DOI: https://doi.org/10.53350/pjmhs211581773

SYSTEMIC REVIEW

Causes of Ovarian Dysfunction and its Sonographic Findings With Respect to Infertility: A Systematic Review

NIMRA AFZAL[1], SAYYEDA KHADIJA TUL SUGHRA MURRIUM[1], FUROZAN BAIG[1,2], IRUM RAHEEM[1,3]
[1]*Department of Radiology, University of Lahore Pakistan*
[2]*Department of Medical Imaging and Ultrasonography, School of Health Sciences, University Of Management & Technology, Lahore*
[3]*Department of Medical Imaging and Radiology, Northwest Institute of Health Sciences affiliated with Khyber Medical University Peshawar*
Correspondence to Namra Afzal, Email: *namraadnan4@gmail.com, Cell: 92-0321-4852591*

ABSTRACT

Background: Ovarian dysfunction is a condition in which ovaries stop working and menstrual periods stops before age 40. This can cause fertility problems. There are several causes of ovarian dysfunction causing infertility such as endometriosis, ovarian torsion etc.
Aim: To revise the current literature about causes of ovarian dysfunction and its sonographic findings in infertile women.
Methods: Electronic data base search was performed (PubMed, Science direct, Google Scholar) with data range from 2000 to 2019. All the data is available online in English.
Results: Seventeen articles were found regarding different causes of ovarian dysfunction and their sonographic appearance. Also our results show that ultrasound can be used as a reliable tool for detection of ovarian pathologies.
Conclusion: This study supports a temporal association between various causes of ovarian dysfunction and infertility risk. Gray-scale in addition to color Doppler ultrasound serves an important role in detection of different causes of ovarian dysfunction and their sonographic appearances.
Keywords: Ultrasound exam, ovarian dysfunction, ovarian volume, ovarian masses

INTRODUCTION

Ovarian dysfunction's subclass is primary ovarian insufficiency. Ovarian dysfunction is classified by the trio of amenorrhea for minimum 4 months[1]. Ovarian dysfunction is termination of menstruation afore the predictable age of menopause due to diverse diseases in ovaries[2]. Infertility is the failure of a couple to get pregnancy within 12 months of unguarded intercourse. This problem is disturbing people of all communities[3]. For evaluating ovarian follicular maturation and ovulation in women natural menstrual cycles ultrasound is considered an important tool[4,5]. It is also used in treatment of infertility and essentially used in management of ovarian pathologies and diseases[6].

Ovarian cyst is commonly diagnosed in women of reproductive age as well as in those undergoing follow up for infertility[7]. The typical features of polycystic ovaries are growth in the size (volume) of the ovary because of larger number of follicles and volume of stroma associated through normal ovaries[8]. There are evidence proposing that diabetes may accelerate menopausal onset. Type 1 diabetes causes early decay of anti-Müllerian hormone levels, that's indicates premature ovarian ageing. Also, women with T1D have been stated to move in menopause 5 years prior than non-diabetic women[9]. Infertility can be caused by ovarian masses for example dermoids, endometriomas, or functional cysts. Ovarian cyst is often seen with endometriosis associated with typical low-level echoes in infertile patients[10]. Bone disorders as well as cardiovascular disease can be caused in patients with diabetes[11]. Endometriosis was seen in 20 to 50% of women having infertility[12].

Received on 26-02-2021
Accepted on 21-07-2021

RESULTS AND DISCUSSIONS

E. J. Pavlik performed a study (2000) according to which amount of yearly screened patients was 13963.Which shows women with age less than thirty years having mean ovarian volume 6.6±0.19 cm^3. Drop in mean ovarian volume was seen as age of females increased6.1± 0.06 cm^3 in females 30to39 of age; 4.8± 0.3 cm^3 in females 40to49; 2.6± 0.01 cm^3 in females 50to59; 2.1±0.01 cm^3 in females 60to69; and 1.8 ±0.08 cm^3 in females ≥70.There was note worthy reduction in ovarian volume by every decade of life span from age 30to70. Mean ovarian volume lessened on or after 4.9± 0.03 cm^3 in "Premenopausal females" to 2.2±.01 cm^3 in "Postmenopausal females"[13].

Joseph E. Pena performed a study (2000), 25 patients was diagnosed with ovarian torsion. 21 patients undergoing surgery and ovarian torsion wereconfirmed in them. Out of 21 patients, Doppler ultrasound was performed in 10 patients who were undergoing the surgery. 60% patient's shows normal Doppler findings, while 20% shows reduced Doppler flow, and 20% shows absent Doppler flow. When nonstandard flow was identified on Doppler, diagnosis time (mean= 5.3 hours) & discharge time (mean= 2 days) were reduced when linked thru cases where standard flow of "Doppler" was identified, by fifty nine hours and fifty five hours. No association was found among the "size", "pathology", or side of "torsed ovary" or "tubal ligation"&"Doppler results of ovary also reviews the frequency of possibly influencing circumstances in females having "adnexal torsion". "Torsion" includes right ovary in 70% patients. "Ovulation induction" was linked in 19% patients; 75% were recognized properly with nonstandard Doppler results. Pregnancy was linked in twenty four percent patients. Prior tubal ligation was linked in twenty nine percent patients[14].

Juan Luis Alca´zar performed research (2012) in which 69 women undertook surgical removal of the mass. Cysts vanished afterwards one continuation examination and were acknowledge functional in 16 women. Cases having benign masses 1simple cyst, 2 hydrosalpinges, 5 endometriomata, 5 dermoid cysts then 1 pedunculated uterine leiomyoma. 14 women having benign masses selected conservative management. Overall, 41% Masses were “Malignant” and 59% were “Benign”. Affording to the assessor carrying out assessment of “3D-Volumes”, the assessment could be performed in wholly cases. Arrangement among “Real-Time Ultrasound” and“3D-Volume”investigation was worthy for both assessors (Kappa Index: 0.82, 95% CI: 0.70–0.93 and 0.78, 95% CI: 0.65–0.90). No arithmetical differences in sensitivity & specificity amongst the 2 methods[15].

Akmal El-Mazny conducted a study (2016) according to which total of 120 women met standards. Study consisted on group of women diagnosed with hydrosalpinx with U/L 46(76.7%) or B/L 14(23%). “Hydrosalpinx” arranged for “laparoscopic tubal” discontinuation or “Salpingectomy” afore In vitro fertilization. Non-hydrosalpinx set contained of sixty women with men 38(63.3%) and inexplicable 22(36.7%) childlessness prepared aimed at In Vitro Fertilization. Not essential variances in age (p=0.947), equality (p=0.605), childlessness kind (p=0.566), childlessness period (p=0.646), intermission of menses (p=0.304),& BMI (p=0.453) amongst the 2 groups. Ovarian Velocity Index and Velocity Flow Index were lesser in “hydrosalpinx group” as compare to the “non-hydrosalpinx group”. Though, “Ovarian Artery” Pulsatility Index (p=0.246) & Resistive Index (p=0.179), &volume of ovaries (p=0.157) & FI were not suggestively dissimilar amongst 2 groups. No important variances were detected in “Endometrial” and “Ovarian” Velocity Index, FI, and Velocity Flow Index amongst females with U/L &B/L hydrosalpinx[16].

Juan Luis Alca´zar conducted a study (2013) according to which 320 women were qualified for this study. 76 were omitted as ultrasound was not done in 32 patients, operation was not done at our hospital in twenty eight patients &patients lacking records were sixteen. 244 women were eventually counted in. Patients age stretching from 19 to 84 years old. 67 patients have type I Epithelial ovarian cancer, and 177 patients have type II Epithelial ovarian cancer. Females having type I Epithelial ovarian cancer were young in age, showing no symptoms at identification more often, & had lesser “CA-125” levels & lesser cancer stage than female shaving type II Epithelial ovarian cancer. Type II Epithelial ovarian cancer was commonly recognized as solid mass and minor lesions as compare to type I Epithelial ovarian cancer. Quantity of Flow inside cancer was not dissimilar amongst groups. Unusually, “High-Grade Serous carcinomas” & “undistinguishable Carcinomas” appears more regularly such as greatly vascularized minor solid cancers as paralleled to all further histotypes and contribute to infertiity[17].

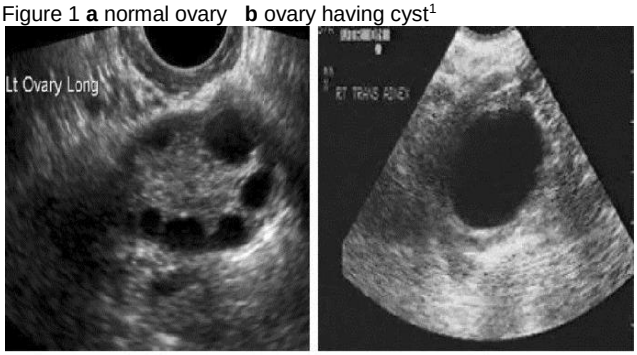
CONCLUSION

In conclusion, we witnessed that a 2-fold augmented hazard of consequent infertility amongst women with the age >35 years and/or with >BMI, 25kg/m2, progression of PCOS in potential to insulin resistance (IR), upper genital tract infection in diabetic patients and its association to infertility, endometriosis results to lower live birth rate ; potential management of this can improve the quality of fertility outcomes. Ultrasonography in corelation with the other diagnostic tools can diagnose timely and overcome the persistence of this problem.

Acknowledgment: I am very thankful to Dr. Sayyeda Khadija, Assistant Professor, Department (UIRSMIT) FAHS, University of Lahore, and my classmate Irum Raheem (Student of MS Diagnostic Ultrasound, University of Lahore) for their unforgettable kind help and encouraging support.

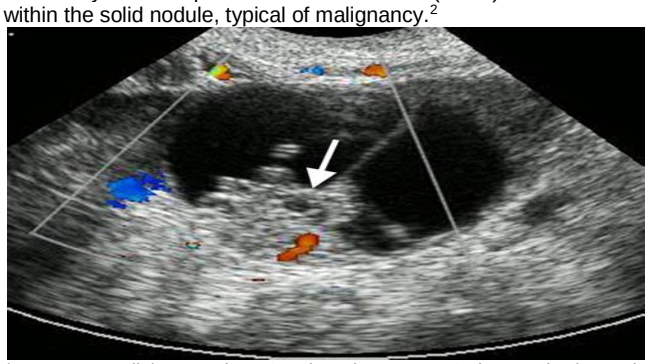
Financial sources & competing interests disclosure: I declare that I have no related associations or economic contribution with any institute or entity with an economic attention in or economic clash with the subject material or resource is coursed in the script. It is a learning based study and I have no competing interests.

Figure 1 **a** normal ovary **b** ovary having cyst[1]



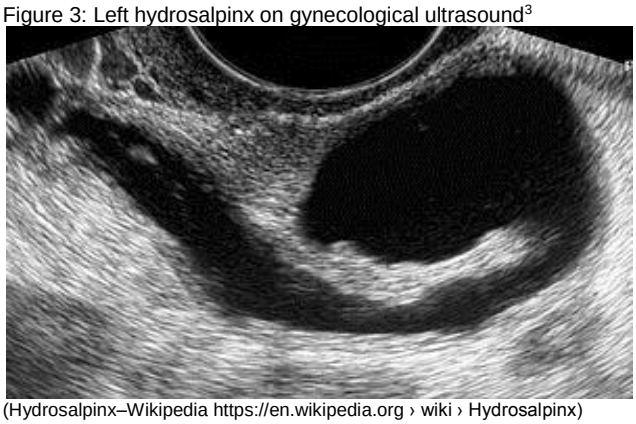
(Srivastava S, Kumar P, Chaudhry V, Singh A. Detection of Ovarian Cyst in Ultrasound Images Using Fine-Tuned VGG-16 Deep Learning Network. SN Computer Science. 2020 Mar;1(2):1-8)

Figure 2: Serous cyst adeno carcinoma of the ovary in 38-year-old woman. TVS color Doppler Ultrasound scan shows a complex ovarian cyst with septum and a solid nodule (arrow). There is flow within the solid nodule, typical of malignancy.[2]



(Brown DL, Dudiak KM, Laing FC. Adnexal masses: US characterization and reporting. Radiology. 2010 Feb;254(2):342-54)

Figure 3: Left hydrosalpinx on gynecological ultrasound[3]



(Hydrosalpinx–Wikipedia https://en.wikipedia.org › wiki › Hydrosalpinx)

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