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The Study Effect on Serum Prolactin Level in Women with Hypothyroidism Disorder

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Abstract: Objective:-The find to the incidence of hypothyroidism was being much higher than hyperthyroidism. Reported studies these two conditions on reproductive physiology in women and in experimental female animals have shown that both hypothyroidism is associated with delay in onset of puberty, anovulation, various menstrual irregularities, infertility and spontaneous abortions.
Material:-Twenty women is conducted on the level of Prolactin in subjects between the age group 20 – 40 years out of which twenty are control, . In this 20 patients are hypothyroid.
Result:- the present study indicates that there is significant (>0.001) increase in serum prolactin levels in hypothyroidism.Themean serum prolactin level in hyperprolactinemic women was 41.615 ± 5.03 ng/mL.
Conclusion:- The incidence of hypothyroidism in hyperprolactinemia was 40%. There is a high incidence of hyperprolactinemia in infertile women. A positive correlation is found between hypothyroidism and hyperprolactinemia.
Key words : hyperprolactinema, infertility, hypothyroidism.

Introduction:

The function of thyroid hormones include modulation of carbohydrates, proteins and fat metabolism, gene expression and also sexual and reproductive function[(1)]. thus when the thyroid hormone gets out of balance, many body functions are affected. This is why hypothyroidism can mimic many other diseases. Hypothyroidism is caused by insufficient production of thyroid hormones by the thyroid gland. Hypothyroidism has many effects on reproductive system development and function. The reproductive tract[(2)] appears to develop normally in cretins, thus hypothyroidism during fetal life does not appear to affect thenormal development of the reproductive tract . Hypothyroidism beginning before puberty causes a delay in onset of puberty followed by an ovulatory cycle in women. In some cases juvenile hypothyroidism, precocious puberty and galactorrhoea have been reported[(3)]. In women hypothyroidism is associated with delay in the onset of puberty, anovulation, amenorrhea, polymenorrhea, menstrual irregularities, infertility and increased frequency of spontaneous abortions Table (1). It was suggested that these alterations may be caused by decrease in gonadotropin secretion, due to hyper prolactinemia (prolactin levels are directly correlated with TSH levels). In hypothyroid women changes in menstrual cycle suggests that thyroid disorders are associated with ovarian hyperactivity like hyperestrogenemia, hyper prolactinemia, impaired fertility. The effects of thyroid hormones on the impaired function of reproductive and to great extent is thought to be due to changes in TSH level, whose secretion overlaps with prolactin and thus it may have overlapping function[(4)].

Table 1. Clinical and Laboratory Findings of Primary Hypothyroidism

Symptoms	Physical Findings	TFTs
-General: Weakness, lethargy and fatigue	Thin, brittle nails	Increased TSH
-Muscle cramps, aches andpains	Thinning of skin	Decreased TH levels
-Cold intolerance	Pallor	Antibodies (Hashimoto's)
-Headache	Puffiness of face and eyelids	RAIU: <10%
-Loss of taste/smell	Yellowing of skin	Increased cholesterol, CPKLDH, AST
-Deafness	Thinning of outer eyebrows	Decreased Na, Hct/Hgb
-Hoarseness	Thickening of the tongue	
-No sweating	Peripheral edema	
-Modest weight gain	Effusions: Pleural, peritonealor pericardial	
-Dyspnea	Decreased deep tendonreflexes	
-Slow speech	Goiter	
-Constipation	CV: Hypertension	
-Menorrhagia	bradycardia	
-Galactorrhea	Myxedemaheart	

In primary hypothyroidism the loss of thyroid function/tissue results in increased TSH secretion which promotes goiter formation. Secondary hypothyroidism may be caused by: 1)[5]. Insufficient stimulation of the thyroid from hypothalamic (decreased TRH secretion) or pituitary (decreased TSH secretion) disease, or 2). Peripheral resistance to thyroid hormones. Hypothyroidism secondary to pituitary or hypothalamic failure is relatively uncommon; most patients have clinical signs of generalized pituitary failure. The most common causes of secondary hypothyroidism are postpartum pituitary necrosis and pituitary tumor[6]. The various sub-types of hypothyroidism are listed in Table 4 and discussed in more detail in subsequent sections in table (2).

Table 2. Types and Causes Hypothyroidism

Primary Hypothyroidism: Thyroid gland failure	
Hashimoto's Disease	! Autoimmune destruction (acquired)
• Iatrogenic Hypothyroidism i.e Thyroid ablation (surgery/RAI in Graves' and radiation for head/neck cancer)	Diminished TH synthesis/release
• Others: Iodine deficiency, Enzyme defects, Thyroid hypoplasia, Goitrogens	! Diminished TH synthesis/release:
Secondary Hypothyroidism	
• Pituitary Disease	! Deficient TSH secretion
• Hypothalamic Disease	! Deficient TRH secretion:
Hypothyroidism: Special Conditions	
• Myxedema Coma	! End-stage hypothyroidism
• Congenital Hypothyroidism	! Aplasia or hypoplasia of thyroid gland ininfants and children
• Hypothyroidism in Pregnancy	
• Hypothyroidism and Other Medications	! Disease may alter the kinetics of drugs usedfor other disease states

Antibodies: Autoantibodies of clinical interest inthyroid disease include thyroid-stimulating antibodies (TSAb), TSH receptor-binding inhibitory immunoglobulins (TBII), antithyro-globulin antibodies (Anti-TgAb) and the antithyroid peroxidase antibody (Anti-TPO Ab)[7]. Elevated levels of Anti-TPO A are found in virtually

all cases of Hashimoto's thyroiditis and in approximately 85 percent of Graves' disease cases. Also, approximately 10 percent of asymptomatic individuals have elevated levels of Anti-TPO Ab that may suggest a predisposition to thyroid autoimmune diseases[8]. Historically, Anti-TG Ab determinations were used in tandem with antimicrosomal Ab determinations to maximize the probability of a positive result in patients with autoimmune disease. Although the prevalence of Anti-TG Abs in thyroid autoimmune disease is significant (85 percent and 30 percent in Hashimito's thyroiditis and Graves' disease, respectively)[9], it is much lower than the prevalence of the Anti-TPO Abs. Thyroid-stimulating antibodies (TSAb) are present in more than 90% of Grave's disease, and TSH receptor-binding inhibitory immunoglobulins (TBII) are present in atrophic form of Hashimoto's Disease, in maternal serum of pregnant women (predictive of congenital hypothyroidism) and myxedema[10].

Radioactive Iodine Uptake (RAIU): The RAIU test indicates iodine use by the thyroid gland but not hormone synthesis capacity or activity. A tracer dose of radioactive iodine (131I or123I) is administered intravenously, and the thyroid gland is scanned for iodine uptake[11]. A normal test result is 5% to 15% of the dose taken up within 5 hours and 15% to 35% within 24 hours. This test is primarily used for diagnosis of Graves' disease (increased uptake)[12]. In patients who are iodine deficient, results indicate a greater uptake of iodine, and in those with an iodine excess, lesser uptake. Additionally, after the administration of radioactive iodine, a thyroid scan can reveal "hot" or "cold" spots indicating areas of increased or decreased iodine uptake, which can be useful in the detection of thyroid carcinoma in the table (3).

Tests of Thyroid Gland Function				
RAIU	Thyroid uptake of iodine	24 hr: 15-35%	< with Excess Iodine and > with iodine deficiency	Different. of hyperthyroidism
Scan	Size, shape & activity	----------	Thyroid and antithyroid drugs	Detect “Hot” vs “co nodules

The aims of the study were to find the incidence of hyperprolactinemia in female infertility after exclusion of tubal factor and male factor infertility, and to study its correlation with hypothyroidism.

Methods:

The present studies include twenty women patients between the age group 20-40 years out of which twenty are control, twenty are with hypothyroid cases The hypothyroid cases have shown the symptoms like, Enlargement of thyroid, Hair loss, Menstrual irregularitie ,Weight gain, Dry skin, Cold intolerance etc..

In all the cases following hormones are estimated and confirmed the thyroid abnormality.

- Tri iodothyronine (T3)
- Tetraiodothyronine (T4)
- Thyroid stimulating hormone (TSH)
- -Prolactin.

Results:

The present study was done by taking blood samples from 20women patients who attended to Hospital for thyroid hormone estimation as per their physician’s advice. In all these cases T3, T4 and TSH levels are estimated. All patients belonged to the Age group 20-40 years. Careful history regarding their menstrual history, number of children, age of the lost child, signs and symptoms of Hypothyroidism if any, were also recorded. Depending up on their results of T3, T4 and TSH they are categorized into 3 groups.

Group I: - In this group subjects with normal T3, T4 ,TSH and prolactine levels are included, and served as control group. Number of Subjects twenty.

Group II: - In this group subjects with decreased T3, T4 and increased TSH levels are included. Number of twenty subjects .
Group III:- In this group subjects with decreased anti-TPO, Thyroglobulin antibody are included. Number of twenty subjects.
Group IV:- patients have shown hypothyroid profile. The prolactin level are increase significantly (<0.001). All twenty patients have shown hypothyroid symptoms and menstrual irregularities.

Table (4)-Summury of Results

Biochemical parameters	**values**	**Group I**	**Group II**
Prolactin Normal values: Females:8.39-20.15 ng/ml	Mean	11.22	41.615
	SD±	2.13	5.035
	P value		<0.001
TSH Normal values: 0.3-6.0µIU/ml		1.98	25.9
		0.78	5.45
			<0.001
T_3 Normal values: 0.9-1.9ŋg/ml		1.3	0.704
		0.42	0.137
			<0.001
T_4 Normal values: 52-156µ/ml		149.6	47.745
		11.9	7.643
			<0.001

Table (5)-Summury of Results

Biochemical parameters	**values**	**Group I**	**Group II**
Prolactin Normal values: Females:8.39-20.15 ng/ml	Mean	11.22	41.615
	SD±	2.13	5.035
	P value		<0.001
Anti-TPO Normal values:>100 IU/ml		145	1198
		2.11	6.87
			<0.001
Thyroglobulin antibody Normal values:>8% ng/ml		45	238
		1.42	0.67
			<0.001

Comparison of thyroid and prolactin values between women with subclinical hypothyroidism and the controls who fulfilled the study criteria showed higher prolactin values in the hypothyroidism group. However, the differences were statistically significant (Table 4,5). High positive anti-TPO which are indicative that the Patient 1 was known to suffer from clinical hypothyroidism and had received L-thyroxine substitution therapy for several years. TSH tests, performed at the end of the 24 h blood sampling period, showed lower stimulated T4 . A significant difference between patients and controls was calculated for TSH and for T4 ($P \leq 0.001$). Again, T3 and FT4concentrations for the infertile patients were in the euthyroidrange, with significant differences between the groups.TSH stimulation resulted in normal increases in prolactin for both patients and controls. However, basal prolactin was significantly increased in the controls ($P \leq 0.001$).

Discussion :

Review of literature and clinical evidence show that thyroid disorders in women are associated with frequent menstrual disturbances, impaired fertility and unsuccessful pregnancy[13-15]. Animal studies have shown that hypothyroidism may lead to serious disturbances not only in development of the ovarian follicles but also their activity[16-21]. According to the result obtained in the present study, in hypothyroid women, enhanced basal levels of prolactin is obtained. This study confirms the published observations on elevated prolactin levels on hypothyroid women, experimental studies on rats that suggest that formation of poly cystic ovaries in hypothyroid rats is associated with high levels of prolactin[22]. The present study also indicates that altered hormonal status of gonadotropins may be responsible for the irregular menstrual cycle, and also may predispose to development of polycystic ovarian syndrome in hypothyroid women.

Conclusion:

From the present study it is concluded that there is increased levels of prolactin in hypothyroid cases, indicating their susceptibility for the development of polycystic ovarian syndrome. In hypothyroidism menstrual irregularities and altered gonadotropin patterns are observed, indicating that the thyroid hormones play an important role in reproductive physiology.

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