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ORIGINAL ARTICLE

Sonographic Association of Polycystic Ovaries with Ovarian Arterial Pulsatility and Resistive Index

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ABSTRACT

Aim: To evaluate the sonographic association of polycystic ovaries with ovarian arterial pulsatility and resistive index.

Methodology: In Al Mustafa Trust Medical Centre Lahore, a comparative analytic study was conducted. 140 patients of age group 17 to 50 were included in this study with convenient sampling technique. All patients were females and 70 were with the history of PCOs and normal. Gray scale Ultrasound and Doppler was used to diagnose the PI and RI in normal and subject.

Duration of study: 02- Aug-2021 to 14- Dec-2021

Results: 70 PCOs patients have hyperechoic ovarian stroma and other 70 shows normal echogenicity. In this study different age groups were selected with minimum age was 17 years and maximum age was 50 years. In PCO females the mean RI was 0.7333 and PI was 1.6303 and in normal females the mean RI was 0.8889 and PI was 2.7251. Out of 140 patients the mean volume of right ovary is 9.6557 cm^3 and of left ovary is 9.7943 cm^3. Our Study was significant at point 0.0001.

Conclusion: It is concluded that ovarian Doppler ultrasound is a basic tool in the diagnosis of the PCOS and provide an insight into the pathophysiological state and degree of progression in the affected ovary.

Keywords: Polycystic ovary syndrome, Doppler ultrasound

INTRODUCTION

The ovaries are the female pelvic conceptive organs that house the ova and are additionally answerable for the development of sex chemicals. They have matched organs situated on one or the other side of the uterus inside the expansive tendon beneath the uterine (fallopian) tubes.[1] Polycystic ovary (PCO), is a typical complex issue among regenerative matured ladies, portrayed with hyper-androgen-ism, ovulatory brokenness, and polycystic ovary morphology,[2] it influences 818% of ladies during their conceptive years.[3] Polycystic ovary condition (PCOS) is a typical endocrine problem of ladies, described by a heterogeneous show of hyperandrogenism and ovulatory dysfunction[4]. Using the more extensive 2003 Rotterdam models, presently supported by the NIH and acknowledged globally, the predominance of PCOS goes from 5.5% to 19.9%.[5] PCOS is turning into a regularly analyzed condition in Pakistan where the pervasiveness is just about as high as 15.737%.

The etiology of PCOS in ladies stays muddled, and it has been viewed as connected with an-ovulatory barrenness feminine dysfunctions and hirsutism[7]. Though this infection is generally normal and influences each 1 out of 10 ladies of regenerative age, its etiology is as yet indistinct and symptomatic trouble stays there[8]. The clinical show of PCOS shifts broadly. Ladies with PCOS regularly look for care for feminine unsettling influences, clinical indications of hyperandrogenism, and fruitlessness. Feminine unsettling influences ordinarily seen in PCOS incorporate oligomenorrhoea, amenorrhea and delayed unpredictable feminine dying. Nonetheless, 35% of ladies with PCOS will have typical menses. Over 75% of ladies giving indications of androgen overabundance have PCOS and hirsutism is a typical clinical show of hyperandrogenism happening in up to 60% of ladies with PCOS[10]. The radiological assessments which are used for the disclosure of polycystic ovaries are ultrasound Doppler stream considers, MRI. Out of these, most typically used are transabdominal and transvaginal ultrasound since they are viably open and are cost effective.[11] Important components of PCOS on ultrasound are different, anechoic minimal developments in enhanced ovaries which are coordinated on edges around a thick focus of the thick echogenic stroma. Ultrasound shows upgraded ovaries in 75% of captivating patients and follicles might be spread all through the hyperechogenic stroma.[12] A few females with PCOS might contain normal ovarian volume on ultrasound it will, as a rule, be overviewed or separated by clinical, histological, and biochemical appraisals On account of a full bladder, fundamental fat tissues in the sort of weight, low target of ultrasound test, stomach circles which are piled up with inside gases which covered key ovaries, to beat this enormous number of obstructions in the interesting importance of ultrasound transvaginal approach is utilized which is called transvaginal ultrasound by utilizing an exceptional high rehash transvaginal test in which no need of bladder filling.[13] In an audit coordinated by Jonard S et.al, they used in the survey were somewhere around 12 follicles for each ovary and the size of each follicle from 3-10mm.[14] Doppler sonography of the utero-ovarian stream may add to the appraisal of PCOS patients and a prevalent perception of the pathophysiology of this condition. According to an evaluation which was done by three-dimensional power Doppler imaging in PCOS, results show low ovarian PI and RI in ladies with PCOS as separated and regular[15]. The ovarian passage PI, RI, and SD extents were on a very basic level lower in PCOS than in controls on the right side similar to the left side[16].

The rationale of this study is the comparison of grayscale and Doppler ultrasonography and to see significance of Doppler over grayscale in good prognosis of polycystic ovary syndrome. This study will try to find out the early detection of PCOS so that the morbidity and infertility could be reduced in the society due to this problem. Our research will provide a way to use Doppler ultrasound as early modality of choice to diagnose PCOS.

MATERIAL AND METHODS

In Al Mustafa Trust Medical Centre Lahore, a comparative analytic study was conducted from 22 June 2021 to 30 August 2021 after permission from IRB. 140 patients of age group 17 to 49 were included in the study with convenient sampling technique. All patients were females and half of them were with the history of polycystic ovarian syndrome and remaining was normal. Pregnant and females with any other pelvic pathology were excluded. Internationally accepted protocols were followed, and this research was voluntary i.e. if participants choose not to participate they can withdraw their consent any time. Independent t-test will be applied

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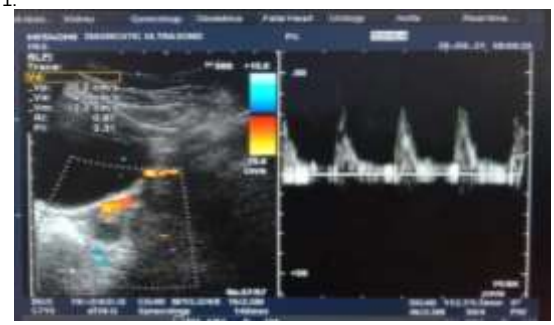
to analyze the differences in averages. P value < 0.05 will be considered as significant.

RESULTS

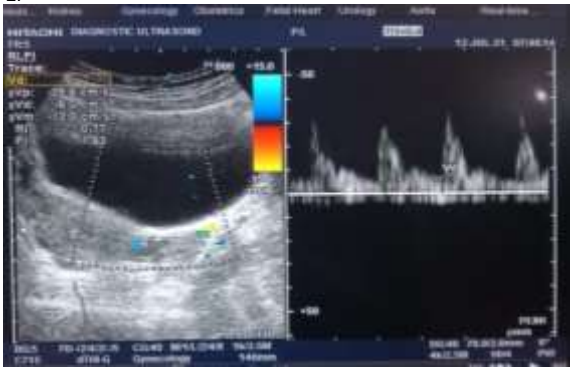
Out of 140 patients 70 patients were diagnosed with PCOS and 70 were normal females. Half of them showed hyperechoic echogenicity in their ovaries and other 70 showed normal echogenicity. In this study different age groups were selected. Minimum age was 18 years and maximum age was 50 years. In PCO females the mean RI was 0.7333 and PI was 1.6303 and in normal females the mean RI was 0.8889 and PI was 2.7251. Out of 140 patients the mean volume of right ovary was 9.6557 and of left ovary is 9.7943. In the age group 15-25 there were 43.5% PCO patients, in 26-35 there were 61.8% PCO patients and in 36-45 age group PCO patients were 42.9% out of normal patients. Our Study was significant at point 0.0001.

Fig. 1:



Following case shows Doppler indices of 37 years old normal female with pulsatility index= 2.31 and resistive index= 0.87

Fig. 2:



Following case shows Doppler indices of 19 years old PCO female with pulsatility index= 1.61 and resistive index= 0.77.

Table 1: Frequency Distribution of PCO

	Frequency	Percent
No	70	50.0
Yes	70	50.0
Total	140	100.0

Out of 140 patients 70 patients were diagnosed with PCOS and other 70 were normal. (Table 1)

Table 2: Frequency Distribution of Group Statistics

	PCO	N	Mean	Std. Deviation	Std. Error Mean
RI	Yes	70	0.7333	0.06257	0.00748
	No	70	0.8889	0.05210	0.00623
PI	Yes	70	1.6303	0.28549	0.03412
	No	70	2.7251	0.52546	0.06280

In PCO females the mean of RI was 0.7333 and PI was 1.6303 and in normal females the mean RI was 0.8889 and PI was 2.7251 (Table 2)

Table 3: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RI	Equal variances assumed	2.530	.114	-15.986	138	.000	-.15557	.00973	-.17481	-.13633
	Equal variances not assumed			-15.986	133.619	.000	-.15557	.00973	-.17482	-.13632
PI	Equal variances assumed	28.270	.000	-15.318	138	.000	-1.09486	.07148	-1.23619	-.95353
	Equal variances not assumed			-15.318	106.472	.000	-1.09486	.07148	-1.23656	-.95316

Study was significant at point 0.0001 (Table 3)

DISCUSSION

The writing examines accessible to assess the sonographic relationship of polycystic ovaries with ovarian blood vessel pulsatility and resistive values. There concentrates on outcomes that are not the same as our populace as a result of a contrast in way of life and hereditary background. In our study out of 140 patients 70 patients were diagnosed with PCOS and 70 were normal females. 70 patients had hyperechoic echogenicity of their ovaries and other 70 shows normal echogenicity. In this study different age groups were selected. Minimum age was 18 years and maximum age was 50 years. In PCO females the mean of RI was 0.7333 and PI was 1.6303 and in normal females the mean RI was 0.8889 and PI was 2.7251. Out of total patients the mean volume of right ovary is 9.6557 and of left ovary is 9.7943. In the age group 15-25 there were 43.5% PCO patients, in 26-35 there were 61.8% PCO patients and in 36-45 age group PCO patients were 42.9% out of normal patients. Our Study was significant at point 0.0001. “Color Doppler as diagnostic criteria in polycystic ovarian syndrome” was studied by Dr. Sonia Garg in 2021. Aim of this study was to determine the role and significance of color Doppler ultrasound as diagnostic criteria in patient of polycystic ovarian syndrome. The author inspected uterine and ovarian arteries and explained that elevated LH may be responsible for increase of ovarian vascularization. As the number of cysts in ovaries increases, ovarian volume also escalates and Doppler indices get worse. The author also highlighted that color Doppler is more sensitive to slow flow. She took pulsatility index (PI) and resistive index (RI) and measure them electronically. The author came to know that ovarian artery PI and RI are lower in PCOs patient in comparison to normal individuals. According to their results mean age of subjects of this research were in PCOS and non PCOS groups respectively. All patients of PCOs were complaining about menstrual irregularity and 15% were in non PCOS group. In PCOS group 64%, 96% and 3% patients presented with hirsutism, polycystic ovaries on ultrasonography and infertility respectively while 10% had hirsutism and none had polycystic ovaries on ultrasonography and infertility in controls. In both groups difference between clinical presentations were significant. The difference was highly significant. Mean PI of ovarian artery in PCOS group and controls was 1.29 ± 0.84 and 1.46 ± 0.51 respectively. Their difference was significant. Mean RI

of ovarian artery in PCOS group and normal group was 0.75 ± 0.24 and 0.78 ± 0.26 respectively. The difference was significant. The author concluded that color Doppler ultrasonography can be used as a diagnostic criterion in suspected cases of PCOS.[17] Ameenah Khan et.al conducted a concentrate on their point was to decide recurrence of unhinged ovarian supply route Doppler files in patients of PCOS as rate. Complete 205 ladies matured between 18-40 years giving PCOS were incorporated. Transvaginal Doppler ultrasound was performed to decide Pulsatility and Resistive records of ovarian vein which were marked insane if above or underneath the typical reach PI and RI. In this review, they saw that ovarian conduit Doppler records were insane in a huge extent of ladies with PCOS which proposes likely job of Doppler files in the demonstrative workup of ladies with doubt of PCOS[18]. Dr Garima Pureha et al directed a review named "Ovarian and Uterine Course Doppler Lists in Polycystic Ovary Disorder". They came concerning that among the cases, the center right ovary volume was 15.8 and it was 5.0 in controls. Among the cases, the center left ovary volume was 14.0 and it was 4.92 in controls. The qualification in the ovarian volume between the survey bundles was truly enormous. The mean right ovarian RI in cases was 0.57 ± 0.032 and it was 0.73 ± 0.065 in normal. The mean left ovarian RI in cases was 0.55 ± 0.055 and it was 0.72 ± 0.071 in controls. The differentiation in the ovarian hall RI between the two social affairs was truly basic.[19] Sebiha Ozkan et.al directed a review where they intended to concentrate on the blood stream examples of ovarian and uterine veins in patients of PCOS. They reasoned that the ovarian vein pulsatility file, resistivity record and SD proportions were lower in PCOS patients than in ordinary on the right side just as on the left side[20]. Mehmet Suhha Bostanci et.al presumed that patients with PCOS uterine vein PI and RI esteems are higher than ladies with ultrasonographic proof of polycystic while ovarian corridor PI and RI esteems were lower[21].

CONCLUSION

It is concluded that ovarian Doppler ultrasound is a basic tool in the diagnosis of the PCOS and provide an insight into the pathophysiological state and degree of progression in the affected ovary.

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