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THE CHANGES IN THE CONCENTRATIONS OF TSH T_3 AND T_4 IN HEALTHY AND AFFECTED YOUNGSTERS

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Abstract

Circulating levels of TSH T_3 and T_4 were studied in healthy and affected. Values of TSH was contradictory as comared to normal range. Significant change was noted in T_3 in affected youngsters (1.66± 42) nmol/l) as compared to healthy persons (2.157 ±).32 n,mol/l). A change, but insignificant was also noted in T_4 in both healthy and affected persons, however, both T3 and T4 were within the range of normal values.

Key Words: **Concentration of TSH T_3 T_4; youngsters,**

Introduction

Radioimmunoassay (RIA) technique for the measurement of serum triiodothyronine, T_3 and tetraiodothyronine T_4 and thyrotropin TSH are now readily available for the assessment of thyroid function in healthy persons. Normal thyroid functions are advised from adult samples (Firsher 1973) using competitive protein binding assay. O.Halloran and Webster, (1972) reported that after the neonatal surge in thyroid hormone concentration serum T_4 decline till the age of one year to stabilize at mean level 9.2 ug/100 ml. Murray *et al.,* 1971 showed higher serum T_3 and T_4 resin (mixture of organic complex substances) uptake levels in childhood which decline slowly with age until adult. The function of thyroid gland in previous studies demonstrated during Ist 10 to 15 years of life is an inverse relationship between chronological age and serum level of protein bound iodine (PBI) and butanol extractable iodine as well as changes in serum concentration of thyroid binding protein (Firsher *et al.,* 1962). There is evidence for an increased thyroid activity during childhood which gradually decreases throughout adolescence. Serum T_3 and T_4 binding globulin (TBG) concentration is higher or lower in affected patients than healthy persons, but in case of children it is higher than in the adult and decline gradually throughout childhood (Parra *et, at.,* 1980, Liapis *et al.,* 1981). Workers have found a parallel pattern of TSH concentration (Minunto *et al;* 1981, peny *et al.,* 1983) while others have not (Liappis *et al,* 1981; parra *et al.,* 1980). Whether the changes in the circadian pattern of serum TSH are concomitants of these development features of the pituitary-thyroid axis, is unknown.

Serum TSH and thyroid hormone levels have been measured in a large group of older persons and their middle aged offsprings. Serum TSH showed a long normal distribution, the mean TSH in women was similar to the in middle aged man. Free T_4 was slightly higher in older women than in middle aged women. There was no significant correlation between TSH and any thyroid hormone level (Hershman *et al.,* 1993).

Some investigations have explored free hormone concentration from thyroid

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hormone and binding protein level (Fisher et al, 1977; Para et, al., 1980) but more recent direct methods of free hormone measurement have only been applied in one study reported by (Butler et al., 1981). However hormone measurement have only been applied in one study staging was not carried out (AV Ruskin et al., 1973) and it is not possible to relate reported changes in thyroid functions to other events which occur during puberty.

The present study was conducted to understand the changes occurring in the level of TSH, T3 and T4 in healthy versus affected persons.

Materials and methods

Present study was performed in the organic chemistry laboratory and atomic energy center L.M.C. Jamshoro. The series comprised of 20 clinically healthy students 10 boys and 10 girls aged 20 to 24 years with normal weight and height. On the other hand the series comprised of 20 clinically affected people 10 males and 10 females aged between 20 to 24 years of normal weight and height. Blood samples were collected from the healthy students between 9.00 to 11.00 am while they were engaged in the class work and from the affected patients admitted in the hospital.

5.c.c blood samples were taken from each person by a disposable syringe. Samples were centrifuged at 5000 r.p.m for 10 minutes. Separated serum was transferred into small bottles by micropipette. Serum kept frozen at 20)^{0}C till the determination of TSH, T3and T4 were performed.

The results were statistically analyzed by using t-test.

Results

Circulating level of TSH, T3 and T4 in healthy and affected girls and boys are mentioned in table I. The levels in healthy versus affected persons show enough variation. For instance, mean TSH values in healthy persons is 1.492 ±0.21 nmol/ml and in affected persons is 2.94 ± 0.21nmol/ml. So the results show inconsistency with each other in healthy/affected and to the normal value. (4.7 – 6.7 nmol/ml).

T_3 values in healthy persons (2.157 ± 0.32 nmol/I) and in affected persons (1.661 ± 0.31 nmol/l) show a significant variation ($P < 0.01$) in healthy versus affected persons. (Table –I). The normal values in healthy persons are in the range of 0.8 to 2.7 nmol/l).

The results of T4 shown in (Table –I) for healthy and affected persons, indicate that, T_4 in affected persons is low, but higher (13%) compared to the healthy persons which is insignificant, whereas, the normal values of T_4 are in the range of 62 to 165 nmol/l.

It is concluded from the present study that only the levels of T_3 are being changed in the thyroid patients

TABLE – I:- THE MEAN PLASMA LEVELS OF TSH, T3 AND T4 IN HEALTHY (BOYS AND GIRLS). NORMAL RANGE OF TSH (0.54-4.58 nmol/ml), T3 (0.8-2.7 nmol/l and T4 (62-165 nmol/l).

No of Persons Examined	TSH	T3	T4
Healthy {boys–10) Total 20 {girls-10)	1.492±0.21	2.157±0.32	125.171±12.32
Affected (boys-10) Total 20 {girls-10)	2.941±0.42	1.661±0.31*	125.0171±12.32

* Significant variation ($P < 0.01$)

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Discussion

We have described the changes in the thyroid hormones and TSH in healthy and affected persons. Neonatal level of thyroid hormones are considerably elevated vis-à-vis normal adult levels, and progressively decrease between the age of one and fifteen years as claimed by several groups (Fisher *et al;* 1977; para *et al;* 1990).

In the present study we have noted that the TSH levels observed in healthy and affected youngsters are not in the normal range. This finding is in contradiction with the previous findings. (Chaussain and Job, 1972).

The levels of T_3 in the healthy youngster (boys and girls) as compared to affected were higher and remained within the range of normal values confirming the earlier reports mellitus and check, 1970; Corcoran *et al;* 1977).

Insignificant change in the level of T_4 in both the healthy and the affected youngsters reported in this work supplement the earlier data (Dunger *et al;* 1990).

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