



BURDEN OF POLYCYSTIC OVARIAN DISEASE (PCOD) IN NON-ANC ULTRASOUND STUDY OF FEMALE PATIENTS

Radiodiagnosis

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ABSTRACT

Introduction - Polycystic ovary syndrome (PCOS)/ disease (PCOD) is a hyperandrogenic disorder associated with chronic oligo-anovulation, polycystic ovarian sonographic morphology and menstrual irregularities.

Material and Methods This is a retrospective study and the data is collected through Radiology departmental registers at Veer Chandra Singh Garhwali Government Medical Sciences and Research Institute, Srinagar, Uttarakhand, 2016. A probability (P) value of < 0.05 was taken for statistical significance.

Results- A total of 29 female patients had PCOS. The mean age of patients was in years 27.17 (S.D $\pm$ 8.7)]. The Patients age 20 to 30 years was the commonest to have Poly cystic ovarian disease. The most presenting complaint of patients diagnosed Poly cystic ovarian disease was oligomenorrhea (58.6%). Two of the Poly cystic ovarian disease patients had associated finding, Adenomyosis with retroverted bulky uterus and Pelvic inflammatory disease, respectively.

Conclusion- The sonographic diagnosis of PCOD with clinical signs and symptoms will help in institution of therapy for the same by the clinicians and eventual correction of their disease.

KEYWORDS

PCOS, ultrasound, student

Introduction

Polycystic ovary syndrome (PCOS)/ disease (PCOD) is a hyperandrogenic disorder associated with chronic oligo-anovulation, polycystic ovarian sonographic morphology and menstrual irregularities.^{1,2,3} Hyperandrogenism refers to increased levels of androstenedione, testosterone, Dehydroepiandrosterone (DHEA) and cortisol, resulting from insulin resistance and compensatory hyperinsulinemia which in turn leads to inhibition of follicular development, microcyst formation in both ovaries which get peripherally around echogenic stroma on USG (ultrasonography) study. It is thus associated with anovulatory cycles, menstrual disturbance like oligomenorrhoea, delayed and scanty menses, irregular cycle, spasmodic dysmenorrhoea (pelvic pain), infertility and even amenorrhoea for longer periods.^{1,2,4} This syndrome is often associated with psychological impairments like depression, mood disorders, metabolic derangements, obesity and is seen in age group of 11 to 44 year i.e. in active reproductive age group.^{1,2,4} Dyslipidaemias are common with PCOS, with increased incidence of type 2 diabetes, glucose intolerance, due to dietary consumption of fatty foods, high calorie diet, and physical inactivity all ending up into obesity and related hyperandrogenic state confirmed by clinical signs and symptoms of acne, hirsutism, alopecia and infertility.^{1,2,4} In such situations, increased sympathetic nervous system activity with further increased levels of Ovarian nerve growth factor (NGF) and Anti-Mullerian hormone (AMH) is seen, leading to follicular growth arrest.² This is confirmed by use of metformin in treatment of PCOS which leads to inhibition of AMH. There is also high prevalence of later cardiovascular disease (myocardial infarction), metabolic syndrome, hypertension, anxiety, depression, sleep apnea and even endometrial cancers, in most of women with PCOS especially those having dyslipidaemias and obesity.^{1,2,4} Pregnant women with PCOS have high rate of miscarriages (abortions), gestational diabetes, pre-eclampsia and preterm delivery.^{1,4} Environmental and socio-emotional factors which also contribute are modern lifestyle, hostel life with poor dietary chances and bad food habits (consumption of junk fast foods) stress of studies and exams which lead to disturbed circadian rhythm and hormonal disturbances as increased incidence of PCOD is seen in unmarried students living in hostels, far away from homes. These risk factors are confirmed by reversal of PCO morphology on favorable lifestyle modifications, dietary changes weight loss and increased physical activity/exercise.^{1,2,4}

Treatment of polycystic ovarian disease includes correction of anovulation by clomiphene citrate, antidiabetic agents like metformin, use of human menopausal gonadotrophins (HMG) and FSH. Adding FSH (exogenous) with clomiphene citrate restores normal follicular growth and regularization of menstrual cycle.¹ Even ovarian

laparoscopic wedge resection or ovarian diathermy restores normal follicular growth in such patients of PCOS.^{1,2} Western data shows prevalence of polycystic ovarian morphology in women in order of 17 to 33% and in general population about 5 to 10% women of age-group 11-44 years develop PCOS.² Treatment also includes use of antiandrogens like spironolactone, flutamide, medroxyprogesterone acetate, statins like vastatin; and even use of oral contraceptive pills in those who do not wish to conceive.¹

Definition of PCOS:- Morphology of polycystic ovary was defined as an ovary with 12 or more follicles measuring 2-9 mm in diameter and/or increased ovarian volume (> 10 cc).^{2,3,4} In some polycystic ovaries even lesser volumes of ovaries are noted on sonography.^{1,2,4} It is suggested by consensus that a woman having polycystic ovary morphology on USG without any menstrual or ovulatory abnormality should not be considered as having PCOS, but is labeled as 'asymptomatic PCO'.^{2,4} It is noticed that 70% of patients with PCOS have polycystic ovaries in sonography.^{1,4}

European Society of Human Reproduction and Embryology (ESHRE) and the American Society for Reproductive Medicine (ASRM) added polycystic ovarian sonographic morphology as seen on pelvic ultrasound to the **NICHD/ NIH criteria** of diagnosis of PCOS/ PCOD, in a joint consensus in Rotterdam (Year 2003).^{1,4} The criteria are as follows:-

- 1) Hyperandrogenism
- 2) Oligo-ovulation/ anovulation
- 3) Polycystic ovaries

(Only two of three criteria are needed to diagnose PCOS).^{1,2}

If PCOS is suspected, clinician usually takes a complete medical and clinical history, conduct physical examination of patient and also conduct a pelvic ultrasound and blood tests which include blood glucose and lipid estimation, hormonal assays.^{1,2} Medical history and clinical examination includes information of unexplained weight gain, menstrual disturbances, male pattern of hair growth, skin changes and estimation of blood pressure (high BP).¹ After diagnosis of PCOS, it is observed that most patients develop (almost 50%) glucose intolerance, and type 2 diabetes mellitus.^{1,4}

Material and Methods

This is a retrospective study and the data is collected through Radiology departmental registers at Veer Chandra Singh Garhwali Government Medical Sciences and Research Institute, Srinagar, Uttarakhand. The period of study is from March 2016 to August 2016. The patient who was provisionally diagnosed for Poly cystic ovarian

disease is traced through her radiological findings in respective registers. The female patients were examined using transabdominal ultrasound pelvic ultrasound scan by Toshiba Nemio Ultrasound scanner, with help of 2.5 to 5 MHZ convex ultrasound transducer, with patient coming with full bladder, usually in forenoon. SPSS 20, Windows compatible software, did data analysis. Suitable statistical tests (e.g. Fischer exact test) applied, and a probability (P) value of < 0.05 was taken for statistical significance.

Results

A total of 29 female patients were studied. In the present study, the age distribution of the patients ranged from 17 to 62 years [mean age in years 27.17 (S.D±8.7)]. [Figure 1] The Patients age 20 to 30 years was the commonest to have Poly cystic ovarian disease. Majority of the patients were married 21 patients (72.4%). By occupation, students and staff comprised of 10 (34.5%) of patients. The maximum number of patients (34.5%) seeked health care in June 2015 [Table 1].

The most presenting complaint of patients diagnosed Poly cystic ovarian disease was oligomenorrhea seen in 17 patients (58.6%), followed by Irregular Menstrual cycle in 6 patients (20.7%), and Delayed menarche only 3(10.3%) and others. Department of Obstetrics and Gynecology was most common 28(96.6%) to refer patient for ultrasound to investigate for Poly cystic ovarian disease. Of the total 19(65.5%) of the patient was examined using per abdominal ultrasound technique [Table 2].

The presenting complaints of Poly cystic ovarian disease patients were broadly classified as oligomenorrhea, Irregular Menstrual cycle, Delayed menarche, Primary Infertility and amenorrhea. Two of the Poly cystic ovarian disease patients had associated finding, Adenomyosis with retroverted bulky uterus and Pelvic inflammatory disease, respectively.

Discussion

In our study of 787 Non-antenatal ultrasound cases of female of reproductive age-group done over a period of six months from March to August 2016 over Toshiba Nemio Ultrasound scanner (machine) in Department of Radiology, HNB base Teaching Government hospital, Srinagar Garhwal - we found 29 female patients having clinical indications of menstrual irregularities to have polycystic ovaries on sonography confirming presence of PCOS/ PCOD; with overall prevalence of confirmed PCOD of 3.7% in the local and student population of Srinagar Garhwal. This is in contrast to high prevalence of PCOD in western world with high prevalence of as much as 7% explaining modernization and competitive lifestyle with working women culture with night shifts as well as dietary influences with poor dietary choices, being cause of PCOS in westerners as compared to east. The prevalence of PCOD is quite low in our population of Garhwal as per our observations made. We hope still more data of sonography of pelvis in Uttarakhand comes out in near future confirming or refuting our findings. Out of these 29 cases, 21 were married individuals and had menstrual irregularities, infertility, and pelvic pain as clinical symptoms. Other 8 cases were unmarried individuals and were local students and medical doctors studying in colleges and universities in and around Srinagar city of Garhwal. Predominant clinical history of these patients with PCOD was oligomenorrhoea (14 cases), amenorrhea (2 cases), irregular menstrual cycles (6 cases), infertility (1 case), and delayed menses (3 cases). 19 cases belonged to surrounding locality whereas rest 10 cases were student and doctor population. One case had associated pelvic inflammation (enlarged ovaries with free fluid in POD and thick endometrium) on sonography study apart from polycystic ovaries. And one another single case of PCOD had Adenomyosis of uterus on sonography (bulky globular uterus with speckled echotexture and increased echogenicity explaining excessive menstrual bleeding in that case. Only one elderly female had polycystic ovarian morphology on sonography whereas rest all 28 cases of PCOD belonged to age group of 18 to 44 years, cause of which was not clear. All cases except few were referred from Gynecology and obstetrics department with clear clinical indications of PCOD whereas other few (2-3) referred from Surgery and medicine were incidentally detected to have Polycystic ovaries on ultrasound and on further probing had clinical history of menstrual irregularities which they did not reveal to

clinicians. The sonographic diagnosis of PCOD with such clinical signs and symptoms helped in institution of therapy for the same by the clinicians and eventual correction of their disease. It was unfortunate on our part that no data of follow up sonography of such cases of PCOD after treatment is available with us.

Table1: Distribution of socio demographic variables of studied PCOD patients at Department of Radiology.

Variable	Total n(%) 29(100.0)
Age (years)	
< 20	2(6.9)
20-30	18(62.1)
>30	9(31.0)
Marital Status	
Married	21(72.4)
Unmarried	8(27.6)
Occupation	
Students	7(24.1)
Medical college Staff	3(10.3)
Others	19(65.5)
Month of Presentation	
March	9(31.0)
April	2(6.9)
May	2(6.9)
June	10(34.5)
July	2(6.9)
August	4(13.8)

Table 2: Distribution of clinical variables of studied PCOD patients at Department of Radiology.

Variable	Total n(%) 29(100.0)
Presenting Complaints (years)	
Oligomenorrhea	17(58.6)
Ammenorrhea	2(6.9)
Irregular Menstrual Cycles	6(20.7)
Primary Infertility	1(3.4)
Delayed Menarche	3(10.3)
Referral Department	
Obstetrics and Gynecology	28(96.6)
Others	1(3.4)
Mode of Ultrasound	
Pelvis	10(34.5)
Abdominal	19(65.5)

Figure 1: Histogram showing the distribution of studied patients by age

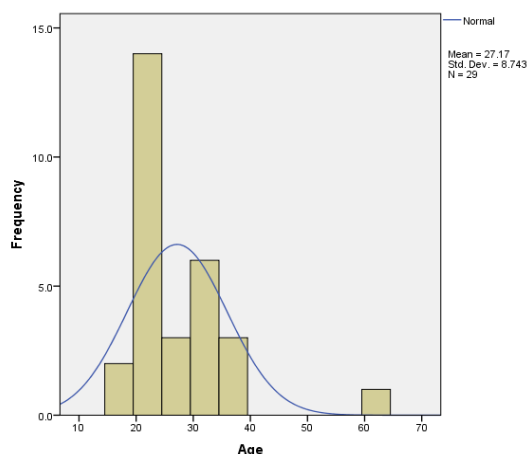
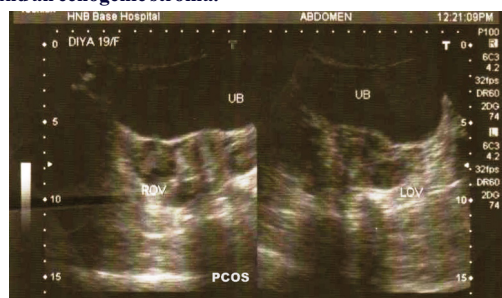


Table 3: Distribution of various factors of with presenting history of studied PCOD patients at Department of Radiology.

Category	Presenting history in PCOD patients										Total		Fischer Exact Test	P Value
	Oligomennorhea		Ammenorrhea		Irregular Menstrual cycle		Primary Infertility		Delayed Menarche					
	n	%	n	%	n	%	n	%	n	%	n	%		
Age (years)														
< 20	1	5.9%	0	0.0%	1	16.7%	0	0.0%	0	0.0%	2	6.9%	2.3	0.971
20-30	11	64.7%	1	50.0%	3	50.0%	1	100.0%	2	66.7%	18	62.1%		
>30	5	29.4%	1	50.0%	2	33.3%	0	0.0%	1	33.3%	9	31.0%		
Marital Status														
Married	14	82.4%	2	100.0%	3	50.0%	1	100.0%	1	33.3%	21	72.4%	5.7	0.216
Unmarried	3	17.6%	0	0.0%	3	50.0%	0	0.0%	2	66.7%	8	27.6%		
Occupation														
Students	4	23.5%	0	0.0%	1	16.7%	0	0.0%	2	66.7%	7	24.1%	6.6	0.574
Medical college Staff	3	17.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	10.3%		
Others	10	58.8%	2	100.0%	5	83.3%	1	100.0%	1	33.3%	19	65.5%		
Month of Presentation														
March	3	17.6%	1	50.0%	3	50.0%	1	100.0%	1	33.3%	9	31.0%	15.7	0.731
April	0	0.0%	0	0.0%	1	16.7%	0	0.0%	1	33.3%	2	6.9%		
May	1	5.9%	0	0.0%	1	16.7%	0	0.0%	0	0.0%	2	6.9%		
June	8	47.1%	1	50.0%	0	0.0%	0	0.0%	1	33.3%	10	34.5%		
July	2	11.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	6.9%		
August	3	17.6%	0	0.0%	1	16.7%	0	0.0%	0	0.0%	4	13.8%		
Referral Department														
Obstetrics and Gynecology	17	100.0%	1	50.0%	6	100.0%	1	100.0%	3	100.0%	28	96.6%	13.9	0.007*
Others	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	1	3.4%		
Mode of Ultrasound														
Pelvis	4	23.5%	2	100.0%	2	33.3%	1	100.0%	1	33.3%	9	33.5%	8.5	0.379
Abdominal	13	76.5%	0	0.0%	4	66.7%	0	0.0%	2	66.7%	19	65.5%		
Total	17	100.0%	2	100.0%	6	100.0%	1	100.0%	3	100.0%	29	100.0%		

Figure 1 a- USG image of Polycystic ovaries in 19 year female student showing bilateral enlarged ovaries with peripherally arranged small follicles arranged in 'string of beads' appearance around an echogenic stroma.

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