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Estimation of LH,FSH, Prolactin And TSH Levels In Polycystic Ovarian Syndrome And Correlation of LH And FSH With Serum TSH Levels

Dr. GulabKanwar[1], Dr.Neelam Jain [2], Dr. Monika Shekawat[3], Dr.Nidhi Sharma[4]
1 - Professor and Head, Government Medical College, Kota, Rajasthan, India
2, 3 ,4 - P G Resident, Government Medical College, Kota, Rajasthan, India

Abstract
Background &Objectives:-*PCOS is the most common endocrine disorders among women between the ages of 18 and 44. It affects approximately 5% to 10% of this age group. It is one of the leading causes of poor fertility. PCOS patients usually develop thyroid disorders which have an adverse effect on fertility and other hormones. Hence this study was done to estimate levels of LH, FSH, Prolactin and TSH hormones and to find a correlation between LH,FSH and TSH levels.*
Methodology: *The study was carried out in New Medical College Hospital (NMCH), Kota, Rajasthan. The study period was from January 2013 to March 2015. 100 patients were studied. Out of them 50 were cases which were diagnosed as PCOS on basis of Androgen Excess PCOS Society. 50 were controls who were healthy females. The cases were divided in two groups according to age. In one group the age was from 17 to 25 years (Group A) and in second group the age was from 26 to 40 years (Group B).LH,.FSH, Prolactin and TSH levels were estimated in serum and compared with age matched controls.*
Results: The *study showed that LH is raised in cases with p value of 0.0001 which is statistically significant.. LH is raised more in groupB (26.8* ***± 20.9)*** *as compared to Group A (17.3± 9.7) with p value of 0.04 which is statistically significantTSH is also raised incases (****5.3± 2.4****) as compared to controls (* ***2.32 ± 0.75****)with p value of 0.0001 which is statistically significant.In casesthe rise in TSH was much more in Group B (6.4 ± 2.6) as compared to Group A(4.3± 1.7)with p value of 0.002 . There was positive correlation between TSH and LH in both groups of cases. The ratio of LH/FSH was more than 2:1in cases. Prolactin and FSH levels were normal.*
Interpretation & Conclusion:*The results of our study showed that levels of LH were high in patients with PCOS with ratio of LH/FST >2 :1. Though there is a positive correlation between LH and TSH in both age group it is more significant in older group .TSH levels were high in cases which signifies the evaluation of thyroid function in PCOS patients.Thus It was concluded that in PCOS diagnosed patients we should evaluate thyroid functions along with hormonal evaluationto prevent further complications.*
Keywords*: Polycystic ovarian syndrome, hormonalprofile, thyroid function tests. TSH, LH*

I. Introduction

Polycystic ovary syndrome (PCOS) is also called hyperandrogenic anovulation (HA) or Stein–Leventhalsyndromeis a set of symptoms due to a hormone imbalance in women. Symptoms include irregular or no menstrual periods, heavy periods, excess body and facial hair, acne, pelvic pain, trouble getting pregnant, and patches of thick, darker, velvety skin. Associated conditions include Type 2 diabetes, obesity, obstructive sleep apnea, heart disease, mood disorders, and endometrial cancer.It is one of the leading causes of poor fertility. Risk factors include obesity, decreased physical exercise, and a family history of someone with the condition. It affects approximately 5% to 10% of this age group[1,] PCOS is the most common endocrine disorder among women between the ages of 18 and 44.[2]

Diagnostic Criteria[2:] In 2006, the Androgen Excess PCOS Society suggested a tightening of the diagnostic criteria to all of the following:[2]

1. excess androgen activity
2. oligoovulation/anovulation and/or polycystic ovaries
3. exclusion of other entities that would cause excess androgen activity

Women with PCOS are at risk for infertility and early pregnancy loss. Many are overweight, find it difficult to lose weight, and suffer with fatigue, depression and anxiety. There's a significant overlap of symptoms between PCOS and Thyroid Disease, despite the fact that they are two very different conditions.It is adversely affected by associated thyroid dysfunction. Both act as independent risks of ovarian failure and pregnancy related complications.

Therefore, this study was planned to evaluate the hormonal status ie (LH, FSH, LH, Prolactin) and thyroid stimulating hormone (TSH) in patients with PCOS to see if there is a relationship between PCOS and thyroid function.

II. Methodology

Study population

The study was carried out in New Medical College Hospital (NMCH), & Attached group of Hospitals,Kota, Rajasthan The study period was from January 2013to March 2015. A total of 100 patients of age group 17 - 40 years were studied of which 50 were cases and 50 controls. The cases were divided in two groups according to age. In one group the age was from 17 to 25 years (Group A) and in second group the age was from 26 to 40 years (Group B).

The patients were included if they satisfied the diagnostic criteria suggested by Androgen Excess PCOS Society. They were excluded if they were having DM II. Hypertension, liverdisorders ,renal disorders and other chronic diseases. After informed consent and brief clinical history, examination was done to rule out renal disorders, liver disorders or any other condition that would affect the parameters under study. LH.FSH. Prolactin and TSH was estimated and compared with age matched controls.

Sample collection

After overnight fasting, samples were collected in the morning on 3rd day of menses. The samples were left standing for one hour and then serum was separated by centrifugation at 3000 rpm for 10 minutes. The samples were analyzed onCobas e 411 in Department of Biochemistry .GMC, Kota for FSH, LH Prolactin and TSH levels.

Normal levels of FSHis 3-20 mIU/ml, LH< 7 mIU/ml , TSH .4-4 uIU/ml , Proiactin< 24 ng/ml on 3rd day of menses.

Statistical analysis:

Statistical analysis was carried out on Microsoft excel. Continuous parameters were expressed as mean ±SD.

Student´s t test was applied to the data. Pearson correlation was used to correlate LH and TSH, FSH and TSH.

P value < 0.05 was considered statistically significant.

III. Results

During the 27 month study period from January 2013 to March 2015 a total of 100 patients were studied of which 50 patients were cases that were categorized into Group A and Group B according to ageand 50 were controls who were normal females without any diseases in age group of 17-40 years. The controls were adjusted with the cases for age as shown in Table 1.

Table 1: Age in case and controls

Age In Years	Cases		Controls	
	No.	%	No	%
17.25 (Group A)	25	50	25	50
26-40(Group B)	25	50	25	50
Total	50	100	50	100

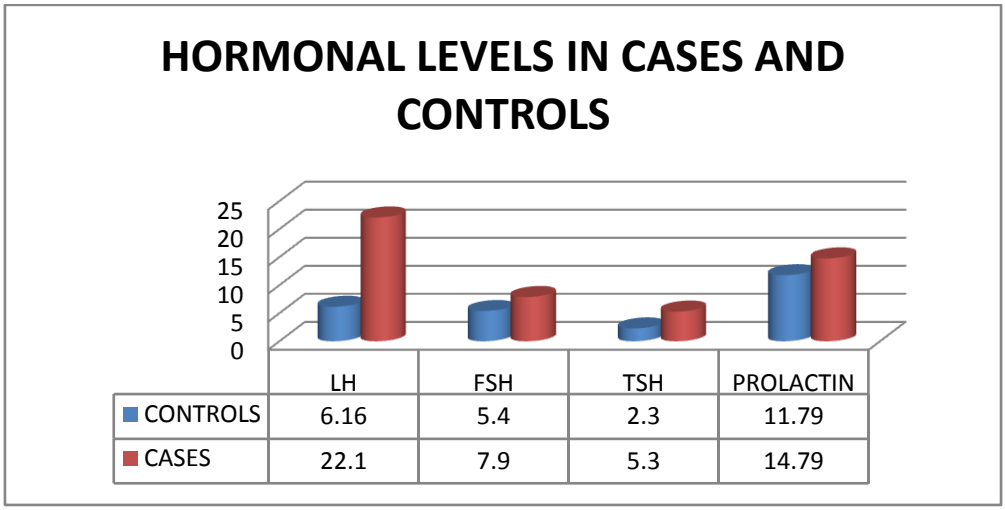
Levels of hormones in cases and controls

LH levels are significantly raised in cases with p < o.oo1.There is no significant difference between Prolactin levels in cases and controls.(p =0.09)TSH levels are significantly raised in cases with p < o.oo1.This shows that as LH increases TSH also Increases in PCOS patients. (Table 2, Chart 1) FSH levels are 7.9 ± 4.6 mIU/ml as compared to 5.4 ± 2.5mIU/ml in controls.p< o.o1.Prolactin levels are normal in both groups.(p= o.o9)

Table 2: Study Parameters between Cases and Controls

	controls	cases	t	p	Significance
LH	**6.16± 3.3**	**22.1± 16.86**	**6.5**	less than 0.0001	extremely statistically significant.
FSH	**5.4± 2.5**	**7.9± 4.6**	**3.38**	**0.001**	extremely statistically significant.
TSH	**2.3± 0.7**	**5.3± 2.4**	**8.4**	less than 0.0001	extremely statistically significant.
PROLACTIN	**11.79 ± 6**	**14.79 ± 10.36**	**1.7**	**0.09**	notstatistically significant.

Chart 1



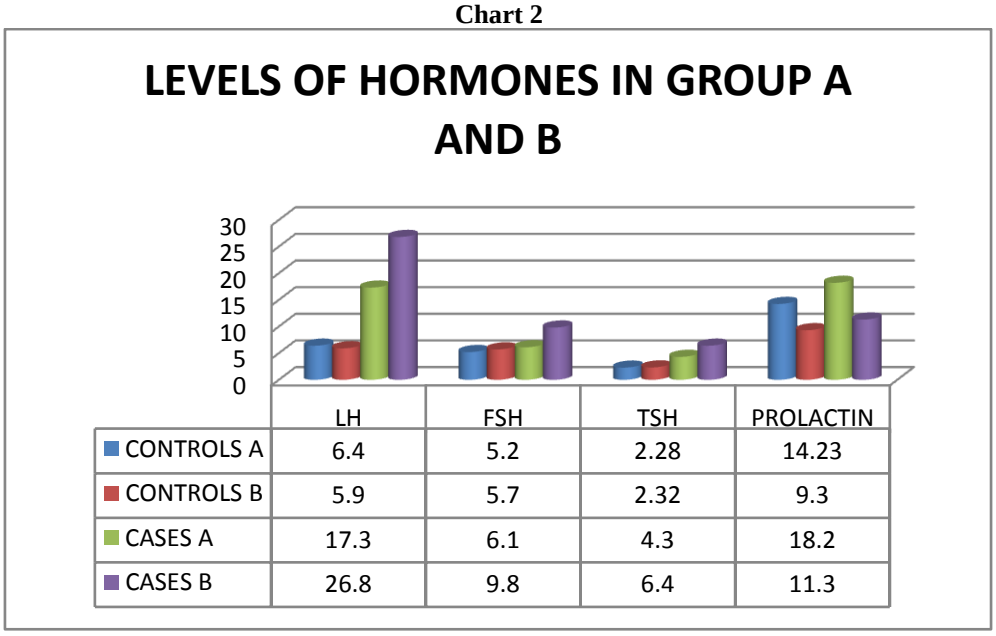
Levels of hormones in Group A and Group B of Cases and controls

The casesand controls were divided in two groups. A group consisted of patients 17-12 years of age.B group consisted of patients 26-40 years.LH levels are significantly higher in group B casesthan group A with p value < 0.05FSH levels are in normal range in both groups but group B has higher values.(p =0.0042) Prolactin levels is in normal range in bothgroups but group a showed higher levels as compared to group B.(p =0.01)TSH levels are raised in group B cases(6.4 ± 2.6 uIU/ml)as compared to group A cases. (4.3 ± 1.7 uIU/ml) with p value <0.05 which is statistically significant. This shows that hypothyroidism is present in cases. It is more in age group 26-40 years.(Table 3, chart 2)

Table 3: Study Parameters between Cases and Controls according to groups.

Parameter	**CONTROLS**			
	GROUP A(Mean ± SD)	**GROUP B (Mean ± SD)**	t	p
LH	6.4 ±3.5	5.9 ±3.1	o.5	0.6
FSH	5.2 ±2.3	5.7 ±2.6	0.7	0.48
TSH	2.2 ±o.78	2.3 ± 0.74	8.4	0.68
PROLACTIN	14.3 ±8.5	9.3 ±3.7	1.7	0.012

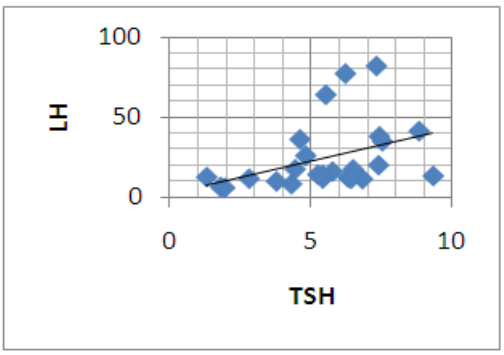
Chart 2



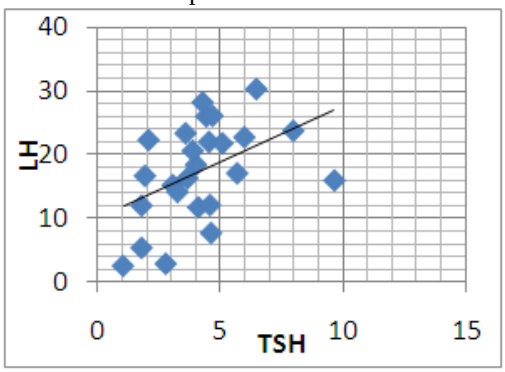
Correlation between LH and TSH in cases

There is positive correlation between LH and TSH in both groups of cases r =0.7 and p < o.oo1 which is statistically significant. This shows that as LH levels increases chances of hypothyroidism increases.

Chart 3Group A Cases



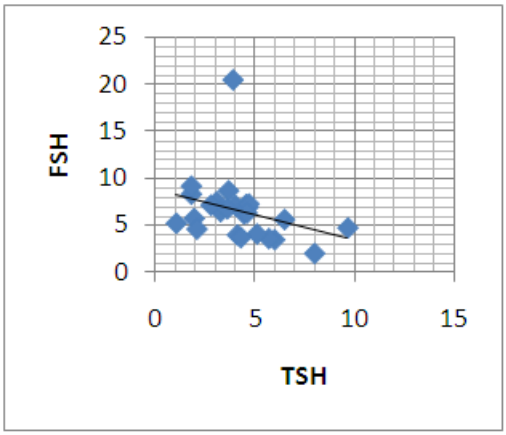
Group B Cases



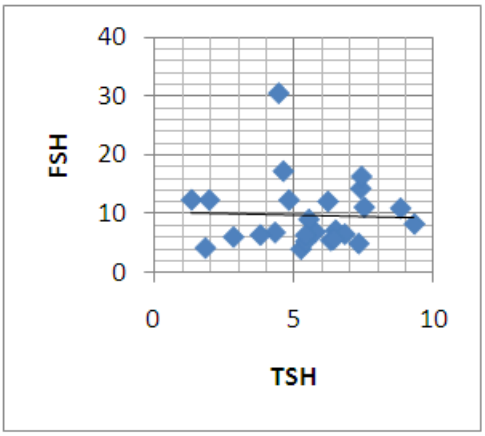
Correlation between FSH and TSH in cases

The correlation is negative with r – 0.43 , p = 0.007 in group A and positive with r =0.42 , p = 0.04 in group B . Chart 4

Group A Cases



Group B Cases



IV. Discussion

Our study showed that women with PCOS have higher TSH levels and are also more likely to have subclinical hypothyroidism when compared to age-matched controls without PCOS.This is in agreement with study done by Janssen OE et al.[3]Several studies have suggested a lower cut off than the conventional 4-5 miU/L to define subclinical hypothyroidism. The National Academy of Clinical Biochemistry (NACB)'s laboratory guidelines state that >95% of rigorously screened normal euthyroid volunteers have serum TSH values between 0.4 and 2.5 mIU/L[4]A 2011 study compared two groups of women with hypothyroidism—one group with polycystic ovaries and the other with normal ovaries—to a group of women with normal thyroid function. The researchers discovered that the hypothyroid women had larger ovaries. Providing thyroid hormone replacement therapy reduced the size of the ovaries in both groups of hypothyroid women, and improved TSH, FT3 and FT4, prolactin, estradiol, free testosterone and total testosterone levels.[5]Dahiya et al also found raised levels of TSH inPCOS patients.[6]Ghosh, et al. tried to evaluate the role of hypothyroidism in the causation of PCOS .Hypothyroidism can lower the levels of sex hormone binding globulin (SHBG) which in turn can lead to higher concentrations of free testosterone . After two years Wakim, et al. in their research on human reproductive biology also reestablished the hypothesis that hypothyroidism worsens PCOS by further decreasing sex hormone binding globulin levels, increasing the conversion of androstenedione to testosterone and aromatization to estradiol and reducing the metabolic clearance rates of androstenedione and estrone. Since thyroid hormones are involved in the gonadotropin induced estradiol and progesterone secretion by human granulosa cells, hypothyroidism would interfere with ovarian function and fertility.High level of testosterone contributes to PCOS symptoms like infertility, polycystic ovaries, hirsutism, male pattern hair loss and acne.[3]In our study mean serum LH was significantly higher than mean serum FSH in PCOS women compared with

control subjects.The ratio is more than 2.This has been also seen in other studies-ShaheenAraAnwary, et al. found raised LH (>14) in 56% patients, Banaszewaska, et al. found raised LH/FSH ratio in 45.4% of their patients and Anlakesh, et al. detected a prevalence of raised LH/FSH in 64% of their 107 PCOS patients[9] [,1O] Legros et al found a modest association between raised LH to FSH ratio in women with polycystic ovarian morphology[11]. Disturbed pulsatile release of gonadotrophin releasing hormone (GnRH) results in the relative increase in LH to FSH release due to Hypothalamic-pituitary-ovarian or adrenal axis abnormality[12].

V. Conclusion

There is high prevalence of thyroid disorders in PCOS patients .This points towards the importance of early correction of hypothyroidism in the management of infertility associated with PCOS.All women with PCOS should have their thyroid function tests evaluated thoroughly.Attention should be given to women in age group 25 -40 years. Thyroid health has a profound impact on the pathology of PCOS, affecting all aspects of the disorder. Correcting subclinical hypothyroidism will lead to improvementof overall hormonal and metabolic health. Long-term studies are required to assess the significance of thyroid dysfunction in patients with PCOS, especially on fertility.

References

[1]. "Polycystic Ovary Syndrome (PCOS): Condition Information". http://www.nichd.nih.gov/. 2013-05-23.

[2]. Teede H, Deeks A, Moran L (2010). "Polycystic ovary syndrome: a complex condition with psychological, reproductive and metabolic manifestations that impacts on health across the lifespan". BMC Med**8** (1): 41. doi:10.1186/1741-7015-8-41. PMC 2909929.PMID 20591140.

[3]. Janssen OE, Mehlmauer N, Hahn S, Offner AH, Gärtner R. High prevalence of autoimmune thyroiditis in patients with polycystic ovary syndrome. Eur J Endocrinol. 2004 Mar;150(3):363-9

[4]. NACB: Laboratory Support for the Diagnosis and Monitoring of Thyroid Disease. Laurence M. Demers, Ph.D., F.A.C.B.and Carole A. Spencer Ph.D., F.A.C.B

[5]. Muderris II, Boztosun A, Oner G, Bayram F. Effect of thyroid hormone replacement therapy on ovarian volume and androgen hormones in patients with untreated primary hypothyroidism. Ann Saudi Med. 2011 Mar-Apr;31(2):145-51

[6]. Dahiya K, Sachdeva A, Singh V, Dahiya P, Singh R , Dhankhar R, Ghalaut P, Malik I . Endocrinol 2012;3(6):WMC003455

[7]. Ghosh S, Kabir SN, Pakrashi A, Chatterjee S, Chakravarty B. Subclinical hypothyroidism: A determinant of polycystic ovary syndrome. Horm Res. 1993;39:61–6.

[8]. Wakim AN, Polizotto SL, Burholt DR. Augmentation by thyroxine of human granulosa cell gonadotrophin-induced steroidogenesis. Hum Reprod. 1995;10:2845–8.

[9]. Banaszewska B, Spaczyński RZ, Pelesz M, Pawelczyk L. Incidence of elevated LH/FSH ratio in polycystic ovary syndrome women with normo-and hyperinsulinemia. RoczAkad Med Bialymst. 2003;48:131–4.

[10]. Anlakash AH. Polycystic ovarian syndrome-the correlation between LH/FSH ratio and disease manifestation. Middle East FertilSoc Jl. 2007;12:35–40.

[11]. Legro RS, Strauss JF. Fertility and Sterility. 2002; 78 (3): 569–576.

[12]. Radosh L. Am Fam Physician 2009;79: 671-676.13.