Original Research Article

Evaluation of Serum Prolactin Levels in Female Patients of Primary Hypothyroidism in Tertiary Health Care Center

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Abstract

Introduction: Prolactin is an anterior pituitary hormone that plays a vital role in ovulation, reproductive functions and lactation. Excess prolaction can manifest as galactorrhoea, menstrual disturbances, gonadal dysfunction, and infertility. Hyperprolactinemia is one of the common endocrine disorder of hypothalamic pituitary axis resulting from various causes including hypothyroidism. The loss of thyroxine feedback inhibition in primary hypothyroidism causes overproduction of TRH (thyrotropin releasing hormone) .which has a stimulatory effect on lactotroph cells of pituitary result in raised prolactin and TSH thyroid stimulating hormone. **Aims and Objective:** The aim and objective of this study is to evaluate hyperprolactinemia in female hypothyroid patient of tertiary health care centre. **Material and Method:** It is an observational institutional study done in Gandhi Hospital, Biochemistry Dept from March 2019 to May 2019 during which prolactin levels are measured with patient concern in newly diagnosed 50 primary hypothyroid patient and 50 normal euthyroid individuals by using chemiluminescence immunoassay method. Serum T3,T4,TSH and prolactin were assessed in age group 15-35yrs. **Inclusion criteria**: Females age 15-35yrs,nonpregnant, nonlactating , with symptoms of hyperprolactinemia like galactorrhea, menstrual irregularities, infertility. **Exclusion criteria**: Pregnancy, lactation, pituitary adenoma, medications, h/o thyroid surgery or radiation therapy and other systemic disorders. **Results:** 100 samples were collected with mean age group of 25±3 in females, 50 are hypothyroid and 50 are euthyroid. When compared with control out of 50 hypothyroid patients 7(14%) patients are having raised prolactin levels (>25ng/ml). In this study significance association of hyperprolactinemia is seen in subclinical hypothyroid patients with P value <0.05. **Discussion &Conclusion:** This study shows that prevalence of hyperprolactinemia is more common in subclinical hypothyroid female patients specially in age group 25 -35 yrs. Therefore hyperprolactinemia should be screened for hypothyroidism and vice versa.

Keywords: Prolactin, Hypothyrodism, hyperprolactinemia,

Introduction

Prolactin is an important anterior pituitary hormone that plays a vital role in ovulation, reproductive functions and lactation. Its secretion is controlled by prolactin inhibitor factor of hypothalamus. Hyperprolactinemia is the most prevalent endocrine disorder in hypothalamicpituitary axis [1]. Pathologic hyperprolactinemia is generally applied for the situation in which prolactin level increases because of some reasons other than physiologic causes. Prolactin secretion is controlled by prolactin inhibitor factor that is secreted from hypothalamus, other factors like vaso active inhibitory peptide (VIP) and Thyroid relising hormone (TRH) cause to increase prolactin secretion [1]. In fact, TRH in addition to increasing TSH causes to rise prolactin level [2]. In patients with primary hypothyroidism, increased levels of TRH can cause to rise prolactin levels and these patients may have galactorrhea [3].

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Different increased level of serum prolactin has been reported in 30% of patients with primary hypothyroidism [4]. Subclinical hypothyroidism is defined by high TSH and normal thyroid hormones [5].

The loss of thyroxine feedback inhibition in primary hypothyroidism causes overproduction of thyrotropin releasing hormone (TRH).Which has a stimulatory effect on lactotroph cells of pituitary resulting in raised prolactin and thyroid stimulating hormone (TSH) levels. Thyroid dysfunction which is quite prevalent in the population affects many organs including male and female gonads, interferes with human reproductive physiology, which reduces the likelihood of pregnancy and adversely affects pregnancy outcome, thus becoming relevant in the algorithm of reproductive dysfunction. Difficulty to conceive or subfertility constitutes a major psychological burden. Proper evaluation of these disorders involves multidimensional diagnostic approach, with a pivotal contribution from clinical laboratories [4]. Thyroid dysfunctions interfere with numerous aspects of reproduction and pregnancy. Therefore measurement of prolactin and thyroid hormones, especially thyroid stimulating hormone (TSH), has been considered an important component of infertility work up in women. In the present study age matched (primary and secondary) infertile females were compared with normal fertile females to assess status of prolactin and thyroid stimulating hormone

Aims and Objective

To evaluate hyperprolactinemia in female hypothyroid patient of tertiary health care centre.

Material & Method

- Type of study: observational institutional study
- Place of study: Gandhi Hospital
- Duration of study: 3months (March 2019 to May 2019)
- Controls: 50 Apparently healthy females age 15-35Yrs.
- Cases: 50 Newly diagnosed primary hypothyroidism female cases age 15-35Yrs.

Inclusion criteria

Females
Age group 15-35years
Non pregnant
Nonlactating
H/o galactorrhea,
Menstrual irregularities,
Infertility

Exclusion criteria

- Pregnancy
- Lactation
- Pituitary Adenoma
- Medications
- h/o thyroid surgery or thyroid replacement therapy
- Renal failure and other systemic disorders

Sample Collection

3ml of sample is collected after overnight fast avoiding any stress.

Method

Chemiluminescence immunoassay method in siemens advia centaur.

Statistical analysis

For the statistical data analysis, descriptive statistics were used to show the characteristics of the infertile and fertile females (controls).

Results

Data analysis is done, in which raised prolactin levels are seen in 8 patients(16%) of hypothyroid cases.out of this 12% belongs to subclinical hypothyroid patient with no significant change in T3 &T4. Mean age ± SD =25.6 ±5.48. Mean age ±SD with hyperprolactinemia=20.1 ±11.0. Prolactin levels in cases=22.1 ±9.6(mean ± SD). TSH Levels in cases=7.34 ±2.74 (mean ± SD). Coefficient of variance=<1. P value = <0.05.

Table1. Variable in Controls

	Age	Prl ng/ml	T3 ng/ml	T4 µg/dl	TSH µIU/ml
Mean	25.6	9.63	0.88	8.81	4.05
S.D	5.48	2.73	0.18	1.84	0.46

Table2. Variables in Cases

	Age	prl	T3	T4	TSH
Mean	26.2	22.1	1.10	7.79	7.34
S.D	5.73	9.6	0.38	2.73	2.74

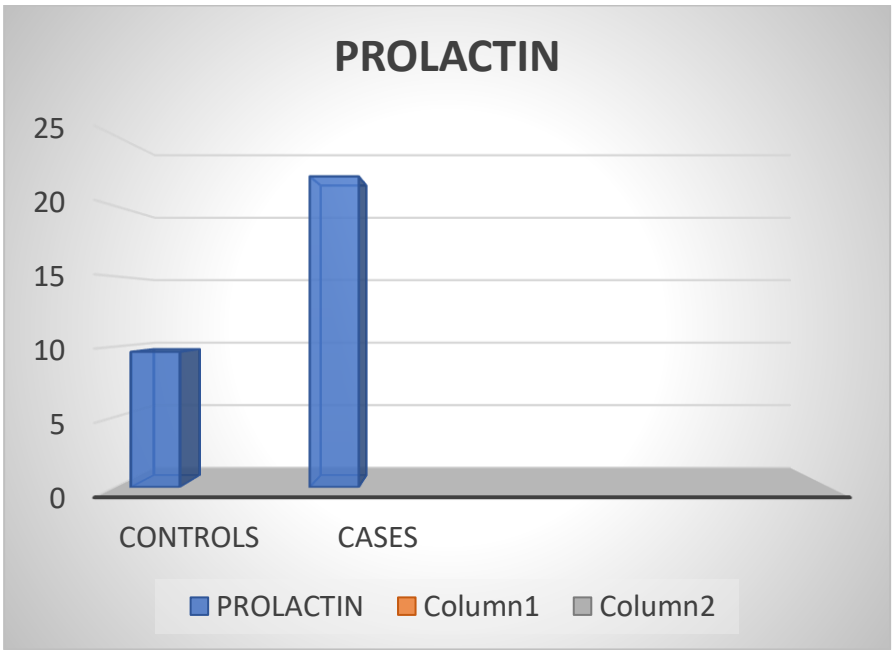

Fig1. Levels of Prolactin in both cases and controls

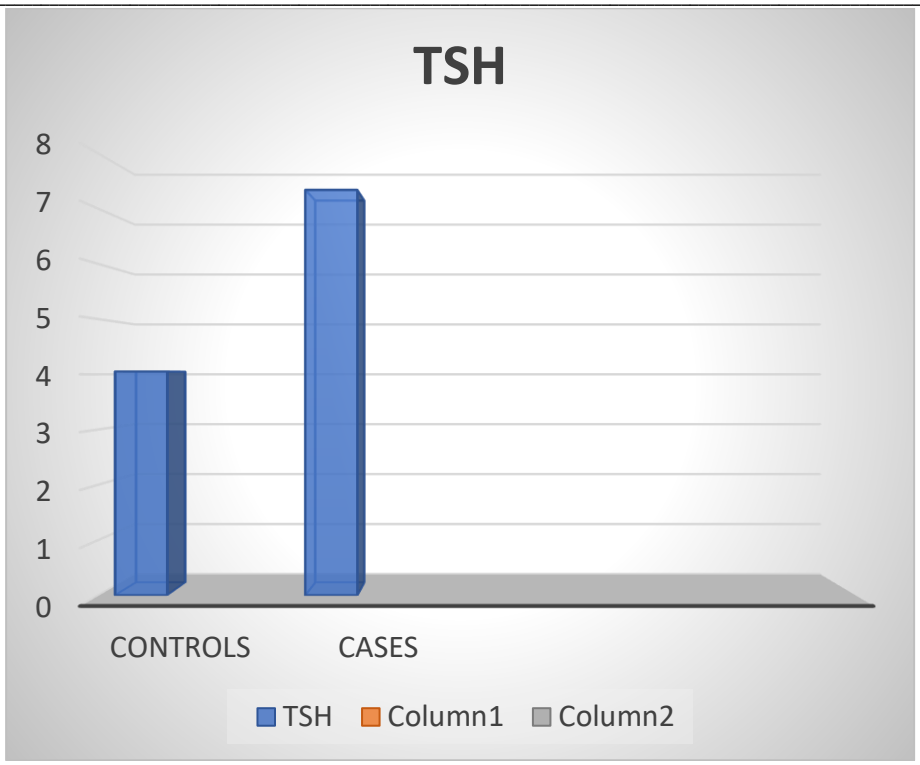

Fig2. Levels f TSH in boths cases and controls

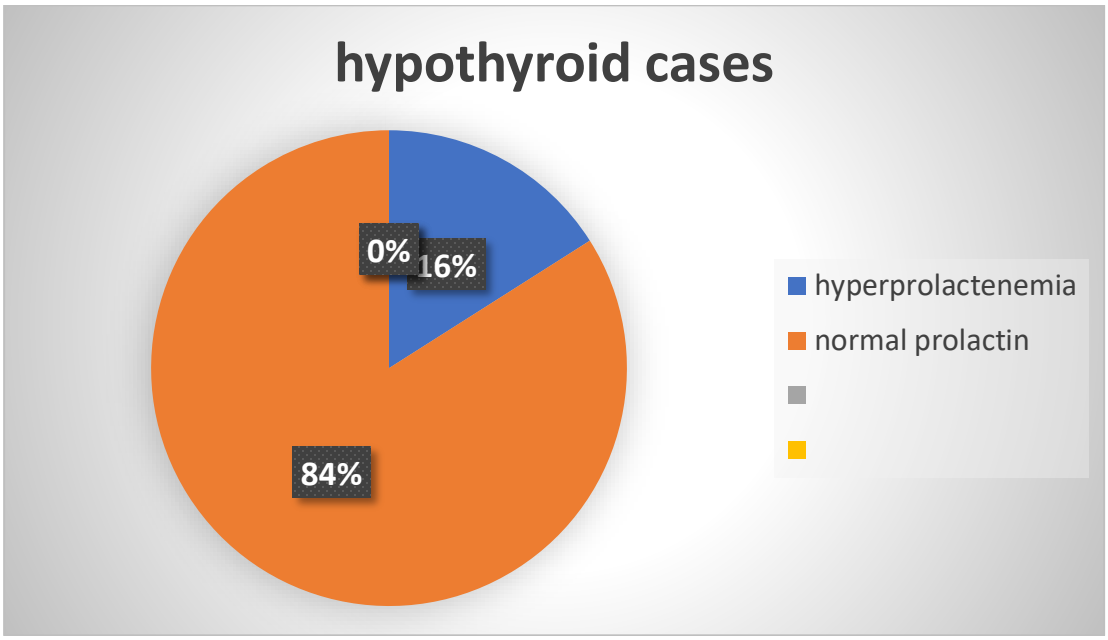

Fig3. Prevalence Hypothyroidism in cases and controls

Discussion

Hyperprolactinemia of variable magnitude (39% to 57%) has been reported in overt hypothyroidism in several studies; but research on the prevalence and extent of hyperprolactinemia in SCH are few and has different results [6-9]. Several mechanisms have been proposed for the increase in prolactin levels in primary hypothyroidism. First, elevated prolactin levels can be attributed to TRH which is a physiologic mediator of both PRL and TSH release [10]. A higher prevalence of hyperprolactinemia in hypothyroid females than males as observed in our study is because hypothyroidism per se is not sufficient to cause hyperprolactinemia and other stimulus, such as estrogen, is required for this effect [11,12]. Second, prolactin clearance may be decreased in hypothyroid patients [13]. Third, reduction in senstivity of prolactin production to the inhibitory action

of dopamine and dopamine agonists as suggested by Foord et al., in their study on cultured anterior pituitary cells from hypothyroid rats [14]. Fourth, thyroid hormone itself may also play an important role in the cause of hyperprolactinaemia. Davis et al., noticed that 3,5,3'-triiodothyronine reduces prolactin messenger RNA levels in rodent pituitary cells [15]. Thus, decreased circulating thyroid hormone levels result in increased prolactin synthesis. Bahar et al showed that prevalence of hyperprolactinemia in subclinical hypothyroidism is notable [16]. Sirohi ,et al done observational study showing possitive correlation between SCH and hyperprolactinemia and sterility [17,18].

In the present study, there is a significant association between subclinical hypothyroidism and Hyperprolactinemia with P- Value <0.05 has seen. therefore all hypothyroidism cases should be screened for hyperprolactinemia. Bahar A et al., in their study on subclinical hypothyroid patients for clinical related symptoms observed 23.5% menstrual disorders in hyperprolactinemic patients and 21.8% in normal prolactin groups [16]. According to Binita Goswami's study, amenorrhoea occurs in hypothyroidism due to hyperprolactinaemia which results from a defect in the positive feedback of oestrogen on LH, and because of LH and FSH suppression [19]. Supporting this view is the study by Turankar et al., who reported increase in the serum prolactin levels in infertile women as compared to those in the fertile ones in the control group [20]. In our study as well we observed raised PRL concentration in 4 out of 6 subclinically hypothyroid women with menstrual disorders and 10 out of 17 females with overt hypothyroidism. The increase in the incidence of hyperprolactinemia even in patients with subclinical hypothyroidism emphasizes the significance of prolactin screening in all hypothyroid cases. If thyroid tests are normal in a patient with high PRL levels, further tests should be done to determine the aetiology of the hyperprolactinaemia.

Conclusion

Hyperprolactinemia is more commonly seen with subclinical hypothyroidism. Close follow up of serum prolactin and TSH should be done, which is further evaluated for anti tpo or auto antibodies in order to rule out autoimmune diseases.

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