

EVALUATING PROLACTIN DYNAMICS AND CLINICAL CORRELATES IN POLYCYSTIC OVARIAN SYNDROME

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ABSTRACT

Introduction: Hyperprolactinemia is a frequent endocrine issue that can affect men and women of all ages. Hyperprolactinemia is a common endocrine problem and may be detected in both women and men of all ages. This study aimed to investigate the association of hyperprolactinemia and polycystic ovary syndrome to clarify the approach in the management of PCOS patients.

Material & Method: A retrospective cross-section study done on 138 newly diagnosed patients of PCOS. Adult cases diagnosed by Rotterdam criteria and adolescent by clinical and biochemical parameters. Participants with hypertension, diabetes, hyperlipemia, cardiovascular disease, hypothyroidism, hypothalamic-pituitary diseases, pregnancy, kidney failure, liver failure, lactation, and receiving drugs were excluded.

Observation and Result: Mean age of the patients was 23-64 years. The normal prolactin level was detected in 61% and hyperprolactinemia in 39%. Accidental pituitary adenoma was discovered in 13% cases. Clinical features including hirsutism, hair loss, acne, and ultrasound findings were almost similar in all. Levels of estradiol levels, LH and the LH/FSH ratio were significantly higher in patients with normal prolactin levels compared to the patients with hyperprolactinemia.

Conclusion: Prolactin association with PCOS is significant. Precise investigation of the prolactin level in PCOS patients is recommended to detect the causes of hyperprolactinemia, especially macroprolactinemia.

KEYWORDS: Prolactin, PCOS, Mensural disorder, Pituitary.

INTRODUCTION

Between 5 and 10% of women who are of reproductive age may have Polycystic Ovarian Syndrome (PCOS), the most prevalent cause of anovulatory infertility [1]. The most prevalent signs of PCOS include irregular menstruation, hirsutism and obesity. Its diagnosis can be made using pelvic ultrasonography's characteristic picture, hyperandrogenism, and oligo-anovulation [2,3]. Hyperprolactinemia is a frequent endocrine issue that can affect men and women of all ages [4]. Hyperprolactinemia can be due to pathological conditions, physiologic changes, drugs, and macroprolactin excess. Polycystic ovarian syndrome is one of the pathological conditions apart from, chronic kidney disease, chest wall surgery or trauma, cirrhosis, prolactinoma and hypothyroidism [5]. In 30% of PCOS cases, there is a little increase in blood prolactin (PRL) levels during both the follicular and luteal phases [6]. Studies have shown that an increase in blood prolactin levels may cause both a decrease in ovarian follicles and decrease in ovulation [7]. However, some studies that excluded transient elevations of prolactin using serial serum sampling, have shown a less frequent association of these disorders [8,9]. Thus, little is known regarding the relationship between serum PRL and metabolism in infertile females, despite a large number of studies. One significant subset of infertile women is PCOS patients. Hyperinflammation, insulin resistance, impaired glucose tolerance, metabolic syndrome, hyperlipidemia, hypertension, and a higher risk of cardiovascular disease are all intimately linked to PCOS [10,11,12]. Macroprolactin is described as a large molecule of prolactin that mostly binds to antibodies [13]. This molecule can result in decreased renal clearance of prolactin and a concomitant increase in the serum level of prolactin [14]. Detecting macroprolactin as the cause of hyperprolactinemia is essential to avoid further radiological investigations or in appropriate treatment with dopamine agonists [15]. Drugs are also responsible for hyperprolactinemia. The most common drugs that can cause hyperprolactinemia, are anti-depressants, antipsychotics, and anti-emetics drugs [16,17].

We conducted this study with aim to elucidate the strategy in the treatment of PCOS patients, this study sought to explore the relationship between prolactin and polycystic ovarian syndrome. Also Correlation of serum prolactin and other

metabolic markers can guide about its importance in metabolism.

MATERIAL & METHODS:

A retrospective cross-sectional hospital based study conducted in the department of obstetrics and gynaecology, NKP Salve institute of medical sciences and Research Centre and Lata Mangeshkar Hospital Nagpur. After taking written informed consent from all enrolled PCOS patients, a detailed history taken and a general and systemic examination [done](#). In adults, PCOS was diagnosed using the revised Rotterdam criteria. In adolescent (ages 10 to 18) girls, PCOS diagnosis was made based on clinical and/or biochemical HA (after exclusion of other causes) in the presence of persistent menstrual irregularities. Total 138 newly diagnosed patients of PCOS were enrolled. A questionnaire was used to collect data on each patient's demographics, medical history, menstrual history, clinical examination (including height, weight, BMI), and laboratory test findings. Hormone profile was evaluated for each patient on the second or third day of menstruation including total testosterone level, estradiol, LH, FSH, TSH, DHEAS, and 17OHP. FBS, insulin level were also measured. For each participant, a fasting serum sample was taken three to four hours after they woke up in order to measure their prolactin level.

Data collected was entered in SPSS software version

2.0. Chi-square test applied to see the association between two variables and student t-test was applied to see the difference between two means.

OBSERVATION & RESULTS:

We enrolled 138 PCOS patients in this study. The mean age of the patients was 23-64 years. In almost all the patients persistent menstrual irregularities was the presenting complaint. The normal PRL level was detected in 84 patients (61%) and hyperprolactinemia was diagnosed in 54 patients (39%) of PCOS.

All 138 patients were divided in 04 groups based upon the serum PRL levels and other mentioned features:- Group I with normal PRL level (n= 84), Group II with macroprolactinemia (n= 32), Group III with pituitary adenoma (n=15) and Group IV is idiopathic hyperprolactinemia (n=07). Thirty two patients (59% of 54) with hyperprolactinemia had normal serum PRL levels after PEG precipitation (macroprolactinemia) and 22 (41%) patients remained in the group of hyperprolactinemia after PEG evaluation. Then, the last group of patients with hyperprolactinemia after PEG evaluation underwent brain MRI to detect pituitary adenoma. Subsequently, pituitary adenoma was discovered in 15 (27%) patients in the MRI scan. Seven patients (13%) had normal MRI scans and categorized as idiopathic hyperprolactinemia.

The levels of LH and the LH / FSH ratio were significantly higher in patients with normal PRL levels (group I) compared to the patients with hyperprolactinemia (group II, III & IV). However, serum estradiol level was significantly higher in patients with hyperprolactinemia (group II, III & IV) compared to the patients with normal PRL levels (group I). Similarly level of serum testosterone was found higher in group II i.e. Group with normal PRL level as compared to groups having higher PRL level. Serum insulin level was highest among group I patients and lowest in group IV patients. Menstrual irregularities were observed more frequently among PCOS subjects with pituitary adenoma. Clinical features including hirsutism, hair loss, acne, and ultrasound findings were not significantly different between groups.

Table01: Comparison of Clinical Findings of Patients

Features	Group I (Normal Prolactin, n=84)	Group II (macroprolactinemia, n=32)	Group III (Pituitary Adenoma, n=15)	Group IV (idiopathic hyperprolactinemia, n=07)
Menstrual irregularities	73 (87%)	24 (75%)	15 (100%)	06 (85%)
Hirsutism	62 (75%)	23 (72%)	14 (93%)	05 (71%)
Acne	46 (46%)	19 (60%)	08 (53%)	04 (57%)
Hair loss	55 (55%)	21 (65%)	09 (60%)	05 (71%)
Ultrasound findings	70 (83%)	25 (78%)	09 (60%)	04 (57%)

Table02: Comparison of Bio chemical Characteristics between nGroups

Parameter, mean value	Group I (Normal Prolactin 84)	Group II (macroprolactinemia 32)	Group III (Pituitary Adenoma 15)	Group IV (idiopathic hyperprolactinemia 07)
Insulin mIU/ml	12.21	11.60	11.05	10.76
LH mIU/ml	8.71	7.11	7.53	7.28
FSH mIU/ml	5.41	5.58	6.28	4.81
LH/FSH ratio	1.84	1.42	1.40	1.32
Testosterone ng/ml	0.88	0.81	0.72	0.65
Prolactin ng/ml	16.50	44.30	57.65	48.40
Estradiol pg/ml	40.10	44.50	51.40	54.20

DISCUSSION

In our study we found that idiopathic hyperprolactinemia is least common. Also we observed higher levels of LH and /FSH ratio in patients with normal prolactin level compared to other group. Contradictory results were found in a study by Konrad et al. in 2015 which showed that PCOS was not associated with high serum prolactin levels and could not be considered as a part of the PCOS features; however, the necessity of checking the serum prolactin level in PCOS subjects has been issued. We found around 22% patients with macroprolactinemia similar results were reported by Robin et al. where they recommended detecting macroprolactinemia before considering any diagnostic procedures such as brain MRI [18]. Bahceci et al. study revealed that higher levels of prolactin in PCOS patients were due to insulin resistance phenomenon [19]. We reported 15 cases of pituitary adenoma in our study, other study also proposed that more diagnostic tests needed for PCOS patients with hyperprolactinemia to reveal secondary hyperprolactinemia causes such as pituitary adenoma and macroprolactinemia [20].

CONCLUSION

Prolactin association with PCOS is significant. Precise investigation of the prolactin level in PCOS patients is recommended to detect the causes of hyperprolactinemia, especially macroprolactinemia. Different diagnostic tests are needed for PCOS patients with hyperprolactinemia. However sample size in our study was less thus larger studies with more sample size needed for consolidating our findings.

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