

Sonographic Evaluation of Polycystic Ovarian Syndrome (PCOS) :Hospital Based Observational Study

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Abstract-

Poly-Cystic Ovary Syndrome (PCOS) is a common endocrine disorder affecting women in reproductive age group. The diagnosis of PCOS have been of much debate, due to its multifactorial etio-pathogenesis with multiple diagnostic criteria introduced by international consensus. The most commonly accepted criteria, 'The Rotterdam Criteria' includes: I. Oligo and/or Anovulation II. Hyperandrogenism III. Polycystic ovaries on ultrasound. With the inclusion of Polycystic ovaries morphology by ultrasound, this study was done to evaluate radiological features and its relation with hormonal and biochemical profile.

OBJECTIVE: Ultrasonographic assessment (TAS/ TVS) of patients with PCOS in terms of ovarian volume, number of follicles, follicle distribution, stromal thickness and endometrial character and its relationship with hormonal profile.

Study design: Hospital based observational prospective Study in Department of Radio-diagnosis, Assam Medical College and Hospital for a period of 1 year.

Result and Observation: The average age was 24 years, with the age range of 15-35 years. Majority were unmarried (85%) compared to the married (15%). In the study (93%) had oligomenorrhea. The other complaints were obesity hirsutism and infertility. Total ovarian volume, total follicular volume and follicular number correlated well with the LH and LH/FSH. Increased testosterone levels were observed in patients with stromal thickness.

Key Words: Polycystic ovarian syndrome, PCOS sonography, Oligomenorrhea, PCOS ovarian features.

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I. INTRODUCTION

Poly-Cystic Ovary Syndrome (PCOS) is a common endocrine disorder resulting in anovulation and infertility affecting 5-10% of women in reproductive age group. PCOS commonly presents with various clinical Symptoms manifesting with a variety of signs and symptoms; including menstrual irregularities, hyperandrogenism, infertility, and obesity. [1, 2].

The diagnosis usually involve exclusion of other causes of hyperandrogenism. According to various society recommendations, the presence of at least two of the following three conditions—chronic anovulation, symptoms and signs of hyperandrogenism, signs of ovaries polycystic ovaries required for the diagnosis of PCOS. According to various international society consensus. Diagnosis of PCOS in adults can follow three different guidelines:

1. National Institute of Health criteria proposed by the US National Institutes of Health in April 1990.
2. ESHRE/ASRM (Rotterdam) Criteria, according to expert conference organized in Rotterdam in May of 2003 sponsored by ESHRE and ASRM..

3. Androgen Excess and Polycystic ovarian syndrome Society (AE-PCOS) in 2006^[3,4].

Radiological and laboratory tests are also advocated for diagnosis of PCOS. Ultrasound of the pelvis is a common component of radiologic investigations, and relevant gonadotropin and other hormone levels needs to be evaluated.

II. Methods

Study Design: Prospective observational study in a tertiary care hospital study done in Department of Radiodiagnosis, Assam Medical College & Hospital, Dibrugarh, Assam for a period of 1 years.

Sample size: 80 patients.

SELECTION OF CASES:

Informed consent taken from all the participants.

Patients were selected based on the Rotterdam's 2003 criteria. Obstetric history included chief complaint, fertility status of the patient classified as fertile, infertile (primary or secondary infertility of atleast 1 year duration), unproven (pregnancy not attempted). Other clinical symptoms (1) Irregular menstrual cycles in the form of oligo- or anovulation (menstrual cycles <21 or >38 days), Hirsutism, or Obesity⁵:

According to National Institute of Health (NIH) criteria Patient were classify BMI <18.5 as underweight, BMI between 18.5 and 24.9 as normal weight, BMI between 25 and 29.9 as overweight and obesity as a BMI of 30 or greater

Inclusion Criteria:

- Female patients in reproductive age group (15 – 35 years)
- Irregular or no Menstrual periods
- Hirsutism / Acne (Androgen excess)
- Infertility

Exclusion Criteria:

- Known cases of Polycystic ovarian syndrome on treatment and follow up Less than 15 years or greater than 35 years age group
- Patients with other known or incidentally detected health problems.
- Pregnancy and hyperandrogenism due to any other endocrine disorders hyperprolactinemia, hypercortisolemia, and thyroid dysfunction.
- Patients lost for follow up

Hormonal and Biochemical : Hormonal profile were estimated under enzyme linked immunosorbent ELISA. Test was carried out in Multidisciplinary Research Unit, Assam Medical College & Hospital, Dibrugarh. For hormonal assessment blood sample was taken either in morning or after 10 - 12 hrs fasting and analyzed for LH, FSH, Prolactin , RBS and total testosterone under aseptic condition

EQUIPMENT AND PROTOCOL

Transabdominal Ultrasonography:

Ultrasound of pelvis was performed using Samsung USG machine Samsung RS 80A Prestige, Ovaries were scanned s in both the transverse and sagittal planes. The examination include (1) ovarian volume, (2) total follicle count (3) largest follicle diameter and (4) follicle distribution.

III. Results

Clinical demographic profile:

The age range of 80 patients with clinically suspected polycystic ovary syndrome was 15 to 35 years. The mean age distribution was 24 years. Majority (71.9%) of the patients were below 30 years. Maximum cases were seen in group of 21 to 25 years.

TABLE – 1 Table 1 shows the clinical demographic profile of patient with PCO

AGE GROUP	Number	Percentage %
15-20	2	2.5
21-25	36	45
26-30	32	40
31-35	10	12.5

CHIEF COMPLAINTS:

75% the patients had oligomenorrhea , 4% had amenorrhea and other main complaints were obesity 23.75%, hirsutism 12.5% and infertility 21.5%.

BODY MASS INDEX (BMI):

CHIEF COMPLAINT	Number	Percentage (%)
Amenorrhea	5	4%
Oligomenorrhea	75	75%
Obesity	19	23.75%
Hirsutism	10	7%
Acne	4	3%
Infertility	21	16.5%

TABLE 3:Distribution of patient according to BMI

BMI (Kg/m2)	Number	Percentage (%)
Underweight <20	10	12.5
Normal 20–25	16	20
Over Weight 25–30	35	43.75
Obese >30	19	23

Arrangement, number and size of the follicles per ovary and endometrial character:Most(71%) of the patients showed more than 12 follicles per ovary and peripheral arrangement of the follicles was the most common finding in these patients and it was observed in 91%. Maximum number (90%) of the patients howned 2-9mm follicles. Endometrium was normal in 93.3%. Heterogenous and thickened endometrium was seen in one case. Thickened and homogenous endometrium was seen in 5.6%

Distribution of patients according hormonal and biochemical profile:

93.75% of the patients showed normal or low levels of FSH values. 73.75% of the patients had elevated LH levels. 30% of the patients had increased LH/FSH ratios. 80% of the patients showed elevated testosterone levels.

IV. Discussion

PCOS is a common endocrinological disorder affecting women of reproductive age group usually characterised by menstrual irregularity,infertilty and metabolic disorder.

The average age of the patients in this study was 24 years, with the age range of 15- 35 years and the most common age group was 25-30 years (87%).The study done by Krithika et al., also shows similar observation in which the mean age of 27 +/-7.1 years. Another study by Spandana JC et al. also shows similar observation where majority age group was between 26 and 30 years.

In the present study, out of 80 patient majority were married (85%) compared to the unmarried (15%). A study conducted by Gayatri .M in 2001, out of 120 patients with polycystic ovarian syndrome most of the patients were married and 24% were unmarried. Oligomennorhea was the most common complaint with (93%) had irregular periods. The other main complaints of the patients were obesity which constituted about 23.3% of the patients, infertility 21.2%. followed by 12.1% of hirsutism.Similar studies by Nagamani Peri et al in 245 patients with polycystic ovarian syndrome, 146 showed

Case 1: 26 year old presenting with infertility, Transabdominal scan(TAS) increased volume(Fig A) and perpherrally placed follicles (Fig B)



Fig A

Fig B

Case 2: 33 year presenting with infertility Transvaginal scan- showing increased ovarian volume (Fig C)



Fig C

Case 3: 30 year old presenting with infertility Transabdominal scan-Left ovary with echogenic stroma with peripherally placed follicles (Fig D) with normal endometrium Fig E

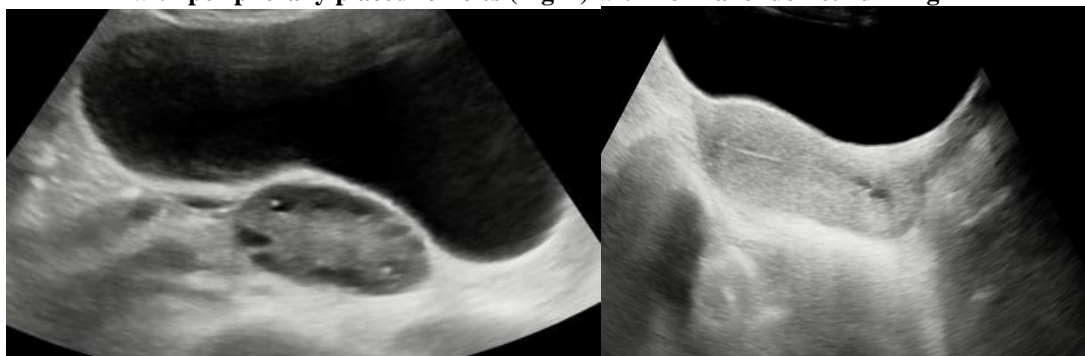


Fig D

Fig E

menstrual irregularities, 38 had hirsutism, 15 had infertility. Transabdominal ultrasonography was performed on all 80 participants in the current investigation. Transvaginal ultrasonography was additionally performed for 7 of the participants in addition to TAB.

In 93.3% of the patients had normal endometrial thickness between 3 and 9 mm. The endometrium's overall thickness ranged from 3 to 19 millimetres. This observation is comparable with the study by Nagamani Peri et. al, in which out of 245 patients with polycystic ovarian syndrome, about 93% had homogenous endometrium with thickening ranging from 1mm – 17mm.

Present study showed peripheral distribution of follicles in 91% of the patients. A similar study conducted by Vandana Yadav, Kanti Maurya in 2016 in which 100% showed peripheral arrangement of follicles.

In this study 93.75% of the patients with PCOS showed normal or low levels of FSH values. 73.75% of the patients had elevated LH levels. 30% of the patients had increased LH/FSH ratios.

V. CONCLUSION

Sonographic appearance including follicular number, ovarian volume, distribution of follicles show changes with endocrine and hormonal levels. Most patient shows hormonal alteration with LH, testosterone, LH/FSH ratio which correspond to ovarian changes.

Trans-abdominal sonography was found to be quite effective and successful in identifying all sonological aspects of PCOS although transvaginal sonography is more sensitive and accurate.

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