CLINICAL AND HORMONAL PROFILE OF POLYCYSTIC OVARY DISEASE

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SUMMARY

PCOD has variable clinical presentaion. Hormonal profile is also likely to be variable. On studying 21 cases of PCOD most frequent findings were menstrual disturbances, hirsutism and infertility. Elevated LH with normal to low FSH was found in 38% only; normal LH with low FSH in 28.6% and normal LH and FSH in 33% ; 50% of lean PCOD and 44.4% of obese PCOD showed normal ovarian scan. No consistent correlation was found between USG, hirsutism, menstrual disturbances and hormone profile.

INTRODUCTION

In 1935, Stein and Leventhal described a syndrome in women which consisted of amenorrhoea, infertility and hirsutism and was associated with bilateral, enlarged cystic ovaries. During the last two decades this polycystic ovarian disease (PCOD) has been the subject of considerable number of fundamental studies (Berger, 1975; Givens, 1976).

The complexities of the clinical picture of PCOD continues to present us with fresh challenges. In addition to the classical triad additional features like obesity, oligomenorrhoea or dysfunctional uterine bleeding, acne and virilisation with clitoromegaly are also found.

To study the profile of patients with PCOD the present work was undertaken with the following aims : (1) to study clinical spectrum of PCOD (2) to study the correlation between clinical and endocrine profile.

MATERIAL AND METHODS

Present study was done on 21 cases

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of PCOD. Patients were examined clinically and specific symptoms and signs were recorded. These included menstrual history, fertility status, acanthosis, skin tags, hirsutism with Ferriman Galloway (F.G.) Score, virilisation, galactorrhoea, clinical evidence of thyroid dysfunction, Cushing syndrome, Blood pressure, Body mass index (B.M.I>) and waist/hip ratio. Based on B.M.I. patients were divided in two subgroups - lean PCOD (BMI<25) and obese PCOD (BMI>25).

After an overnight fast venous blood was drawn for the determination of serum thyroxine, T.S.H. testosterone, prolactin, FSH and LH. Samples for serum LH were estimated using the RIA kit. Serum FSH, PRL and TSH were measured by IRMA (DPC) and serum thyroxine by CAC (DPC).

Radiological investigations included transabdominal pelvic ultrasonography for ovarian size, number and size of cysts.

OBSERVATIONS

Table I depicts that menstrual disturbances, infertility and hirsutism were the

Table I

CLINICAL PROFILE WITH RESPECT TO BODY MASS INDEX

	BMI < 25 (N = 12)		BMI > 25 (N = 9)	
	N	%	N	%
1. Normal menses	3	25.0	1	11.1
2. Menstrual disturbances	9	75.0	8	88.8
a) Oligomenorrhoea	5	55.5	2	25.0
b) Hypomenorrhoea	1	11.1	2	25.0
c) Amenorrhoea	3	33.3	4	50.0
3. Infertility (N=10) married	4	80.0	3	60.0
4. Acanthosis	None		8	88.8
5. Hirsutism	8	66.67	8	88.8
F.G. Score < 8/36	2	25.0	6	75.0
> 8/36	6	75.0	2	25.0
6. Deep voice	1	8.3	1	11.1
7. Temporal balding	1	8.3	1	11.1
8. Acne	4	33.3	None	
9. Breast regression	None		None	
10. Galactorrhoea	None		None	
11. Hypertension	None		1	11.1

most common presentations. None of the lean PCOD patient had acanthosis while 88.8% of obese PCOD had it.

Evaluation of Table II reveals that serum levels of LH and FSH were found to be normal in most of lean PCOD patients (41.67%) while most of the obese PCOD showed elevated LH with normal to low FSH (55.5%).

50% of lean PCOD and 44.4% of obese PCOD showed normal USG for ovary (Table III). All the PCOD patients with abnormal USG in both the groups showed bilateral multiple small cysts in ovaries. While none of lean PCOD showed enlarged ovaries 60% of obese PCOD women showed it.

Ultrasonographic findings were also correlated with hirsutism, menstrual distrubances and hormone profile (Tables IV & V).

Table II
HORMONAL PROFILE WITH RESPECT TO BODY MASS INDEX

	BMI < 25 (N = 12)		BMI > 25 (N = 9)	
	N	%	N	%
1. Normal LH & FSH	5	41.67	2	22.2
2. Elevated LH with normal to low FSH	3	25.0	5	55.5
3. Normal LH with low FSH.	4	33.3	2	22.2
4. Prolactin > 25 ng/ml	1	8.3	1	11.1
5. TSH (Normal)	12	100.0	9	100.0
6. Testosterone (ng/dl)				
20 - 60	6	50.00	6	66.6
60 - 100	4	33.3	0	00.0
> 100	2	16.6	2	22.2

Normal range :

FSH	5-20 mIU/ml
LH	5-25 mIU/ml
Prolactin	2-15 ng/ml
TSH	0.5-3.5 mIU/ml
·tosterone	<100 ng/dl

Table III
ULTRASONOGRAPHIC FINDINGS IN LEAN AND OBESE PCOD

	BMI < 25 N = 12		BMI > 25 N = 9	
	No.	%	No.	%
1. Normal USG	6	50.0	4	44.4
2. Abnormal USG	6	50.0	5	55.5
(a) Enlarged ovaries	None	00.0	3	60.0
(b) Bilateral multiple (>5) small cysts (3-6 mm)	6	100.0	5	100.0

Table IV
CORRELATION OF ULTRASOUND FINDINGS WITH HIRSUTISM AND MENSTRUAL HISTORY

	USG Hirsutism score		Menstrual History	
	< 8/36	> 8/36	Normal	Abnormal
Normal (n = 10)	2	5	2	8
Abnormal (n = 11)	6	3	2	9

Table V
CORRELATION OF ULTRASOUND FINDINGS WITH SERUM LH, FSH AND SERUM TESTOSTERONE LEVELS.

USG	N-LH N-FSH	LH N to low FSH	N-LH Low-FSH	Serum Testosterone (ng/dl)		
				20-60	60-100	>100
Normal (n = 10)	1	5	4	7	2	1
Abnormal (n = 11)	7	2	2	6	2	3

Table VI
CORRELATION BETWEEN HIRSUTISM AND SERUM LH, FSH AND TESTOSTERONE LEVELS.

FG Score	N-LH N-FSH	LH N to low FSH	N-LH Low-FSH	Serum Testosterone (ng/dl) 20-60	60-100	>100
< 8/36	2	4	2	4	1	3
> 8/36	2	3	3	4	3	1

Table VII
CORRELATION BETWEEN MENSTRUAL HISTORY AND SERUM LG, FSH AND SERUM TESTOSTERONE

	N-LH N-FSH	LH N to low FSH	N-LH Low-FSH	Serum Testosterone (ng/dl) 20-60	60-100	>100
Menstrual disturbances (N = 17)	6	7	4	11	4	2
Normal menses (N = 4)	1	1	2	2	-	2

No correlation was found between hirstisim and serum LH and FSH profile (Table VI).

Table VII shows that the frequency distribution of patients with menstrual irregularities was almost similar for normal LH, FSH or elevated LH with low to normal FSH or normal LH with low FSH. Also patients with normal menses did not show any one consistent abnormality in LH and FSH profile. Majority of patients with menstrual disturbances showed serum testosterone levels < 60 ng/dl.

DISCUSSION

Twenty one patients of PCOD formed the subject matter for the present study. Overall menstrual disturbances were seen in 80.9%, hirsutism in 76.2%, infertility in 70%, obesity in 42.8%, and acanthosis in 38.1%. One fifth of patients had cyclical menses (Table I). Goldzeiher (1962)

published a series of surgically proved cases of PCOD with mean incidence of symptoms reported as - amenorrhoea 31%, hirsutism 69%, infertility 74%, obesity 41%, and clinical menses 12%.

Evaluation of serum gonadotropin revealed elevated LH with normal to low FSH in 38% (25% in lean PCOD and 55.5% in obese PCOD), with LH/FSH ratio ranging from 4.7:1 to as high as 21.5:1 with a mean of 10.68:1. 33% showed normal levels of gonadotropins - more commonly observed in lean PCOD (41.67%) than in obese PCOD (22.2%). Normal LH with low FSH was found in 28.6% as a total group, in 33.3% of lean PCOD and 22.2% of obese PCOD (Table II).

The relationship between serum gonadotropin abonrmalities and PCOD have also been variable in the literature. In about 75% of patients with PCOD serum gonadotropin levels may be abnormal (Berger, 1975; Givens, 1976). Occasionally levels may fall within normal range as well. An important diagnostic characteristic of PCOD is presence of chronically elevated LH with elevated LH/FSH ratio (Yen, 1970; DeVane et al, 1975, Rebar, 1976). FSH may be either normal or slightly depressed. This manifestaion may be present in as many as 70% of cases. Ratios of 2.5 to 3.0 or greater are consistent with the diagnosis of PCOD. However in our study population one third patients showed normal gonadotropin profile (Table II).

Most of the patients had normal serum total testosterone levels in the range of 20 to 60 ng/dl - in both subgroups of PCO. The hyperandrogenicity of PCOD is best reflected by the increase in serum teestosterone and/or androstenedione. In the absence of increase in total testosterone free levels may be increased.

Elevated serum prolactin was seen only in 2 patients (10%). Elevated serum prolactin has been reported in 13% to 27% of PCO in the literature (Lunde, 1981).

USG has provided a new tool both for diagnosis of PCOD and monitoring the course of therapy (Parisi, 1984; Ventoroli et al, 1987). In our study 50% of lean PCOD and 44.4% of obese PCOD showed normal ovarian scan. All the PCOD patients with abnormal USG in both the groups showed bilateral multiple (> 5 in number in each ovary) small cysts (3 to 6 mm). Enlarged ovaries were seen in 60% of obese PCO while none of lean PCOD showed it. Ultrasound findings were also correlated with hirsutism, menstrual disturbances and hormone profile. No consistent correlation could be observed among any of these parameters and scan findings (Table IV & V).

75% of patients who had insignificant hirsutism (FG score < 8/36) showed abnormal USG while 62.5% who had significant hirsutism (FG above > 8/36) revealed normal USG. Similarly patients with normal menses showed equal distribution for normal and abnormal scan. Normal USG findings were as prevalent as abnormal scan in patients with abnormal menses. When USG findings were correlated with serum LH

Table VIII
CORRELATION BETWEEN BMI, CLINICAL HORMONAL DATA AND ULTRASONOGRAPHY

PCOD	Obese PCOD (N = 9)	Non Obese (N = 12)
Hirsutism	8 (88.8%)	8 (66.7%)
FG score > 8/36	2 (25.0%)	6 (75.0%)
< 8/36	6 (75.0%)	2 (25.0%)
Acamtpsos	8 (88.8%)	None
Menstrual irregularity	8 (88.8%)	9 (75.0%)
Mean ± SD LH	19.15 ± 16.56	13.59 ± 11.84
Mean ± SD FSH	5.37 ± 3.37	4.47 ± 2.66
Mean ± SD LH/FSH ratio	4.24:1 ± 4.74:1	4.83:1 ± 6.36:1
Mean ± SD T	63.64 ± 31.83	62.83 ± 30.97
Mean ± SD PRL	15.45 ± 14.49	16.36 ± 10.50
Abnormal USG	5 (55.5%)	6 (50.0%)

and FSH majority (63.6%) of patients with abnormal USG had normal LH and FSH while 90% of patients with normal scan had abnormal hormone profile.

When hirsutism score was correlated with hormonal profile (Table VI) the number of patients with abnormal profile was similar in those with insignificant score as with significant score. Similar distribution was seen for normal hormonal profile. On correlating severity of hirsutism with menstrual pattern majority (87.5%) with insignificant score had abnormal menstrual history as was found similar in those with significant score (62.5%).

In our study group menstrual disturbances were as common with normal LH and FSH as with elevated LH and low to normal FSH. Also patients with normal menses did not show any one consistent abnormality in LH and FSH profile (Table VII).

When correlation was made between B.M.I. clinical, hormonal data and U.S.G. (Table VIII) it was found that hirsutism, menstrual pattern and U.S.G. were similarly abnormal in obese and lean PCOD. Mean LH levels were elevated in both subgroups with elevated LH/FSH ratio.

Thus we observed heterogenity of clinical and hormonal profile of PCOD. From the present study we concluded that any female presenting with menstrual irregularity, hirsutism and/or infertility should be evaluated for PCOD. Additional parameters to be studied include determination of LH, FSH and

ultrasonography of ovaries. Diagnosis of PCOD should be made on documentation of at least two abnormal parameters - clinical, USG and / or hormonal profile, although occasionally both laboratory parameters and USG may be normal.

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