SERUM T_3, T_4 LEVELS IN INFERTILE WOMEN

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SUMMARY

The study was undertaken to estimate the serum T_3 and T_4 level by Radioimmunoassay technique to evaluate the Thyroid status in infertile women. Two groups of females comprising of 60 infertile as study group and 60 fertile as control, were thoroughly examined and subjected to detailed investigation for Thyroid factor. Study showed that T_3 and T_4 levels in infertile cases should be kept in consideration during the diagnosis and management of infertility as the T_3 and T_4 values in infertile cases were significant (18.0%). The estimation of T_3 and T_4 should be done in cases with history of abnormal menstruation, anovulation, secondary amenorrhoea and abortions.

INTRODUCTION

Infertility, an age old problem, has been considered a curse or disgrace by widely separated cultures and generations. By extensive studies it has been proved that for normal sexual function thyroid secretion of T_3 and T_4 needs to be approximately normal. The method of radioimmunoassay of T_3 and T_4 are considered to be appropriate, accurate, rapid and easy indicator of thyroid function. The action of thyroid hormones can not be pinpointed to a specific function but probably results from a combination of direct metabolic effects on gonads and, excitatory and inhibitory effects operating through anterior pituitary hormones that control sexual functions.

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MATERIAL AND METHODS

The study was conducted in the Department of Obstetrics and Gynaecology of our institution during 1992-93 to delineate the relationship between normal thyroid function and infertility.

Selection of Cases

The cases comprised of clinically euthyroid cases and infertile cases coming

to the OPD of the Obstetrics and Gynaecology department. Two groups of volunteers were selected.

(1) **Control group** : Sixty non-pregnant clinically euthyroid women having 2 or more children without any complaints or sterility were selected as control cases. They were in the age group of 19-35 years at different phases of menstruation.

(2) **Study group** : Sixty infertile cases were taken, comprising of 40 primary infertility cases and 20 secondary infertility cases. Among the 20 secondary infertility cases, 4 had habitual abortions. The cases were in age group 19-35 yrs belonging to different socio-economic status from different areas of the Bundelkhand region. The cases had infertility for more than one year of conjugal life and the semen analysis of the husbands in all cases was normal.

Particulars of the patient

Complete history of the patients regarding their socio-economic status, marital status, menstrual history and complaints related to thyroid status were taken. General and systemic examination and local examination of thyroid gland and gynaecological examination was done. The patients were subjected to routine and general investigations of infertility. T_3 and T_4 was measured by radio-immunoassay.

Technique of radio-immunoassay

The basic principle of radio-immunoassay is competitions inhibition of unlabelled antigen of binding of labelled antigen to its specific antibody form (Ahuja and Kochupillai, 1983).

Labelled antigen + Specific antibodies $\rightleftharpoons$ Labelled specific antigen antibody

$\uparrow$ Unlabelled antigen

Unlabelled antigen - antibody

Normal range of T_3 is 0.71 - 2.0 ng/ml. and

T_4 is 5.5 - 13.5 Mgm% (BARC, 1987).

RESULTS

Control group : The T_3 and T_4 levels were estimated in 60 control cases and the mean value of T_3 and T_4 levels were within the normal range (Table I).

Infertile group

The T_3 and T_4 levels were estimated

Table I

T_3 and T_4 levels in control group

T_3 and T_4	Range	Mean	Standard deviation
T_3 (ng/ml)	0.7 - 2.0	1.34	0.34
T_4 (Mg/ml)	6.1 - 13	8.80	1.60

in 60 infertile cases and although the values were within the normal range, they were in a wide range (Table II).

Endometrial study of the infertile case was done. Endometrial biopsy, which not only revealed the endometrial status, but also the anovulatory status of the patient. Out of 60 cases, 36 cases showed secretory phase of endometrium and 21 cases had proliferative endometrium. Three had atrophic endometrium (Table III). The cases with primary amenorrhoea had atrophic endometrium.

There were two cases of primary amenorrhoea of which one showed low borderline values. Three out of 4 cases of secondary amenorrhoea had low T_3 and T_4 values. Anovulation was suspected in cases with proliferative and atrophic endometrium. Out of the 24 cases, 8 had thyroid factor. Of the 8, 2 had high T_3 and T_4 values. Both the patients complained of scanty menses.

There were three cases of habitual abortions of which, two had low values of T_3 and T_4. One of the two cases was also diabetic (Table IV).

DISCUSSION

Various workers have studied the thyroid functions by different indices of thyroid function like Basal metabolic rate (B.M.R.), protein bound iodine uptake (PBI), Radioactive iodine uptake (RAI) and Radio-immunoassay (RIA) etc. Further, Litzenberg (1926), Winkelstein (1940), Hamblen (1941) and Nirodomus (1945), using clinical features, found a

Table II

T_3 and T_4 levels in infertile group

T_3 and T_4	Range	Mean	Standard deviation
T_3 (ng/ml)	0.2 - 4.0	1.45	0.92
T_4 (Mg)	3.8 - 20	8.8	3.2

Table III

Endometrial findings in infertile cases

Cases	Primary infertility (40)	Secondary infertility (20)	Total (60)
Proliferative endometrium	13 (32.5%)	8 (40%)	21 (35%)
Secretory endometrium	25 (62.5%)	11 (55%)	36 (69%)
Atrophic endometrium	2 (5%)	1 (5%)	3 (5%)

Table IV

Thyroid factor in infertile women

Cases	Normal	Thyroid factor			Borderline values		
		Total	High	Low	Total	High	Low
Primary infertility	33	7	2	5	11	2	9
Secondary infertility	16	4	2	2	4	0	4
Total	49 (81.66%)	11	4	7	15	2	13

higher incidence of thyroid factor in infertility.

Cominos (1956), examined 29 infertile cases by P.B.I. uptake and found anovulation or rare ovulation in 15.9% cases due to thyroid impairment.

Conway et al (1985) used RIA of T_3 and TSH and found thyroid factor in 1.3% infertile cases.

Our results are comparable to those of Nath et al (1990). One of the reasons for this similarity in results could be that the two studies were carried-out on the same format. The area studied in our study (Bundelkhand area) is also prone to goitre.

CONCLUSION

The study showed that T_3 and T_4 levels in infertile cases should be kept in consideration during the diagnosis and management of infertility as the T_3 and T_4 values in infertile cases were significant (18.0%). The estimation of T_3 and T_4 should be done in cases with history of abnormal menstruation, anovulation, secondary amenorrhoea and abortions and symptomatic cases after all other causes in these cases are ruled out. Empirical use of thyroid hormone is not necessary.

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