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Original Article

Sonographic Relation between Adnexal Masses and Endometrial Thickness in Infertile Females with Hormonal Imbalance

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ABSTRACT

Objective: To determine the sonographic relation between adnexal masses and endometrial thickness in infertile females with hormonal imbalances.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Department of Radiology, Gilani Ultrasound Center, Jamiat Hospital & Green Town Clinic, Lahore Pakistan, from Mar 2019 to Jan 2020.

Methodology: In this study, 150 infertile females with adnexal masses, aged 18 to 45, were included. Data were collected according to the age, adnexal masses, endometrium thickness, and type of infertility hormonal levels. The endometrium thickness was measured in the sagittal plane at the thickest echogenic area from one basal endometrial interface across the endometrial canal to the other basal surface.

Results: The mean age was 32.55±6.33 years. Out of 150 patients, 97 patients with abnormal and 53 were with normal hormonal levels. Follicular cysts (33%), Polycystic ovarian syndrome (29.9%) and 23.7% hemorrhagic cysts were found with abnormal hormonal levels.

Conclusion: There was a significant correlation between adnexal masses and endometrial thickness in infertile females with abnormal hormonal levels.

Keywords: Endometrial thickness; Follicle-stimulating hormone; Infertility; luteinizing hormone.

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INTRODUCTION

Infertility affects about 10-15% of all couples. Female infertility workup is incomplete without the application of Ultrasonography (US).[1] Menstrual and ovulation dysfunction and uterine factors are the most common causes of impairment in fertility.[2] The aetiology of infertility prevalence and patterns of causes of infertility in different regions are diverse.[3] The endometrium is one of the most dynamic structures in the body on sonography. The uterus of a normal woman exhibits ultrasonographically detectable changes during her reproductive years, indicated by cyclical changes in the endometrium's echo pattern. The sonographic appearance of the endometrium can be used to estimate the day of a normal woman's menstrual cycle. Endometriomas are well-defined, homogeneous structures with low to moderate echogenic density contents, and septations are common. Presentations with hyperechoic walls or nodulations.[4]

The typical endometrium thickens and produces sonographically visible strata from the first day of the menstrual cycle to the mid-cycle. This appearance can be layered, tri-laminar, or 5-line.[5] The normal endometrium brightens & thins during the middle of the cycle. [6]

The most common gynaecological disorder is endometriosis which causes infertility. It affects 2-10% of women in the general population and 20-50% of women undergoing infertility testing.[7] Because of the high prevalence of endometriosis among infertile women, it has been believed that there is a link between endometriosis and infertility.[8] A common gynecologic problem is an adnexal mass (a mass of the ovary, fallopian tube, or surrounding connective tissues).[9] Women with adnexal masses may experience acute symptoms such as stomach discomfort, nausea, vomiting, infection etc.[10]

Infertility is a very common social, economic and medical problem. There are various causes of infertility, and adnexal masses and endometrial thickness play a vital role. Therefore, if we find out the relation between adnexal mass, endometrial thickness and infertility, we can overcome this problem to a great cause.

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METHODOLOGY

The cross-sectional analytical study was conducted at Gilani Ultrasound Center, Ferozpur Road, Lahore, Jamiat Hospital, Lahore and Green town clinic, The University of Lahore, Lahore Pakistam, from March 2019 to January 2020 after approval from the University of Lahore (IRB number: 447). The sample size was calculated using the WHO sample size calculator, taking a reported prevalence of 10-15% globally.[11]

Inclusion Criteria: All Infertile Females aged 18-45 years with an adnexal mass were included in the study.

Exclusion Criteria: Male infertility and Endometrial Pathologies were excluded from the study.

Toshiba Xerio with a convex transducer frequency range of 2.5-5 MHz machine was used. Data was taken after getting informed consent from the patients. Data were collected according to the age, adnexal masses, endometrium thickness, and type of infertility hormonal levels. The endometrium thickness was measured in the sagittal plane at the thickest echogenic area from one basal endometrial interface across the endometrial canal to the other basal surface. It was collected according to the convenient sampling technique.

SPSS ver 23 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

One hundred fifty females were included in this study. The mean age was 32.55±6.33 years. The mean endometrial thickness was 0.78±0.29 mm. 45(30%) females had primary infertility, and 105(70%) females had secondary infertility. There were 4(7.0%) females in Group-A with Ovarian cysts, 4(7.0%) with Endometrioma, 28 (49.1%) with Polycystic ovarian syndrome, 4(7.0%) with Hemorrhagic cysts and 9(15.8%) with Follicular cyst, whereas in Group-B, 16(17.2%) with Ovarian cyst, 7(7.5%) with Endometrioma, 9 (9.7%) with Polycystic ovarian syndrome, 23(24.7%) with Hemorrhagic cyst and 28 (30.1%) with Follicular cyst as shown in Table-I. Among females with abnormal hormonal levels in Group-A, 4(4.1%) were with ovarian cysts, 7(7.2%) with Endometrioma, 29(29.9%) with Polycystic ovarian syndrome, 23(23.7%) with Hemorrhagic cysts and 32(33.0%) with Follicular cyst, whereas in Group-B females with normal hormonal level 16(30.2%) with Ovarian cyst, 4(7.5%) with Endometrioma, 8(15.1%) with Polycystic ovarian syndrome, 4(7.5%) with Hemorrhagic cyst and 5(9.4%) with Follicular cyst (*p*-value <0.001), as shown in Table-II. Bilateral Polycystic ovarian disease with thin endometrium is in shown in Figure-1 and left ovarian endometrioma with low-level Internal Echoes measuring 55x56 mm is shown in the Figure-2.

Table-I: Association of Adnexal Mass and Endometrial Thickness (n=150)

Adnexal Cyst	Endometrial Thickness	
	Group-A <0.7	Group-B 0.7 or <
Normal	8(14%)	10(10.8%)
Ovarian cyst	4(7.0%)	16(17.2%)
Endometrioma	4(7.0%)	7(7.5%)
Polycystic ovarian syndrome	28(49.1%)	9(9.7%)
Hemorrhagic cyst	4(7.0%)	23(24.7%)
Follicular cyst	9(15.8%)	28(30.1%)

Table-II: Association Between Adnexal Cyst and Hormonal Level (n=150)

Adnexal Cyst	Hormonal Level		*p*-value
	Group-A Abnormal	Group-B Normal	
Normal	2(2.15)	16(30.2%)	<0.001
Ovarian cyst	4(4.1%)	16(30.2%)	
Endometrioma	7(7.2%)	4(7.5%)	
Polycystic ovarian syndrome	29(29.9%)	8(15.1%)	
Hemorrhagic cyst	23(23.7%)	4(7.5%)	
Follicular cyst	32(33.0%)	5(9.4%)	

Figure-1: Bilateral Polycystic Ovarian Disease with thin Endometrium

Figure-2: Left Ovarian Endometrioma with low-level Internal Echoes measuring 55x56mm

DISCUSSION

Infertility globally affects approximately 10-15% of couples.[11] It affects women of all ages. In the current study, the mean age was 32.55±6.33 years. In a previous study conducted on 215 women, the mean age was 30.384±3.15 years.[12] In another study conducted by Elhussein *et al.* the mean (SD) age of the females was 32.4.[13] In our study, the mean endometrial thickness was 0.78±0.29 mm. 45(30%) females had primary infertility and 105(70%) females had secondary infertility. A study was conducted in 2009 by Naz *et al*. In another study, 136(70.46%) patients with primary and 57(29.54%) with secondary infertility.[14] Another study shows that the rates of primary infertility (67.37%) were higher than secondary infertility (32.63%).[15] Infertility is a global issue that affects people from all communities, while the causes and severity differ depending on geographical location and socioeconomic status.[16]

In a previous study conducted in 2018, an adnexal mass was present in 27(17.4%) females in this study; 128(82.6%) females had increased endometrial thickness and no gynaecological pathology. Those with adne-xal masses had thicker endometrium than women without adnexal masses. In the group with adnexal mass, non-atypical and atypical endometrial hyperplasia were more common. Endometrial thickness was higher in women with adnexal masses than in women without adnexal masses, and the difference was statistically significant (11.7mm vs 7.8mm, p= 0.009).[17] While in our study, out of 150 patients, adnexal masses were found in 132 patients, endometrial thickness was less than 7mm in 39 patients, and there was a significant correlation between adnexal masses and endometrial thickness.

A study conducted in 2017 by Hussain *et al.* revealed that Polycystic Ovaries (PCO) were detected in 69(69%) of the 100 cases studied by TVS, and it was the most common finding in women with infertility in this study.[18] Our study also has more polycystic ovaries those other adnexal masses. Out of 150 patients, polycystic ovaries were found in 37 patients. The current study revealed that in 37 patients with polycystic ovaries, endometrial thickness was less than 0.7cm, which shows infertility, and there was a significant correlation between adnexal masses and endometrial thickness. A study conducted by Diamanti-Kandarakis *et al.* revealed that 20% of women with infertility problems (early pregnancy loss) had been diagnosed with PCOS.[19] Our Study shows a strong correlation between Hormonal levels and Adnexal masses. Adnexal masses can affect endometrial thickness and Hormones, which can cause infertility. Therefore, early diagnosis and timely treatment are key factors in optimizing Infertility.

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CONCLUSION

There was a significant association between adnexal masses and endometrial thickness in infertile females and a strong association between adnexal masses and hormonal levels. Hormones are directly linked to fertility. Therefore, adnexal masses can disturb the hormonal level, which can cause infertility.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SMYF & SAG: Conception, critical review, drafting the manuscript, approval of the final version to be published.

SKTS & AI: Data acquisition, data analysis, data interpretation, approval of the final version to be published.

M & SZA & LKJ: Study design, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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