a tracer dose of ¹²⁵I were also measured.

Parameters of respiratory function, anthropometric measurements, haematological measurements and physiological responses to a low ambient temperature, were also carried out in all groups and compared between these groups.

The results were statistically analyzed using the Student's Independent t test, which was carried out between the three grades of the "euthyroid" group, as well as between the four groups of varying thyroid activity. With regard to comparison of physiological parameters at room temperature (28.8 - 29°C) with those obtained in the air conditioned room (22.1 - 22.5°C), the Student's paired t test was used. The significance level was accepted at the 0.05 level. Spearman's Correlation Coefficients were also carried out to find the relationship between goitre size and thyroid hormone levels in the goitrous "euthyroid" group. The significance level was accepted at the 0.05 level.

The results of the thyroid function tests indicated that in "euthyroid" goitre (which represents the simple goitre group) -

- 1) An increase in the size of the gland is associated with a longer duration of goitre.
- 2) TT_3 levels increased as the grade increased, indicating a progressive increase in thyroid activity with an increase in the size of the gland.
- 3) Serum TSH levels dropped significantly as the goitre size increased.
- 4) RAIU at 2 hours and 24 hours increased with an increase in size of the gland, indicating an increase in thyroid activity as the gland grew larger.

It is evident from the results that thyroid enlargement, iodine uptake and triiodothyronine secretion are independent of TSH because a significant fall in serum TSH (though within the normal hormone limits) is associated with an increase in size of the gland and a significant increase in TT_3 concentration.

The goitre patients were categorized according to their hormonal status into a "euthyroid" group, a raised TSH group, a hypothyroid and hyperthyroid group.

With regard to the RAIU after 24 hours, the hypothyroid group, showed a significantly lower 24 hour uptake when compared with the "euthyroid" group ($p < 0.05$). The lower uptake in the hypothyroid group rules out the cause of goitre as being due to a deficiency of iodine, and suggests underactivity of the thyroid gland.

With regard to anthropometric measurements namely height, weight, BMI, mid-arm circumference and skinfold thickness, no significant differences existed between the three grades of the "euthyroid" group. In contrast, comparison of these parameters between groups of varying degrees of thyroid activity showed a definite pattern. The normal subjects presented values very similar to those of the "euthyroid" group and raised TSH groups, while the hypothyroid group clearly demonstrated significantly higher values for all of the above parameters except height, compared to the "euthyroid" group. The hyperthyroid group showed highly significantly lower values for all parameters except height, when

compared with the "euthyroid" group. Thus a relationship was observed between the anthropometric parameters and the thyroid status of these patients.

With regard to respiratory function, no significant differences were observed between the three grades of the "euthyroid" group. Comparison of these respiratory indices between groups of varying thyroid activity too showed a downward trend starting from the normal group, followed by the "euthyroid" and raised TSH groups. The hypothyroid and hyperthyroid groups presented with highly significantly lower lung volumes and flows.

Here too a relationship was observed between respiratory function and thyroid status of these patients.

Comparison of haematological parameters between the 3 grades of the "euthyroid" group showed a mild macrocytic anaemia in grade 2 patients followed by a correction of this anaemia in grade 3 patients. With regard to the haematological parameters in varying groups of thyroid activity, the raised TSH group demonstrated a macrocytic type of anaemia while the "euthyroid" group represented a category of patients whose haematological parameters were normal or very close to the normal range. The hypothyroid and hyperthyroid groups too demonstrated a macrocytic type of anaemia. Judging by the variable results obtained in the different groups of thyroid dysfunction, it is necessary to consider the aetiology, duration and severity of thyroid dysfunction together with the

