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RESEARCH ARTICLE

EVALUATION OF ANTHROPOMETRIC MEASUREMENTS AND ITS RELATION WITH GONADOTROPIN SECRETION IN PCOS WOMEN.

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Abstract

Objective:- To evaluate anthropometric measurements and its relation with gonadotropin secretion in patients with polycystic ovary syndrome (PCOS).

Study Design:- Cross-sectional study.

Methodology:- Hundred oligomenorrhic PCOS women of reproductive age (18 - 40 years) were studied. The data recorded on a prescribed proforma included current age, age at menarche, menstrual irregularities, presence of hirsutism, acne, infertility, familial nature, blood pressure, BMI and waist-hip ratio. Blood samples for gonadotropin assay were taken randomly on day 6th to 30th of menstrual cycle. Kruskal Wallis test was used to assess the influence of BMI levels on LH:FSH values. Spearman rank correlation was used for correlation assessment.

Results:- The mean weight was 67.34 ± 11.02 kg and mean BMI was 28.21 ± 4.42 kg/m². There was no significant difference in mean LH/FSH ratio ($p=.575$) among BMI groups. However, there was a positive correlation between BMI and LH:FSH ratio ($p=0.048$, $r=0.161$).

Conclusion:- There was high frequency of obesity (70%) in women with PCOS. Although no significant difference was found between mean LH:FSH ratio among different BMI groups levels but significant correlation between BMI levels and LH: FSH suggested that there was positive relation between BMI and LH: FSH.

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Introduction:-

Polycystic ovary syndrome (PCOS) is a common heterogeneous disorder of reproductive aged women (18-40yrs) with an estimated prevalence of 5%- 10%^[1] and is thought to be one of the leading causes of female infertility. It forms a spectrum of disorder with mild to severe disturbance of metabolic functions and anthropometric parameters. Key features include menstrual cycle disturbance, hyperandrogenism and obesity.^[2] Disturbed gonadotropin secretion including elevated LH/FSH ratio is a characteristic finding among women with PCOS and also thought to play an essential role in ovulatory dysfunction.^[3] Both recent ovulation and progesterone exposure transiently reduce the LH/FSH ratio in women with PCOS.^[4] Furthermore, several studies have also shown that in PCOS women there is a negative influence of obesity on LH values.^[5] Obese PCOS women have been observed to have decreased serum LH level as compared to lean PCOS patients. This study was, therefore, planned to assess adiposity influence in terms of anthropometric measurements and its relation with gonadotropin secretions (serum LH level and LH:FSH ratio) in PCOS women.

Methodology:-

The study was carried out at NIA, jaipur in collaboration with Gynae/infertility Clinics in jaipur. All subjects were enrolled voluntarily in the study after being explained by concerned doctor and signing the consent form.

Inclusion Criteria:-

Hundred oligomenorrhic PCOS women (average duration of menstrual cycle 45 days) of childbearing age (18 - 40 years) were selected.

Exclusion Criteria:-

1. PCOS women who were pregnant,
2. on any contraceptive pills,
3. Using oral hypoglycemic agents,
4. Amenorrhoea PCOS women.

Assessment Criteria:-

1. A detailed history was taken on a pre-structured proforma that included current age, age at menarche, history of menstrual irregularity, acne, hirsutism, infertility, obstetric history and occurrence of similar cases in family.
2. Complete physical examination was recorded including anthropometric measurements body mass index [BMI] in kg/m², Waist circumference in cm Waist-hip ratio
3. For estimation of serum LH and FSH, blood samples were drawn in follicular phase of the menstrual cycle. All these PCOS women had oligomenorrhea with average menstrual cycle of ≥ 45 days.

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 16. At the beginning, normality test was performed on data and p- value of Kolmogorov-Smirnov test was 0.017, gave evidence that data was not normally distributed. Non- parametric Kruskal Wallis test was used to assess the influence of BMI levels on LH: FSH values. p-value < 0.05 was considered as significant. Spearman rank correlation was also used to see any correlation of LH: FSH with anthropometric measurements (BMI levels and waist to hip ratio) respectively. Correlation was considered as statistically significant with p-value < 0.05.

Observations and Result:-

Mean value of following parameters:

1. age 25.68 \pm 5.35 years
2. Weight 67.34 \pm 11.02 kg.
3. BMI 28.21 \pm 4.42 kg/m²
4. waist to hip ratio 0.91 \pm 0.05
5. serum LH 9.41 \pm 6.88 mIU/ml
6. serum FSH 5.89 \pm 2.84 mIU/ml
7. LH:FSH ratio 1.69 \pm 1.35

When means \pm SD, LH: FSH was compared at different BMI levels, it was found that the LH:FSH on the average increased as the BMI level increased, but when BMI was at obese-II category, it decreased the mean LH:FSH. However, the effect was not statistically significant (p = 0.575). Spearman Rank Correlation test was applied to assess any correlation between LH:FSH and anthropometric measurements and it showed a significant positive correlation of 0.161 between LH:FSH and BMI (p=0.048).

Discussion:-

In the present study, the authors tried to evaluate the issue of disturbed gonadotropin secretion and its heterogeneity among PCOS patients and few anthropometric measurements associated with it. Serum LH level is an essential parameter in PCOS. In the present study, blood samples for gonadotropin were taken on specific days of menstrual cycle (from 6th-30th day) in oligomenorrhea PCOS and the study results showed a high frequency (71%) of elevated LH/FSH ratio > 1 among rajasthani population of PCOS. This high frequency of elevated LH/FSH ratio is quite significant as it points towards its potential role in diagnosis of PCOS. These results are reliable with result of Hsu et al. and Hendrick et al. which showed high prevalence of elevated LH/FSH ratio among PCOS women and recommended that gonadotropin assay should be done after 5th day of menstrual cycle.^[6]

Obesity is a common clinical attribute present in approximately 50% of PCOS women. Recent studies have shown that surprisingly serum LH level tends to be normal, rather elevated in obese PCOS women. Lean PCOS women

have the higher LH pulse amplitude in comparison with overweight PCOS women.^[7] The present study was an effort to determine anthropometric measurement on disturbed gonadotropin secretion in PCOS women among local population. BMI, waist-hip ratio and waist circumference are the significant parameters for evaluating the level of obesity. It has been well recognized that Asian population has a higher fat deposition at a lower BMI as compared to Caucasians. WHO in collaboration with the International Association for study of obesity and the international obesity task force has, therefore, proposed a new BMI classification for Asian population.^[8] In the present study, the new BMI criteria for Asian population has been taken as a reference for assessing level of obesity. The study result shows a high frequency of obesity in our PCOS population (70%). This is reliable with study done by Alnakash et al. which also showed a frequency of 63.55% of obesity.^[9] This higher incidence of obesity may be attributed to rapidly increasing trends of sedentary life style among young women. As stated earlier; the new Asian BMI classification was used to divide the study population into 4 groups according to their BMI. No statistically significant ($p = 0.575$) difference was observed in the mean LH/FSH ratio among different BMI groups. These results are in accordance with the findings of Iwasa et al. which showed decreased LH/FSH ratio with increase in BMI but this relationship was not statistically significant ($p = 0.33$).^[10] These results are also consistent with study conducted by Fulghesu et al. which also showed no significant relationship between LH/FSH ratio and BMI.^[11] It is well documented that PCOS women have a high prevalence of abdominal body fat distribution, even if they are normal-weight, making them more vulnerable to obesity related health problems like diabetes, hyper-tension and cardiovascular disorders.^[12]

In the present study, the mean waist to hip ratio was 0.91 ± 0.05 . This result is reliable with study done by Avrbfikov et al. which also showed higher waist to hip ratio values in PCOS women, even among lean group, suggesting preferential abdominal fat deposition in these patients.^[13] Nowadays, waist circumference is considered to be more sensitive indicator for obesity. The present data did not show any significant relationship between the waist circumference and LH/FSH ratio, but it was found significant with BMI levels. One possibility is the relatively small sample size, (especially of fewer cases in obese-II category) as this difference might be significant if we had evaluated a large number of PCOS subjects. Racial differences in presentation of PCOS might be another possibility.

The frequency of different clinical features of PCOS was evaluated in local population. Majority (70 - 80%) of PCOS women have some form of menstrual irregularities including oligomenorrhea, amenorrhea and dysfunctional uterine bleeding. These are all the consequence of anovulation.^[14] In the present study, menstrual abnormalities were noted in almost all patients (98.4%). These results are comparable with the finding of Riaz et al. who also showed menstrual cycle disturbances among 98% of PCOS women.^[15]

Hirsutism is considered the best clinical marker of hyperandrogenic; however, the severity of hirsutism varies with ethnicity. In the present study, hirsutism was observed in 72% patients. This finding is in accordance with the finding of Aziz et al. which also showed prevalence of hirsutism among PCOS women between 60 - 80%.^[16]

Acne is a more variable marker of hyperandrogenism. In the present study, acne was observed in 88% of PCOS women. This finding is much higher than reported in literature which showed frequency of acne in only a third of PCOS women.^[17] However, this high frequency of acne among PCOS women was also observed in the study conducted by Zaidi et al. about 60%.^[18] Therefore, they recommended that PCOS should be ruled out in women of reproductive age who presented with acne along with menstrual abnormalities.

Conclusion:-

The present study concludes that although no significant difference is observed in mean LH:FSH among different BMI groups but significant correlation present between BMI levels and LH:FSH suggesting that there is a relation between BMI and LH:FSH.

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