Original Research Article

Correlation between polycystic ovarian syndrome and endocrinological ad metabolic disorder in obese and non-obese

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Abstract

Polycystic ovarian syndrome (pcos) is well known endocrinopathy Associated with olio or anovulation, Hypoandrogenism and polycystic ovary. The aim of present study was to find a correlation between pcos and endocrinollgical and metabolic disorder, in obese and non obese. Present study was conducted at department of physiology Darbhanga medical college laheriasarai Bihar. Pcos patients were recruited from the outpatient department of obs and genae of Darbhanga medical college& hospital laherasarai Bihar. Sample size was 50 patients. The different investigation including serum FSH, lipid profile, fasting insulin and plasma fasting glucose were done. In our study we found that in non obese mean lh\, FSH is higher whereas FSH is normal. In obese mean fasting insulin level and total mean testosterone, level is higher.

Key Word: polycystic ovarian syndrome, metabolic disorder, obesity.

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INTRODUCTION

Polycystic ovarian syndrome (PCOS) is an endocrinopathy; typified by oligoovulation or anovulation sign of androgen excess and multiple ovarian cyst. These sign and symptom varies widely between women. PCOS appears to equally affect all races and nationalities. PCOS is most common endrocrine disorder of reproductive age group and affect 4 to 12 percent. The term PCOS came in use in 1960, when it was understood that clinical and histological diversity was typical of a syndrome. In 1990, the conference was held by national institute of Health-National Institute of Child Health and Development (NIH-NIHCD), and the majority of participant agreed that PCOS should be defined by clinical and or biochemical evidence of hyperandrogenism and anovulation, after exclution of known disorders such as hyperprolactinemia, thyroid disorders, adrenal hyperplasia, androgen producing ovarian tumor. In 2004 Rottendom workshop group redefined PCOS according to him affected individual must have two of the following three criteria (1) oligo or anovulation (2) hyperandrogenism (clinical or biochemical) and (3) polycystic ovary identified sonographically. Chronic anovulation may present as irregular menstrual periods or oligomenorrhea. It is not essential to document anovulation by ultrasonography or progesterone measurements in the presence of a clear clinical history. In fact, PCOS occurs in 85 to 90% of women with oligomenorrhea and in 30-40% of women with amenorrhea. Anovulation in PCOS women is associated with a steady-state levels of gonadotropins and ovarian steroids. PCOS women are thus in a “chronic estrous state”. Constant estrogen exposure leads to proliferation and hyperplasia of the endometrium and this can lead to unpredictable bleeding episodes.

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Hyperandrogenism is usually suggested by the presence of hirsutism (occurs in approximately 80% of PCOS women) and can be documented by measuring androgen levels in the blood. Free testosterone is the most frequently elevated steroid in the blood in PCOS. Circulating levels of total testosterone, androstenedione and Dehydroepiandrosterone (DHEA) are also elevated (normal value DHEA 3.9-10.66 □mol/L). In obese PCOS women, sex hormone binding globulin (SHBG) levels are decreased (a well-known effect of obesity per se) and this leads to an increase in free testosterone levels. Furthermore, insulin is a negative regulator of the production of SHBG by the liver, and SHBG levels are decreased in hyperinsulinemic conditions such as metabolic syndrome and visceral obesity. Interestingly, concentrations of sulfated DHEA (DHEAS) are also increased in the blood. DHEAS is secreted exclusively by the adrenal glands. The mechanism of increased DHEAS production by the adrenals is not yet known, although insulin and IGF-1 have been shown to up-regulate.

AIMS AND OBJECTIVES

PCOS is a risk factor for type ll DM, cardiovascular disorder and cancer in breast.(46a,46b,46c,46d) complication do not occur in all cases. Metabolic and endocrine abnormalities change with changing age, BMI, ethnicity, positive correlation between age and glucose to insulin ratio, while negative correlation between age and testosterone as well as insulin (BiliH, lovelzall 2001) was observed. PCOS patient with obesity have higher testosterone, triglyceride, VLDL concentration than non-obese PCOS (Pirwany IR, Fleming R, *et al* 2001). Similarly Asian people with PCOS have higher fasting insulin, lower insulin sensitivity than European people. (Chandrica N, Adam H, 2001). In the view of such conflicting reports objective of ths study is to know

1. The endocrine and metabolic alteration in patient with PCOS
2. To further characterize this metabolic alteration with changingage, BMI, ethnicity.

MATERIALS AND METHODS

The present study was conducted at Department of Physiology, Darbhanga Medical College, Laheriasarai, PCOS patients were recruited from the out-patients of the Department of Obstetrics and Gynecology of DARBHANGA MEDICAL COLLEGE AND HOSPITAL, Laheriasarai, Bihar. Based on the criteria derived from the 1990 National Institutes of Health (NIH) conference, diagnosis of PCOS was established when either oligomenorrhea(cycles lasting longer than 35 days) or amenorrhea (less than two menstrual cycles in the past 6 months) and either clinical signs of hyper and rogenism (hirsutism or obvious acne or alopecia and/or an elevated total testosterone (normal range: testosterone(total)<86ng/ml)., were found, and other ovarian, thyroid diseases and hyper-prolactinemia, that may be associated with oligomenorrhea and/or hyperandrogenism, were excluded. Oligoovulation or anovulation is usually associated with oligo-menorrhea or amenorrhea. If serum testosterone is > 200ng/dl, the case may be due to ovarian tumor. Hirsutism was routinely graded by two physicians independently using the common modified Ferriman–Gallwey (FG) score. FG scores neverdiffered by more than 2 and when not identical were re-evaluated by a third physician and the median value used. This methodto assess hirsutism requires the visual scoring of the extent of terminal hairs in nine body areas, namely (a) upper lip,(b) chin, (c) chest, (d) upper abdomen, (e) lower abdomen, (f)upper back, (g) lower back, (h) thighs and (i) upper arms. The lower arms or lower legs are not included in the hair assessment. Each area is scored from 0 to 4, resulting in a possible maximum score of 36. Hirsutism was diagnosed when a score more than 5 was evaluated. Childhood onset hirsutism cases are excluded from the study because those cases may be due to congenital adrenal hyperplasia All recruited women were otherwise healthy. Healthy controls (n = 50) were taken with a subgroup of lean PCOS, BMI< 25kg/m2 women (n = 25) and obese PCOS, BMI ≥30 kg/m2. Controls were recruited from a group without oligomenorrhea or sign of hyper androgenism. PCOS as well as control, subjects were not given any medication known to affect carbohydrate metabolism or endocrine parameters for at least 3 months before entering the study. Women taking contraceptive pills will be also excluded from the study.

OBSERVATION AND DISCUSSION

The spectrum of PCOS clinical signs appeared very heterogeneous, from minimal symptoms of hyperandrogenismin lean women with regular menses (231), to severe disease in obese and amenorrhoeic patients. Multiple hormonal and metabolic abnormality occurs in PCOS. These are

1. gonadotrophin abnormality,
2. insulin resistance,
3. sex steroid abnormality and
4. dyslipidemia.

Gonadotrophin abnormality In our study mean serum concentration of LH of 22 non-obese PCOS was higher than 20 obese PCOS and statically significant (p <.01) while serum FSH level between two group was not statistically significant(p=.651) and LH/FSH ratio is higher in non-obese group than obese group and it is statistically significant (p=.0005 i.e. value < .05). If we

compare this value between PCOS group and BMI match control we found that in non obese PCOS group serum LH level is higher than non-obese control and it is statically significant (p value <.001). Serum LH level is also higher in obese PCOS than obese control and it is statically significant (p value < .001).). Serum FSH level is unaltered in non-obese PCOS than non-obese control and it is statically insignificant (p value =.651 i.e. <.05). Serum FSH level is also unaltered in obese PCOS than obese control and it is statically insignificant (p value = .642 i.e. <.05). In non obese PCOS group serum mean LH/FSH ratio is higher than non-obese control and it is statically significant (p value < .001). Serum mean LH/FSH ratio is also higher in obese PCOS than obese control and it is statically significant (p value < .001). In our study Elevated LH/FSH ratio (LH/FSH>2) was found only in 77% of the studied non-obese PCOS women (17 cases out of 22). Elevated LH/FSH ratio (LH/FSH>2) was found only in 45% of the studied obese PCOS women (9 cases out of 20).Serum LH and LH ratio are strongly negatively correlated, BMI: LH (r = -0.389, p < 0.01), LH/FSH ratio (r= - 0.399, p< 0.1).

CONCLUSION

PCOS has been one of the most explored and controversial areasin reproductive medicine. So is a subject of continuous studies concerning both pathogenesis, diagnostics methods, and therapeutics procedures. It is associated with endocrine and metabolic abnormalities.

- Serum LH in non-obese PCOS is higher than obese PCOS and control.
- While serum FSH level between two group is unaltered in all group.
- In non obese PCOS group serum mean LH/FSH ratio is higher than non-obese control and obese PCOS
- LH and LH/FSH ratio are positively correlated with BMI.
- LH and LH/FSH ratio are negatively correlated with AGE
- Our PCOS population reflects the syndrome heterogeneity: we found that low(< 4.5) fasting G/I ratio affected 22% cases of non-obese PCOS, while in obese-PCOS percentage is 75%. while in obese control percentage is 25% and non-obese control no cases of low fasting G/I ratio.
- Serum fasting insulin level(mean) is higher in obese PCOS than both obese control and non obese PCOS. In obese PCOS group serum fasting G/I ratio (mean) is higher than both non-obese PCOS and obese control
- Serum total testosterone level(mean) is higher in obese PCOS than both obese control and non obese PCOS

PCOS is associated with raised level of VLDL and TG level and these are positively correlated with age. We can conclude that obese PCOS is more associated with insulin, testosterone level abnormalities and non obese PCOS is associated with gonadotrophin abnormalities.

REFERENCES

1. Harrison's Principles of Internal Medicine, 20th edition.
2. Williams Obstetrics, 25th edition.
3. Lobos R, CarminaE,The importance of diagnosis poly cystic ovarian syndrome, Ann intern med 2000:989-993.
4. SozenI, AriciaHyperinsulinism and its interaction with hyperandrogenism in polycystic ovarian syndrome, obsgynsurv 2001; 55; 321-328.
5. ZborowskiJV, CauleyJA, TalbottEO, etal.Clinical Review 116; Bone mineral density, androgen, and the polycystic ovary: the complex and controversial issue of androgenic influence in female bone,J CLIN.END.META. 200:85:3496-3508.
6. BarnsesR,RosenfieldRL,The polycystic ovarian syndrome; pathogenesis and treatement ,Ann intern Med 1986;110:386-399.
7. AchardC,ThiersJ,Levirilsme et son association a I'insuffienceglycolytique, BuilAcadNati Med 1921;86;51-83.

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