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# Comparative Evaluation of Ovarian Morphology of Women with PCOS Versus Those of Normal Women in Tertiary Care Hospital

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## ABSTRACT

**Introduction:** Polycystic ovary syndrome (PCOS) was first described by Stein and Leventhal in 1935 as a condition characterized by "amenorrhea, hirsutism, obesity and sclerotic ovaries. The Aim of this study was comparison of ovarian morphological finding between PCOS & normal female individuals in tertiary care hospital.

**Methodology:** This comparative study was conducted in between normal and PCOS cases in Department of Anatomy in between the age 18 to 40 years, attending the outpatient department of Gynaecology and Obstetrics of Pt. J.N.M. Medical college and Dr. B.R.A.M. Medical Hospital, Raipur (C.G.).

**Results:** This comparative study included total 105 female individuals. Among all,25 cases were normal whereas rest were PCOS cases. In our study, we found 15 & 43 cases of 21-30 age group in normal & PCOS cases respectively. Mean ovarian volume was within normal range (less than 10cc) in all the age groups in normal cases as compared to PCOS cases.

**Conclusion:** Increased ovarian volume is associated with markers of PCOS. Ovarian volume may serve as a useful tool to aid clinicians in their risk stratification and counselling of patients with PCOS.

**Keywords:** Polycystic Ovary Syndrome, Ovarian Volume.

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## INTRODUCTION

The PCOS is the most common endocrinal disturbance leading to anovulatory infertility and oligomenorrhea. PCOS is characterized by the presence of enlarged ovaries with multiple small cysts (2-8 mm in diameter) and a hypervascularized androgen secreting stroma. The disease is manifested clinically by signs of androgen excess including hirsutism, alopecia, obesity and menstrual disturbance either oligomenorrhea or amenorrhea. The diagnosis of the polycystic ovarian syndrome can be done by combination of clinical symptoms with biochemical markers and the ultrasound picture. Classically the PCOS is an enlarged sometimes elongated gonad with a smooth sclerotic, pearly white or grayish capsule. Bilateral enlargement is the rule but unilateral enlargement or normal sized ovaries are not uncommonly found. This was studied by Evans and Riley[1] in 1960 and same studies were done by Taymor and Barnar[2] in 1975.

Adams[3] et al in 1985 stated sonographic criteria for PCO as following-Multiple (>10), small (2-8mm) peripheral cysts. A dense core of stroma. Enlarged ovaries (8-14 mm) In 1991 Ardaens[4] and in 1994 Forquhsr[5] also described the criteria for the ultrasonographic diagnosis of polycystic ovaries which were as following – More than 10 discrete follicles of less than 10 mm

diameter. Usually, arranged peripherally around an enlarged hyperechogenic central stroma. Increased ovarian volume varying between 5.5 cc to 10 cc.

According to Polycystic Ovary syndrome, an update by Gita Ganguly Mukherjee & B.N. Chakravarty[6] on the basis of a transvaginal scan and follicular distribution PCOS is of two types:

- Peripheral cystic pattern (PCP)
- General cystic pattern (GCP).

It has been now shown that these two different morphologies reflect different histologic types and both reflect specific endocrine PCOS patterns.

Another study was done by Morris and Scully[7] in 1958 in which they described as that thickened tunica albuginea and widened cortical stroma both contributed to the "thickened capsule" and beneath the capsule numerous blue domed follicular cysts at various stages of growth and atresia were found which was lined by a hyperplastic theca interna layer showing pronounced leuteinization. Along with these findings the granulosa cells were absent or degenerating. In PCOS the ovaries were also showing the presence of isolated nests of leuteinized stromal cells (theca leutein cells) remote from the follicles which were regarded as

evidence of "Hyperthecosis" and were usually associated with considerable androgen secretion. An authoritative study recently completed by Hugnesdon[8] (1981) demonstrated that polycystic ovaries compared with controls shown an average – Double the cross – sectional area. The same number of primordial follicles. Double the number of ripening and subsequent atretic follicles. A tunica increased by 50% and more collagenized. Cortical stromal thickness increased by about 1/3rd. Sub cortical stroma, with a deep cortical or medullary component, increased by 5 times. Ovarian hilus cell nests 4 times as frequently.

Polycystic ovary syndrome (PCOS) is a very common and heterogeneous disorder. Depending on the criteria used to diagnose PCOS, incidence estimates range from 4–9% of reproductive age women using the 1990 National Institutes of Health criteria. Among these women, there is a wide range of physical, endocrine and metabolic phenotypes.

The Aim of this study was comparison of ovarian morphological finding between PCOS & normal female individuals in tertiary care hospital.

## MATERIALS & METHODS

**Study Population:** This comparative study was done between normal and PCOS cases. Total 105 cases were included in this study. Among all cases, 25 were normal & rests were PCOS female individuals.

**Study Area**: This study was conducted in Department of Anatomy in between the age 18 to 40 years, attending the outpatient department of Gynaecology and Obstetrics of Pt. J.N.M. Medical college and Dr. B.R.A.M. Medical Hospital, Raipur (C.G.)

**Study Duration:** One year.

**Data Collection:** In all these cases (Normal + PCOS patients) ovaries were studied morphologically by USG using high resolution, real time color doppler scanner with 3-7 MHz convex electronic multifrequency transabdominal transducer and 4-9 MHz multifrequency transvaginal transducer, in the Department of Radio-diagnosis, Pt. Jawaharlal Nehru Memorial Medical College, Raipur, (C.G.). Size and Volume of both ovaries were measured by USG. Also, study of stromal echogenicity, involvement of ovary and cystic pattern of ovary was done.



**Fig 1: Normal Ovary**
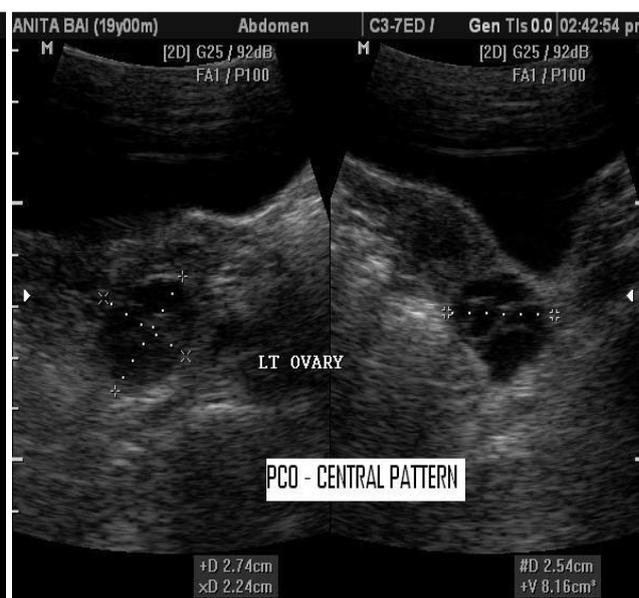


**Fig 2: PCO Peripheral Pattern**



**Fig 3: PCO Central Pattern**

## RESULTS

This comparative study included total 105 female individuals. Out of all cases, there were 25 cases normal, the rest were PCOS cases. In our study, we found 15 & 43 cases of 21-30 age group in normal & PCOS cases respectively. Mean ovarian volume was within normal range (less than 10cc) in all the age groups in normal cases as compared to PCOS cases (Table 2). This result revealed that, in group I it was peripheral cystic pattern seen in 27 cases (33.75%) while in 1 case (1.25%) it was central. In Group II it was peripheral in 42 patients (52.5%) while in one case (1.25%)

it was central. In Group III in the entire patient – 09 cases (11.25%) it was peripheral cystic pattern. So, in 78 (97.5%) cases out of 80 peripheral cystic patterns of PCOS was seen. In 2 cases (2.5%) general cystic (central) pattern of PCOS was seen. 80 patients (18-40 yrs) with clinical suspicion of polycystic ovarian syndrome were evaluated by real time color doppler scanner with 3-7 MHz convex electronic multifrequency transabdominal transducer and 4-9 MHz multifrequency transvaginal transducer, in the Department of Radio-diagnosis, Pt. Jawaharlal Nehru Memorial Medical College, Raipur, (C.G.).
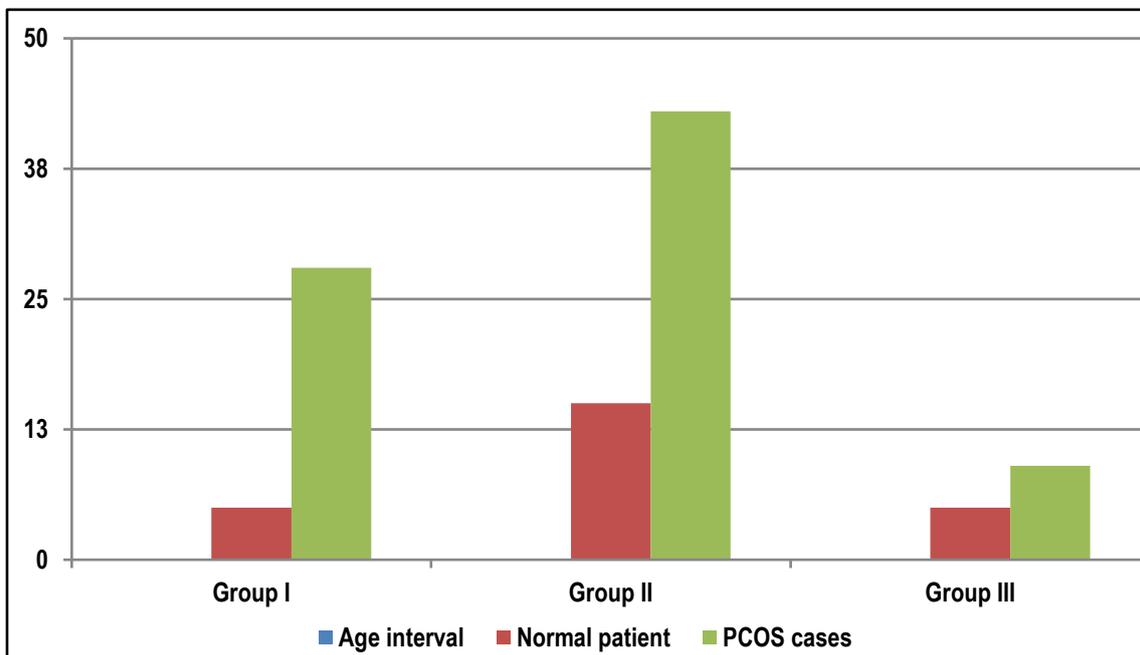


**Chart 1: This chart showing Number of cases according to age group interval**

**Table 1: Distribution of cases according to age**

| Group | Age interval | Normal patient | PCOS cases |
|-------|-------------|----------------|------------|
| I | 18-20 | 5 | 28 |
| II | 21-30 | 15 | 43 |
| III | 31-40 | 5 | 9 |
| Total | | 25 | 80 |

**Table 2: Pattern of PCOS**

| PCOS Pattern | Group I | Group II | Group III | Total |
|--------------|---------|----------|-----------|-------|
| Peripheral cystic pattern | 27 | 42 | 9 | 78 |
| Central cystic pattern | 1 | 1 | 0 | 2 |
| Total | 28 | 43 | 9 | 80 |

**Table 3: Distribution of cases according to mean ovarian volume**

| Group | Age interval | Mean ovarian volume in Normal patient | | Mean ovarian volume in PCOS patient | |
|-------|-------------|------|------|------|------|
| | | Rt | Lt | Rt | Lt |
| I | 18-20 | 7.15 | 5.17 | 11.67 | 8.84 |
| II | 21-30 | 6.12 | 6.12 | 11.59 | 8.48 |
| III | 31-40 | 7.09 | 7.23 | 10.74 | 7.42 |

## DISCUSSION

In our study of 105 cases between the age 18 to 40 years were included. Out of these; 80 were of PCOS and 25 were Normal.

**In normal cases – Observations were as following:**

Age distribution of patients:

Maximum patients were of age group II (Age ranges from 21 to 30 yrs) The number of patients in this age group was 15 (60 %).

On study of ovarian morphology in all normal cases it was observed that –

A) The size of both ovaries was normal

B) The stromal echogenicity was normal.

C) The mean ovarian volume for right ovary was in Group I, 7.15cc, in Group – II 6.12cc and Group III, 7.09cc.

D) The mean ovarian volume for Left ovary was in Group I, 5.18cc, in Group – II, 6.21cc and Group III, 7.23cc.

So, the ovarian volume for both ovaries in Normal female individuals of age group 18-40 years was within normal limits (less than 10cc). AA Kyei[9] reported in 1998 mean ovarian volume as 11cc in normal patients. This value was higher than our observation. In 2001 Hongning Xie[10] et al reported mean ovarian volume as 5.66cc in normal patients. This value correlated with our observation. Another study by Fauzia Nazir[11] et al in 2008 reported mean ovarian volume in normal patients as 7.15cc. This value also correlated with our study.

**In PCOS patients following observations were made:**

Age distribution of patients - most patients was in age group II (21 to 30 yrs). The number of patients in this group was 43 (53.7%).

Pattern of PCOS:

It is of 2 types – Peripheral and Central. In group I it was peripheral cystic pattern seen in 27 cases (33.75%) while in 1 case (1.25%) it was central. In Group II it was peripheral in 42 patients (52.5%) while in one case (1.25%) it was central. In Group III in all the patient – 09 cases (11.25%) it was peripheral cystic pattern. So, in 78 (97.5%) cases out of 80 peripheral cystic patterns of PCOS was seen. In 2 case (2.5%) general cystic (central) pattern of PCOS was seen. In earlier studies by Balen et al[12], 1995, peripheral cystic pattern was seen in 88% of PCOS patients. So, our study correlated with the study by Balen et al.[12]

Mean ovarian volume which was for Right Ovary in Group I, 11.67cc, Group II, 11.59cc and in Group III, 10.74cc. The mean Ovarian Volume was for Left ovary in Group I, 8.84cc, Group II, 8.48cc and in Group III, 7.42cc. According to sonographic criteria for polycystic ovary by Adam et al[3] the ovarian volume in PCOS patients is generally more than 8cc (8 to 14cc). AA Kyei et al[9] in 1998 reported mean ovarian volume as 15.7cc. This value is quite higher than our observation. Another study by Hongning Xie et al[10] in 2001 reported mean ovarian volume as 9.41cc. This value correlated with our study. Fauzia Nazir[11] in 2008 reported mean ovarian volume as 12.09cc. This value was found slightly higher than our observation. These all scientists did not report mean ovarian volume separately of right and left ovary which we studied in all the three groups. In our studies Ovarian volume was more than 10cc for Rt. Ovary in Group I, 42.85%, Group-II, 55.81% and Group III, 33.33%. For Lt. Ovary in Group I, 28.57%, Group-II, 13.95% and Group III, 22.22%. Another study by BN Chakravarty and Yashwant Mane[13] showed the mean ovarian volume more than 10cc in 55.31%. But they did not report separately the ovarian volume for right and left ovary.

## CONCLUSION

This study concludes that increased ovarian volume is associated with markers of PCOS. Ovarian volume may serve as a useful tool to aid clinicians in their risk stratification and counselling of patients with PCOS. Using sonographic criteria in combination improves sensitivity and helps diagnose additional patients with PCOS.

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