THYROID PROFILE IN INFERTILE WOMEN

LAKSHMI SINGH • C.G. AGARWAL • S.R. CHOWDHARY
P. MEHRA • RANJANA KHARE

SUMMARY

Thyroid profile alongwith associated endocrinological status was studied in 47 infertile women. In the present study 19.2% women had hypothyroidism 23.4% hyperthyroidism and 57.4% were enthyroid patients. Anovulatory cycles were present in 77.8% hypothyroid and 63.04% of hyperthyroid patients. 57% of hypothyroid and 60% of hyperthyroid patients had high gonodotrophin levels. 57% patients with hypothyroidism had hyperprolactinemia. Patients with hyperthyroidism had high oestradiol levels. 60% of patients with hypothyroidism had high levels of testosterone. All these factors caused anovulation.

Approximately, one tenth of marriages are barren and 10% have fewer than desired number of children (Wallach & Kempers 1985). While not an illness, infertility can be devastating in that it is unexpected denial of personal and often powerful drive to reproduce. Although, in fair percentage male is the causative factor (33.0%), female is at fault in the predominent number of cases. The infertility of the female reroductive system is maintained by prevailing hormonal mileu which is delicately balanced by hypothalmic pituitary thyroid, adrenal and gonadal axis.

Infertility is a common accompaniment of disorders of thyroid functions. Both hypo as well as hyperthyroidism are associated with a variety of changes in reproductive function including delayed onset of puberty, anovulatory cycle and abnormally high foetal wastage.

Clinical thyrotoxicosis and myxoedema are a rare sight in an infertility clinic. However, subtle changes in thyroid function may have permissive role in production of absolute and relative infertility in some individuals.

Materials and Methods

The present study was carried out in the Department of Obstetrics and Gynaecology, K.G's Medical College, Lucknow in collaboration with Central Drug Research Institute, Lucknow and Thyroid clinic of Department of Surgery and Medicine, K.G's Medical College, Lucknow.

In the present study a total of 47 cases of primary and secondary infertility were studied (with a bias to select those

Dept. of Obst. & Gynaec. / Endocrinology, K.G's Medical College, Lucknow.
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patients who could be candidates for abnormal thyroid function). 10 fertile patients were taken as control.

Study was conducted in two steps:

1. Evaluation of infertile status.
2. Evaluation of thyroid status in relation to female infertility.

Cases of unexplained infertility were selected and a basic evaluation of other endocrinological disorders was also done along with thyroid profile.

Hormones FSH, LH, Progesterone, Oestradiol, Prolactin and Testosterone were studied by Radio-immunoassay serial in the normal menstrual cycle. In thyroid profile, T_3 T_4, Radio-iodine uptake, Thyroid Scanning - serum cholesteral were done.

Observations

The incidence of primary infertility was 61.70% and secondary infertility was 38.29% most of the patients belonged to middle or lower middle class and were in the age group of 25 to 29 years. The duration of infertility was 5 years or less in 55.7% and in 6 to 10 years in 66.6%.

In our study, out of 47 infertile patients 9(19.2%) were of hypothyrodism and 11(23.4%) were of hyperthyrodism

TABLE - I
DISTRIBUTION OF INFERTILE WOMEN ACCORDING TO THYROID PROFILE

Type of Cases	*No. of Cases*	*Percentage (%)*	*T_3 ngm/ml*	*T_4 ngm/ml*	*RAIU*	*Sch. mg.*	*Thyroid Scan.*
Hypothyroid	9	19.2	0.27	36.34	17.2	2.451	Hypo-Active
Hyperthyroid	11	23.40	3.50	124.3	68.2	166.4	Hyperactive
Euthyroid	27	57.4	1.38	92.2	47.3	176.14	Normal

TABLE - II
THYROID PROFILE AND MENSTRUAL IRREGULARITIES
Total Incidence = 72.5%

Thyroid Status	*Menstrual Pattern*	*No. of cases*
Hypothyroid	Menorrhagia	3
n = 9	Oligomenorrhoea	4
	Metrorrhagia	Nil
	Prolonged cycles	1
	Polymenorrhoea	Nil
	Normal	1
Hyperthyroid		
n = 11	Menorrhagia	1
	Oligomenorrhoea	7
	Metrorrhagia	1
	Prolonged Cycles	Nil
	Polymenorrhoea	2
	Normal	Nil

while 27(57.4%) were enthyroid patients.

Patients of both hypo of hyperthyroid group had delayed menarch i.e. menarch at 15 years or beyond.

72.5% of patients had menstrual irregularities 33.3% of patients of hypothyroidism had menorrhagia and 44.4% had oligomenorrhoea. In hyperthyroidism, oligomenorrhoea was the commonest anomaly in 63.6% of cases while menorrhagia was present only in 9% of cases.

Anovulatory cycles were present in 77.8% of hypothyroid and 63.64% of hyperthyroid patients. Ovulation was studied with the help of BBT, cervical mucus, endometrial histology and plasma progesteron values.

TABLE - III
THYROID PROFILE AND OVULATION

Thyroid Profile	*Type of Cycles*	*Percentage (%)*
Hypothyroid	Anovulatory	77.8
	Ovulatory	22.2
Hyperthyroid	Anovulatory	63.64
	Ovulatory	36.36

Thyroid Profile Infertility And Reproduction Hormones

57% hypothyroidism and 60% hyperthyroidism had high gonadotrophin levels.

57% patients with hypo-thyroidism had hyperprolactinaemia. Incidentally, all the 4 patients with hyperthyroidism had hyperprolactinaemia inspite of having large number of anovulatory cycles.

In the present study not a single patient with total failure of oestradiol production by ovarian tissue was found.

Patients with hyperthyroidism had high oestradiol levels.

60% of patients with hyerthyroidism had high levels of testosterone.

Discussion

As obvious from the observation that fertility of female reproductive system is hampered by disbalance in hypothalmic pituitary-thyroid and gonadal axis.

Functional disorders of thyroid are known to produce delayed puberty, every

TABLE - IV
THYROID PROFILE AND GONADOTROPHIN LEVELS

Thyroid Status	*No. of cases*	*Levels of Gonadotrophins*	*FSH IU/L*	*LH IU/L*
Hypothyroid	7	Normal n = 3	2.4	8.4
		Low n = Nil	–	–
		High n = 4	9.05	34.2
Hyperthyroid	5	Normal n = 1	1.6	4.0
		Low n = 1	1.0	2.9
		High n = 3	11.6	13.7

TABLE - V
THYROID PROFILE AND PROLACTIN LEVELS

Thyroid Status	*No. of cases*	*Level Prolactin*	*PRL n U/L*
Hypothyroid	7	Normal n = 3	446
		Low n = Nil	Nil
		High n = 4	1141.5
Hyperthyroid	5	Normal n = 5	373
		Low n = Nil	Nil
		High n = Nil	Nil

TABLE - VI
THYROID PROFILE AND OESTRADIOL LEVELS

Thyroid Status	*No. of Cases*	*Level of Oestradiol*	*Oestradiol p mol/L*
Hypothyroid	7	Normal n = 7	774
		Low n = Nil	–
		High n = Nil	–
Hyperthyroid	5	Normal n = 1	1214
		Low n = Nil	–
		High n = 4	3947

women with late menarchie deserved thorough thyroid profile examination. 33.3% patients with hypothyroid had menorrhagia. It seems that poor progesterone production associated with persistent endometrial proliferation may be responsible for massive bleeding. Another mechanism for this may be failure of LH secretion. 44.4% patients with hypothyroidism had oligomenorrhoea. It may result from necessary depression of pituitary function and mothers infertility due to well known galactorrhoea with amenorrhoea syndrome associated with hypothyrodism (Edwards et al 1971). Oligomenorrhoea in hyperthyroidism may be due to poor responsiveness to LH or increase in hormone binding globulins producing a decrease in free available oestradiol etc, which in turn may produce menstrual anomalies.

Anovulation in hypothyroidism was found in 77.8% and this is in consonance with the reported histopathological atro-

TABLE - VII
THYROID PROFILE AND TESTOSTERONE

Thyroid Status	*No. of cases*	*Level of Testo-sterone*	*Testo-sterone n mol /l*
Hypothyroid	7	Normal n = 3	1.41
		Low n = 4	0.30
		High n = Nil	–
Hyperthyroid	5	Normal n = 2	1.48
		Low n = Nil	–
		High n = 3	8.4

phic changes in ovaries due to post-pubertal hypothyroidism. These changes may in part be due to secondary pituitary depression in hypothyroid states. Apart from this cyclic loss of LH surge hyperprolactinemia has been implicated.

High gonadotrophins in some cases may be due to lack of feed back inhibition by peripheral oestrogens. In thyrotoxicosis, an increase in testosterone, oestradial binding globulin causes a decrease in unbound fraction of these hormones resulting in increase in LH.

Hyperprolactinaemia is an important cause of infertility. Hyperprolactinaemia seems to be a major factor for producing anovulatory cycles in hypothyroidism (Edwards et al 1971), Mechanism of anovulation seems to be entirely separate in hyperthyroidism as none of the patients had hyperprolactinaemia in hyperthyroid patients.

With hypothyroidism an increase in TRH (Thyrotrophin releasing hormone) release occurs, TRH being direct stimulator of prolactin release patients with hypothyroidism are expected to develop hyperprolactinaemia.

In the present series patients with hyperthyroidism had high oestradiol levels i.e. 80% of hyperthyroid infertile women. This can be explained on the basis that there occurs both quantitative as well as qualitative alterations in the metabolism of gonadal steroids in thyrotoxicosis. Quantitatively marked increase is testosterone oestradiol binding globulin is seen which in turn raises total plasma levels of oestradiol, although biologically active unbound fraction may be normal or decreased (Ingbar & Borges 1979).

60% patients with hyperthyroidism had high levels of testosterone levels with mean value of 8.4n mol/L. As detailed above, this increase in testosterone levels can be explained on the basis of increased levels of hormone binding globulin. Thyrotoxicosis also favours metabolism of testosterone to androsterone over that of etiocholanalone, thus producing some increase in androgenic activity with resulting relative infertility in females.

Conclusion

It seems that the infertile patient with abnormal thyroid functions not only show changes in their thyroid parameters but also the total hormonal profile causing anovulatory cycles and infertility.

It would be fair to say that all patients attending infertility clinic should by clinically screened for thyroid dysfunction with high degree of suspicion.

References

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