



RESEARCH ARTICLE



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Assessment of Serum Levels of Prolactin in Sudanese female patients with Primary Hypothyroidism- Khartoum State, Sudan

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Abstract

Objective: hyperprolactinemia is the most prevalent endocrine disorder in hypothalamic- pituitary axis especially among reproductive age women affecting about one-third of infertile women, on one hand the prevalence of hyperprolactinemia in hypothyroidism patients is considerable, hyperprolactinemia cause reproduction disorders (infertility), early diagnosis and treatment of these disease are important, on other hand Sudan studies focusing on serum level of prolactin in thyroid disorder are few, hence the present study has been undertaken to assess prolactin level in hypothyroidism, the objective of the present study is to assess the serum levels of prolactin in Sudanese females patients with primary hypothyroidism in comparison with healthy controls and to find out the incidence of hyperprolactinemia in hypothyroidism Sudanese patients and to evaluate the association between prolactin level and age of females.

Material and Methods: A clinical-based descriptive, analytical study conducted during period from January to October 2013. Forty patients with primary hypothyroidism (study group) and fifty healthy women non hypothyroidism (control group). All participants were selected randomly from Tuga Specialized Hospital and Asia Hospital in Khartoum state. The test and control group, were matched in term of age. The serum level of prolactin hormone was measured by using (ELIZA) commercial reagent kits from diagnostic reagent United Kingdom (OMEGA) diagnostic, serum level of FT3, FT4 and TSH hormone was measured by using Electrochemiluminescent (ECL) immunoassay.

Results : In this study the result s shows the mean level of FT3 and FT4 in study group was significantly decreased than control group, P value < 0.001 and The mean level of prolactin and TSH in test group was significantly increased than control group ,P value < 0.001. Moreover, A thirty of these patients(75 %) had hyperprolactinemia and ten(25%) are normal prolactin level , the mean age of hypothyroidism patients was 33.48±8.48, while it was 34.20±5.90 non hypothyroidism, there were no correlation between prolactin level and age in study group(r=0.002, P = 0.782).

Conclusion : The study showed that the incidence of hyper -prolactinemia in primary hypothyroidism is notable and this disorder is more common in female with primary hypothyroidism than normal individuals.

Keywords: Hyperprolactinemia, Hypothyroidism, Thyroid stimulating hormone, Thyroxin and Tri-Iodothyronine.

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Introduction:

Pathologic hyperprolactinemia is generally applied for the situation in which prolactin level increases because of some reasons other than physiologic causes [1], Hyperprolactinemia is a common problem in reproductive dysfunction affecting about 33% of infertile women [2]. Increased prolactin level (hyperprolactinemia) results in secondary hypogonadism and usually presents in a dimorphic fashion in both females and males. In females, elevated prolactin presents with galactorrhea, irregular or absent menses, infertility, or local symptoms of an expanding pituitary tumor [3], some of the women with galactorrhea and hyper prolactinemia might have primary hypothyroidism, this disease is characterized by low serum level of (FT4) and decreased negative feedback on the hypothalamopituitary axis. The resulting increased secretion of (TRH) stimulates thyrotrophs and lactotrophs, thereby increasing the levels of both (TSH) and prolactin [4]. On other hand increased level of serum prolactin has been reported in 30% of patients with primary hypothyroidism [5].

Prolactin secretion is controlled by prolactin inhibitor factor that releasing hormone (TRH) cause to increase prolactin secretion [2]. In fact, TRH in addition to increasing TSH causes to raise prolactin level [6]. In patients with primary hypothyroidism, increased levels of TRH can cause to raise prolactin levels and these patients may have galactorrhea [7].

Previous studies reported the incidence of hyperprolactinemia in female infertility and its correlation with hypothyroidism. There was a high incidence of hyperprolactinemia in infertile women. A positive correlation of 1:4 was found between hypothyroidism and hyper prolactinemia [4]

Sharma et al found that a high incidence of hyperprolactinemia in infertile women and it was positively associated with hypothyroidism [8].

Goswami B et al study the correlation of prolactin and thyroid hormone concentration with menstrual patterns in infertile women, who found that there was a greater propensity for thyroid disorder in infertile women than the fertile ones. There was also a higher prevalence of hyperprolactinemia in infertile patients, investigated women with primary infertility. The majority of the infertile and fertile women were euthyroid. In infertile group, the crude prevalence of hypothyroidism was slightly higher in the infertile group in comparison with that of the general population. There was a positive correlation between serum TSH and prolactin levels in the infertile subjects were reported by about 60% of the infertile women.

The infertile women with hypothyroidism had significantly higher prolactin levels when compared to the subjects with hyper- or euthyroidism [9].

In Sudan there is no published data concerning serum prolactin level in patients with hypothyroidism. Therefore the present study was conducted to assess the incidence of hyperprolactinemia in hypothyroidism Sudanese patients and to evaluate the association between prolactin level and age of females.

Materials & Methods:

A clinical-based descriptive, analytical study conducted during period from January to October 2013. 40 primary hypothyroidism female patients aged 20-60 years were enrolled as test group. The test group was compared with a control group which included 50 apparently healthy volunteers. All participants were selected randomly from Tuga Specialized Hospital and Asia Hospital in Khartoum state. The test and control group, were matched in term of age. Exclusion criteria of participation in this study were: pregnant and lactated women with hypothyroidism, renal failure, primary hyperprolactinemia. A questionnaire was designed for the evaluation of hypothyroidism for all qualified people. Serum prolactin were measured by OMEGA kit ELIZA method. The thyroid estimating hormone (TSH), tri-iodothyronine (T3) and thyroxine (T4) measured by Electrochemiluminescent methods by using automated analyzer (Elecsys 2010).

Statistical Analysis:

Data was analyzed using statistical package for social sciences (SPSS ver.17). Comparison of means of FT3, FT4, TSH and prolactin hormone was conducted using t. Test. Correlation between age and prolactin was measured using person correlation. Test was considered significant, when P. value is less than 0.05. Data was presented inform of tables and figures.

Results:

A total of forty with primary hypothyroidism and fifty apparently healthy females as controls were enrolled in this study. The mean age of hypothyroidism patients was 33.48 ± 8.48 , while it was 34.20 ± 5.90 non hypothyroidism, there was insignificant difference regarding age between two groups ($P > 0.05$).

Table(1) shows the mean level of FT3 and FT4 in study group was significantly decreased than in control group, P value < 0.001 & the mean level of prolactin and TSH in test group was significantly increased than in control group, P value < 0.001 .

Hormone	Test group (n= 40)	Control (n= 50)	P. value
FT3 (Pmol/l)	2.28 ±1.76	4.71±0.61	<i>P</i> < 0.001
FT4 (Pmol/l)	5.64±3.53	12.64±2.83	<i>P</i> < 0.001
TSH mIU/l	50.93±36.36	1.93±1.20	<i>P</i> < 0.001
Prolactin ng/ml	40.73 ±37.07	8.13±3.66	<i>P</i> < 0.001

The table shows the mean ± SD and probability (P). T-test was used for comparison. P value ≤ 0.05 was considered significant.

Table (1) shows Comparison of means of FT3, FT4, TSH and prolactin hormone between control and study group.

Figure (1) shows insignificant correlation between S prolactin and age of the study group (*r*=0.002, *P* = 0.782)

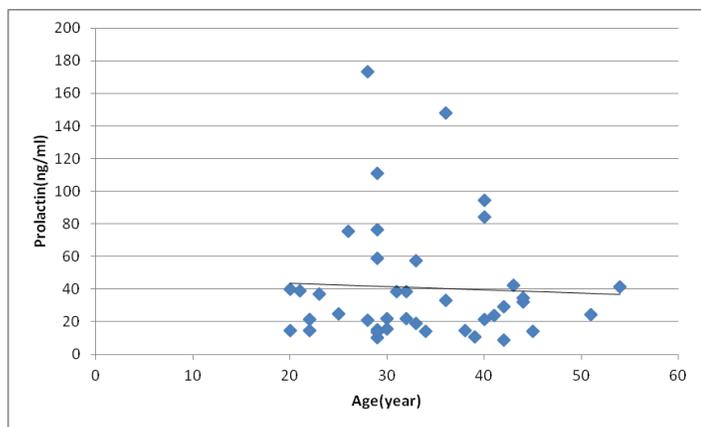


Fig. 1 Ascatter plot shows the relationship between S prolactin(ng/ml) and age (year) of the study group (*r*=0.002, *P* = 0.782)

Figure (2) shows level of prolactin hormones between primary hypothyroidism(test group) and non primary hypothyroidism (control group)was measured by using Chi square test. In study group thirty of patients (75%) were higher than reference value and ten (25%) were normal ,while in control group one (2%) were lower than reference value and forty nine (98 %) were normal (*P* < 0.001).

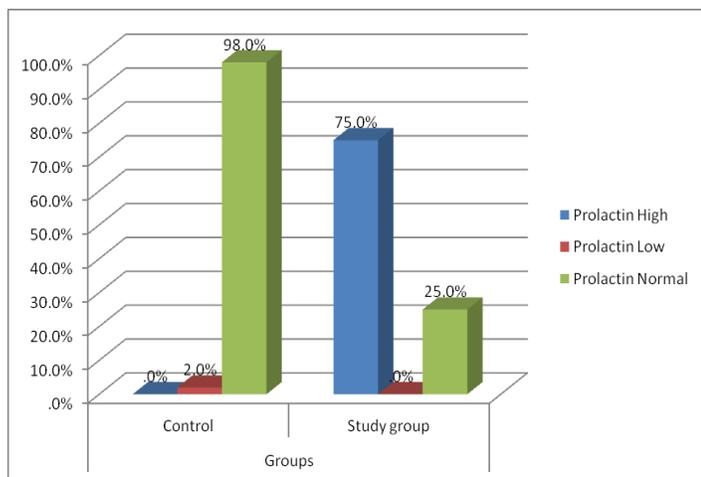


Fig. 2: Association between Prolactin and groups (*P* < 0.001).

Discussion:

In present study, the effect of primary hypothyroidism on prolactin level was evaluated in females patients with primary hypothyroidism compared to healthy females. 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 association with hypothyroidism. 40 diagnosed outpatients with primary hypothyroidism after the confirmation of primary hypothyroidism by repeated measurement of FT3, FT4 and TSH. From 40 patients, 30 (75 %) were found to had hyperprolactinemia, as it proved, this matched the previous studied achieved in this aspect. The serum prolactin concentration increased in primary hypothyroidism group as compared to that in the control group and it was found to be statistically highly significant. The serum TSH concentration increased in primary hypothyroidism group as compared to that in the control group and it was found to be statistically highly significant. The mean age of patients of primary hypothyroidism is (33.48±8.48), while it was (34.20± 5.90) in healthy females and it was found to be statistically insignificant. So that indicated the highest rate of hyperprolactinemia prevalence in our study was in age range of 20 to 60 years. This study agrees with a study done by Lunenfeld *et al.* (10), suspected that the patients with increased prolactin values were often hypothyroidism. Hyperprolactinemia which results from a longstanding primary hypothyroidism has been implicated in ovulatory dysfunctions due to an inadequate corpus luteal progesterone secretion. Also, when the circulating prolactin levels are high, they lead to oligomenorrhoea or amenorrhoea furthermore, Kumkum A (11), stated that amenorrhoea occurs in hypothyroidism due to hyperprolactinemia, which results from a defect in the positive feedback of oestrogen on LH, and because of the suppression of LH and FSH. It also mentioned that the prevalence of ovulatory dysfunction was one of the causes of female infertility, These findings were similar with the report of Raber *et al* (12) that menstrual disorder was seen in 26% of the hyperprolactinemia patients.

Conclusion:

It is obvious from the results of this study that the prevalence of hyperprolactinemia in primary hypothyroidism patients is considerable regardless to their age. Hyperprolactinemia causes reproduction disorders in women, early diagnosis and treatment of this disease is important.

Recommendations:

It is hoped that these insights may lead to further research on the role of prolactin hormone associated with fertility and infertility. Health education about

routinely ordering of serum thyroid function test and PRL are check at the time of the couple's initial consultation for infertility. It is also suggested that it is important to determine the causes of hyperprolactinemia. This will lead to diagnosis and better management of hyperprolactinemia.

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