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Radiology

"Ultrasonographic Assessment of Polycystic Ovaries: Ovarian Morphology versus Ovarian Volume in Diagnosis of Polycystic Ovaries."

Dr. Gulnar Begum[1*], Dr. Selina Afroze Ansary[2], Dr. Ismail Hossain[3], Dr. Shaida Akhter[4], Dr. Shakina Khatun[5]

[1]Senior Consultant, Radiology, 250 Bedded General Hospitals, Jamalpur, Bangladesh
[2]Junior Consultants, FCPS (Obstetrics & Gynecology), Melandaha Health Complex, Jamalpur, Bangladesh
[3]Senior Consultant (Skin & VD, 250 Bedded General Hospitals, Jamalpur, Bangladesh
[4]Medical Officer, Maternity & Child Health Training Institute, Azimpur, Dhaka, Bangladesh
[5]Assistant professor (Gynecology& Obstetrics), Shaheed M. Mansur Ali Medical Hospital, Sirajgonj, Bangladesh

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***Corresponding author:** Dr. Gulnar Begum

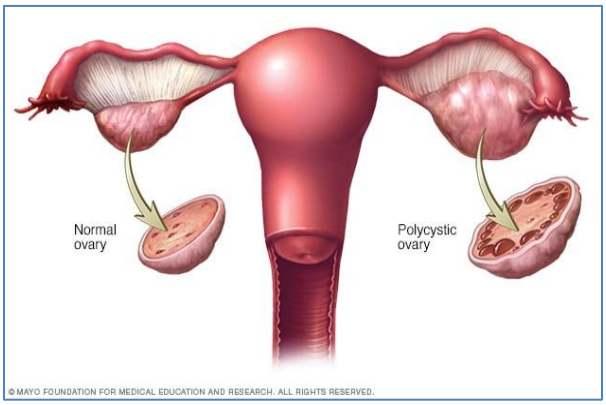
Abstract **Original Research Article**

Polycystic ovaries (PCO) and their clinical expression (polycystic ovary syndrome) are conditions characterized by menstrual abnormality clinical and biochemical features of Hyperandrogenism. It is the killer of the womanhood. Women of any ethnic background can present with PCOS. Polycystic ovaries (PCO) are a common problem among females. As ultrasound examination of such cases is easy, available, cheap and less invasive than hormonal assessments. In practice, ultrasound findings are sometimes equivocal when some patients have normal ovarian volume but with abnormal ovarian morphology. Herein, the study aimed to compare ovarian volume in patients with PCO versus the ovarian morphology and whether one finding alone could make the diagnosis. Ninety(90) patients (women) with clinically and laboratory diagnosed PCO were selected from OPD of Obstetrics and Gynaecology in 250 Beded General Hospital , Jamalpur and other private clinic or hospitals in Jamalpur during the period of August 2017 to July 2019.Transabdominal & Transvagina ultrasound was done for assessment of ovarian volume and morphology. In patients, 16(8.8%) ovaries showed normal morphological appearance while the rest (91.1%) showed morphological picture of PCO in the form of detection of 10 or more cysts of 2-8 mm in diameter. Peripherally arranged around on ecodense stroma (redulla). Ovarian morphological feature is more reliable than ovarian volume in diagnosing patients with polycystic ovarian syndrome in polycystic ovaries (PCO) women.

Keywords: Ultrasonography, Polycystic ovaries (PCO), Ovarian Morphology, Ovarian Volume.

INTRODUCTION

Polycystic ovary syndrome is a hormonal disorder common among women of reproductive age. Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone (androgen) levels. The ovaries may develop numerous small collections of fluid (follicles) and fail to regularly release eggs. The exact cause of PCOS is unknown. The condition now known as polycystic ovarian syndrome (PCOS) was first described by Stein and Leventhal in 1935[1]. PCOS is the most common reproductive endocrinopathy of women during their child bearing years, with a reposted prevalence of 5-10% [2]. The diagnosis of PCOS was previously used on a combination of clinical & endocrine features, including raised serum concentration of Luteinizing hormone (LH), Testosterone (T) & androstenedione and reduced levels of sex hormone binding Globulin[3, 4].



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In 2003 " Rotterdam criteria" allow the diagnosis to be made when two of three features are present- Oligomenorrhea or anovulation, Clinical and biochemical hyperandrogenism, and objectively defined polycystic ovaries on ultrasound[5]". In 1981, Swanson

et al.[6] discussed PCO as enlarged and rounded with a mean volume of 12cm^3 and containing an increased number of small follicles (2-8mm) encircling the ovarian cortex. However, the importance of ovarian size in diagnosis has lessened as various groups[7-9] have shown a considerable overlap between PCOS and normal ovaries and as the upper limit of normal has discussed from greater than 10 to 5.5 cm^3 [10].Whereas hyperandrogenism and menstrual sregeniaritis report the major complaints in young woman with the PCOS, symptoms related to androgens socurr, oligomenorrhaea or omenorrhaea particularly infertility are the main complaints of adult woman with PCOS during the reproductive age. Obesity has an important impact on the severity of these manifestations in proportion to its degree and particularly in the proportion to its degree and particularly in the presence of the abdominal phenotype. In the present study, we tried to compare the reliability of ovarian morphology in cover of PCO verses ovarian volume. The hypothesis in that relying on morphological assessments of the ovary is more accurate than ovarian volume measurements especially when there is discrepancy between both.

OBJECTIVE

To compare the reliability on the Assessment of Ultrasonography of ovarian morphology versus ovarian volume in cases of PCO in women

METHOD AND MATERIALS

It is a descriptive cross sectional study conducted in 250 Bedded General Hospital, Jamalpur, Bangladesh in the department of Radiology and Imaging in collaboration with the department of Obstetrics and Gynaecology, and other private clinics of Jamalpur during the period from August 2017 to July-2019. The present study includes ninety (90) women of reproductive age (16-38yrs) who sonographically show polycystic ovary. Sixty (60) patients had primary sub fertility (17), had secondary sub fertility and thirteen (13) were unmarried who had clinical complaints of either (1) irregular menstrual cycles in the form of oligo, or anovulation (Menstrual cycles<21 days or > 38 days) (2) Hirsutism and or (3) obesity. The laboratory findings included biochemical evidence of hyperandogenism. The inclusion criteria were clinical and laboratory evidence of PCOS and visualization of at least one ovary by TV ultrasnography. The exclusion criteria were use of hormonal contraception, fertility medication in the three month prior to enrollment, hyperprolactinemia, hypercortisolemia and thyroid dysfunction. Ultrasound technique: Ultrasound scans were performed before days 7 to 12 days of menstrual cycle. Trans abdominal USG was done by using a philips 350 clear view with a probe 3.5 MHZ and Transvaginal USG was done by using 14 MHZ probe. All scans are done in a private room after getting patients consent. Tran's abdominal ultrasonography was done with full bladder and TVS was performed in empty bladder. Each ovary was visualized and anatomic orientation with respect to the utero-ovarian ligament was established .Ovaries were seamed from the iuub to outer margin in both the Transverse and sagittal planes. The examination should be include (1) Ovarian volume (2) Total follicle count (3) Layout follicle diameter and (4) Follicle distribution pattern. Ovarian volume was calculated from measurement of the largest and widest diameters of the ovaries in the transverse and sagittal planes. Total follicle count should include follicles more than 2mm in diameter. Follicle distribution patterns is judged whether follicles were predominantly distributed in a peripheral pattern or heterogeneously throughout the stroma .Transabdominal ultrasound has been largely superseded by transvaginal seaming because of greater resolution and in many cases patient preference as the need for a full bladder is avoided-which saves time and may be more comfortable (Gold Stein, 1990). The transvaginal approach provides a more accurate view of the internal structure of the ovaries, avoiding apparently homagenous ovaries as described with transabdominal scan, particularly in obese patients. The transvaginal route , high frequency probes (>7MHZ), which have a better spatial resolution but less examination depth , can be used because the ovaries are close to the vagina and/or the uterus and because the presence of fatty tissue is usually less disturbing (except when very abundant). It is now known that, it is oocyte-containing follicles that were observed when describing the polycystic ovary, rather than pathological or atretic cystic structures. The early literature often refers to 'cysts' rather than follicles, and as the latter are indeed small cysts – that is a sac containing fluid. 'The terminology polycystic ovary syndrome has remained.

RESULTS

The study included ninety (90) patients with age range between 16-38 years (average 27 years). Thirty five (35) representing (38.8%) patients presented with menstrual irregularities, 29 (32%) with infertility, 15 (16.6%) with obesity and 11 (12.2%) with hirsutism. All patients have abnormal hormonal profile in the form of elevated serum LH and Testosterone levels, ultrasound examination was done for all patients with successful visualization of both Ovaries when combining trans- abdominal and transvaginal scan. A total number of 180 ovaries are evaluated in patients. Ovarian morphology is evaluated based on follicle count, largest follicle diameter and follicle distribution within the ovarian parenchyma. In patients the ovarian volume ranges from 6.7 to 12.6 ml, with an average of 9.65ml. Only 30 ovaries (16.6%) should volume above normal. Regarding the ovarian morphology, in patients 16(8.8%) ovaries showed normal morphological appearance while the rest (91.1%) showed morphological picture of PCO in the form of detection of 10 or more cysts of 2-8 mm in diameter peripherally arranged around an echodense stroma.

DISCUSSION

In 1985, Adam *et al*. [11] published new criteria based on TAS, which required 10 or more arts (follicle) of 2-8mm in diameter arranged peripherally around an echo dense stroma. However, these criteria have remained in widespread use even after the introduction of TVS a decade later The 2011 Evidence-based guideline for the assessment and management of polycystic ovary syndrome provides valuable advice to general practitioners on evidence based diagnosis and management [12]. Polycystic ovary syndrome (PCOS) is a common andocrine disorder of unknown cause [13]. It is a highly variable condition with wide array presentations. This polycystic ovary syndrome should meet at least two of the falling three criteria's: oligo or anovulatin clinical and/or biochemical sign of hyperandrogenism; and polycystic ovaries on ultrasound [14]. Ultrasound is a non-invasive and a widely used modality for evaluating such cases. The evaluated ultrasound criteria of PCO were as follows: The presence of 12 or more 2-9mm ovarian follicle; a peripheral distribution of ovarian follicles; an ovarian volume of more than 10cm^3 and a highly echogenic ovarian strom[15.] Our study revealed that clinically and laboratory proven PCO showed the typical morphological changes in ultrasound examination in 91.1%; however, only 30 ovaries (16.6%) showed increased volume. Our data showed that 12 follicles were identified per ovary, in agreement with Lujan *et al*.[16] Who suggested that a significantly higher Threshold than 12 is needed to adequately discriminate between polycystic and normal ovaries[17]. Historically, the peripheral distribution of follicles has been considered a hallmark of polycystic ovaries [18]. The classic "String of pearls" appearance is embedded in the medical imaging literature and remains highly remarked upon in radiological reports confirming the presence of polycystic ovarian morphology. In our study, 91.1% of cases showed typical peripheral follicle distribution in agreement with Adams et.al; on the other hand, Lujan et.al; excluded the assessment of follicle pattern in their study. Ovarian volume was measured in only 16.6% of cases using the cut off value of 12cm^3. Unfortunately there is significant debate regarding the sensitivity of increased ovarian volume as a diagnostic criterion for polycystic ovaries. The currently accepted cut off > 10 cm^3 was associated with 98.2% specificity, but only 45% sensitivity, in discriminating between normal and polycystic ovaries [19]. Since 2003, both a lower threshold of cm^3 and higher threshold of 13 cm3 have been proposed on being more appropriate threshold for polycystic ovarian morphology

LIMITATIONS OF THE STUDY

This study conducted in one district with small sample size. So, the scenario of this study may not reflect the whole country.

CONCLUSION

In summary, typical peripheral distribution of more than 10 follicles of 2-8mm diameter is depicted in most of patients enrolled in the study in controversy to the ovarian volume enlargement and thus, the study concluded more reliability of ovarian morphology than ovarian volume in diagnosing patients with suspected PCO.

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