The relationship between fetuin-A levels and ovarian cyst in Kirkuk women

La relación entre los niveles de fetuina-A y el quiste ovárico en mujeres de Kirkuk

Iman Salman Hassan, Ph. D in Nursing / North Technical University/Technical Institute Kirkuk/Iraq, imanhasan@ntu.edu.iq, ORCID: https://orcid.org/0000-0001-7311
Received: 04/26/2021 Accepted: 07/15/2022 Published: 07/25/2022 DOI:

Abstract

The current study mainly aims to reveal the relationship between fetuin-A levels and ovarian cysts. A purposive sample of women with ovarian cysts visiting Azadi and Al-Jumhuri Hospitals in Kirkuk City is selected according to the study criteria. The study samples include 50 women with ovarian cysts and 20 as controls. The current study's findings exhibited that the highest duration of marriage was one year in patients and control groups (56%, and 60%, respectively). Menstruation in the patients' group was irregular (100%). Abortion in the patients' group reached 86%. The percentage of hereditary disease in patients and control groups were 82% and 90%, respectively. Otherwise, Fetuin-A and Malondialdehyde (MDA) levels in women with ovarian cysts demonstrate significant ($P < 0.05$) elevated compared with the control women.

Keywords: ovarian cyst; Fetuin-A; Malondialdehyde.

Resumen

El estudio actual tiene como objetivo principal revelar la relación entre los niveles de fetuina-A y los quistes ováricos. Se selecciona una muestra intencional de mujeres con quistes ováricos que visitan los hospitales Azadi y Al-Jumhuri en la ciudad de Kirkuk de acuerdo con los criterios del estudio. Las muestras del estudio incluyen 50 mujeres con quistes ováricos y 20 como controles. Los hallazgos del estudio actual mostraron que la mayor duración del matrimonio fue de un año en los grupos de pacientes y de control (56 % y 60 %, respectivamente). La menstruación en el grupo de pacientes fue irregular (100%). El aborto en el grupo de pacientes alcanzó el 86%. El porcentaje de enfermedad hereditaria en pacientes y grupos de control fue del 82% y 90%, respectivamente. De lo contrario, los niveles de fetuina-A y malondialdehído (MDA) en mujeres con quistes ováricos muestran un aumento significativo ($P < 0,05$) en comparación con las mujeres de control.

Palabras clave: quiste de ovario; fetuina-A; Malondialdehído.

Introduction

The ovarian cysts define as a gynecological trouble and are divided into two groups; the physiological group and pathological group[1-2]. The physiological cysts are follicular and luteal cysts. The pathological cysts are ovarian lesions that may be benign tumors, malignant and borderline tumors. The benign are the most common in young women, but malignant most common frequent in the elderly women[3-5]. The ovarian cysts occur in 30% and 50% of women with regular and irregular masses and 6% of postmenopausal women. Most ovarian cysts among female of reproductive age are functional cysts[6-7]. Various systems of scoring according to morphological and Doppler indices can be utilized to recognize the benign from the malignant ovarian cysts[8-9]. Fetuin-A, also known as Alpha 2-Heremans Schmid Glycoprotein (AHSG), is define as multifunctional plasma factor with a molecular weight about 60 kDa and the half-life is estimated of several days[10-12]. Fetuin-A has a direct impact on the insulin resistance with modulates for reactions of inflammatory and lead to different metabolic modifications[13]. The function of the fetuin-A in insulin resistance mechanism was showed in the animal models and humans studies[14-15]. So, the current work objected to reveal the relationship between fetuin-A levels and ovarian cyst.

Material and methods

The study design

A quasi-experimental design was utilized in the current work with two groups patients group and control group, the study was conducted between January to May 2021.

Sampling

Purposive sample of women with ovarian cysts visits Azadi and Al-Jumhuri Hospitals in Kirkuk City that are selected according to the study criteria. The study samples include 50 women with ovarian cysts and 20 women as control.

Questionnaire reliability

Questionnaire reliability was utilized to determine the questionnaire accuracy, since the outcomes of current study demonstrate high level of stability and internal consistency for study groups.

Fetuin-A estimate

The levels of fetuin-A in serum of both groups were measured by using sandwich enzyme-linked immune-sorbent assay (ELISA) and the kit that used to estimate the levels of fetuin-A provided by Biorbyt /USA.

MDA estimate

The estimate of MDA in serum of study groups was according to the reaction with the thiobarbituric acid that lead to forming red color, which absorbed at 532 nm by using spectrophotometer[16].

Statistical analysis

The data in tables are presented as mean ± standard error (SE). The t-test was utilized for analysis, P<0.05 was considered as significant differences.

Results

Reproductive characteristics

The findings of current study exhibited that the highest duration of marriage was 1 year in patients and control groups (56%, 60% respectively). Menstruation in patients group was irregular (100%). The Abortion in patients group was reach 86%. The percentage of hereditary disease in patients and control groups were 82%, 90% respectively as shown in table (1).

Table 1. Studied groups according to reproductive characteristics

RCv.	Variables	Patients		Control	
		No.	%	No.	%
Duration of marriage	1 year	28	56	12	60
	2 years	11	22	3	15
	3 years	8	16	4	20
	4 years	3	6	1	5
	Total	50	100	20	100
Menstruation	Irregular	50	100	2	10
	Regular	0	0	18	90
	Total	50	100	20	100
Abortion	Non	7	14	19	95
	Yes	43	86	1	5
	Total	50	100	20	100
Hereditary disease	Non	41	82	18	90
	Yes	9	18	2	10
	Total	50	100	20	100

Fetuin-A levels

Fetuin-A levels in women with ovarian cyst (25.86±0.416) show significant (P<0.05) elevated compared with the control women (21.73±0.291).

MDA levels

MDA levels in women with ovarian cyst (2.485 ± 0.276) show significant ($P < 0.05$) elevated compared with the control women (1.502 ± 0.124).

Discussion

Various studies and works reported the correlation between Fetuin-A concentrations and polycystic ovarian syndrome. These studies and researches were contradictory. In prior studies and researches, the Fetuin-A concentrations were increased, reduced, or unchanged in women with polycystic ovarian syndrome compared with control women[17-21]. On the other hand, the current findings are agree with study carried out by[22] who found that the concentrations of fetuin-A were elevated in euglycemic patients with polycystic ovarian syndrome. Otherwise, a study indicated by[23] referred contradicting results to the current results. In their study, 88 women (44 female with PCOS and 44 healthy females as control group) were used. Their results demonstrated that the levels of Fetuin-A show non-significant changes between patients and control groups. In the current study, we found that the concentrations of Fetuin-A were markedly increased in female with ovarian cysts compared with healthy female. The current outcomes were consistent with those of[19-20] but contrary to those of[21]. Also, in current study, MDA levels have been elevated significantly in patients with ovarian cysts compared with healthy women. The increasing prevalence of obesity plays a critical role in enhancing the development of polycystic ovarian syndrome in individuals[24]. the study has carried out by Erdogan et al.[25] demonstrated no significant difference in MDA levels between female polycystic ovarian syndrome and control females. It has been shown that elevated synthesis production of reactive oxygen species in polycystic ovarian syndrome may lead to tissue destruction and damage[26]

In a prior study, significant increased in MDA concentrations were detected in infertile female with polycystic ovarian syndrome compared with fertile female with polycystic ovarian syndrome, they suggesting that infertility is related with Oxidative stress in these women[27-29] that agree with current results.

Source of funding: no funding.

Conflict of interest: the authors declare there is no conflict of interest.

Acknowledgments: none.

References

1. Grimes DA, Jones LB, Lopez LM, Schulz KF. (2014). Oral contraceptives for functional ovarian cysts. Cochrane Database Syst Rev. 4: CD006134.

2. Abduljabbar H. S.; Yasir A.; Estabrq G.; Ghazal S. and Afnan A. (2015). Review of 244 cases of ovarian cysts. Saudi Med J. 36 (7): 834-838.

3. Karina C. Nivel de conocimiento sobre Diabetes Mellitus que tienen los pacientes diagnosticados del servicio médico Sanitas de Venezuela entre diciembre 2015 a julio 2016. Diabetes Internacional. 2017;9(1):1.

4. Grimes DA. and Hughes JM. (1989). Use of multiphasic contraceptives and hospitalizations of women with functional ovarian cyst in the United States. Obstet Gynecol. 73: 1037–9

5. Hongqian L.; Xiangao W, Donghao L, Zhihong L. and Gang S. (2013). Ovarian masses in children and adolescents in China: analysis of 203 cases. J Ovarian Res. 6: 47.

6. Maliheh A, Tahereh A, Soghra Y, Giti N, Kourosh S. (2012). Functional ovarian cysts: a Multicenter study of the current management among Iranian patients. Shiraz E-Medical Journal vol. 13, No.3.

7. Israa H. A.; Ruqiya S. T. and Zuhud M. (2017). Ovarian Cysts in Unmarried Women in Tikrit City. Med. J. Tikrit Uni. 23(1): 105-112.

8. Crofton M. Gynecological Imaging. In: Sutton D, editor. Textbook of radiology and imaging.7th edition. Philadelphia: Churchill Livingstone; 2002. p.1069-1104.

9. Jaffar, T. O. and Saeed N. Y. (2013). Validity of ultrasound in detecting benign and malignant ovarian cysts. Ann. Coll. Med. Mosul. 39(1): 53-58.

10. Wojtysiak-Duma B.; Malecha Jędraszek A, Burska A, Duma D. and Donica H. (2010). Serum fetuin-A levels in patients with type 2 diabetes mellitus. Ann UMCS Sect DDD. 2(14):93-9.

11. Kettler M, Bongartz P, Westenfeld R, Wildberger JE, Mahnken AH, Böhm R, Metzger T, Wanner C, Jahnen-Dechent W. and Floege J. (2003). Association of low fetuin-A (AHSG) concentration in serum with cardiovascular mortality in patients on dialysis: a cross-sectional study. The Lancet. 361(9360):827-33.

12. Dabrowskaa, A. M.; Jerzy S. T.; Beata W. and Dariusz D. (2015). Fetuin-A (AHSG) and its usefulness in clinical practice. Review of the literature. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 159(3):352-359.

13. Trepanowski, J.F.; Mey, J.; Varady, K.A. Fetuin-A: A novel link between obesity and related complications. Int. J. Obes. 2015, 39, 734–741.

14. Mathews ST, Chellam N, Srinivas PR, Cintron VJ, Leon MA, Goustin AS. (2000). Alpha2-HSG, a speci¿ c inhibitor of insulin receptor autophosphorylation, interacts with the insulin receptor. Mol Cell Endocrinol. 164(1-2):87-98.

15. Brown WM.; Dziegielewska KM, Saunders' NR, Christie DL, Nawratil P. and Muller-Esterl W. (1992). The nucleotide and deduced amino acid structures of sheep and pig fetuin. Common structural features of the mammalian fetuin family. Eur J Biochem. 205(1):321-31.

16. Rehncrona, S.; Smith, D.S.; Akesson, B.; Westerberg, E. and Siesjo, B.K.(1980). Peroxidative changes in brain cortical fatty acids and phospholipids as characterized during Fe +2 and ascorbic acid-stimulated lipid peroxidation in vitro. J. neurochemistry. 34: 1630-38.

17. Enli Y.; Fenkci SM, Fenkci V. and Oztekin O. (2013).SerumFetuin-Alevels, insulin resistance and oxidative stress inwomen with polycystic ovary syndrome. J Gynecol Endocrinol. 29:1036-9.

18. Kozakowski J.; Jeske W. and Zgliczyński W. (2014). Fetuin-Alevelsin lean and obese women with polycystic ovary syndrome. J Endokrynol Pol. 65:371-6.

19. Sak S.; Uyanikoglu H.; Incebiyik A, Incebiyik H, Hilali NG, Sabuncu T. and Sak E. (2018). Associations of serum fetuin-A and oxidative stress parameters with polycystic ovary syndrome. J Clin Exp Reprod Med.45:116-21.

20. Abali R.; Celik C, Tasdemir N, Guzel S, Alpsoy S, Yuksel A. and Celik E. (2013). The serum protein α2-Heremans-Schmid glycoprotein/fetuin-aconcentration and carotid intimamedia thickness in women with polycystic ovary syndrome. J Eur J Obstet Gynecol Reprod Biol. 169:45-49.

21. Díaz M.; Gallego-Escuredo J. M. and López-Bermejo A. (2018). Low-Dose Spironolactone-Pioglitazone-Metformin Normalizes Circulating Fetuin-A Concentrations in Adolescent Girls with Polycystic Ovary Syndrome. J Int J Endocrinol. 4192940.

22. Remzi A.; Cem C.; Nicel T.; Savas G.; Seref A. and Aytac Y. (2013). The serum protein α2-Heremans-Schmid glycoprotein/fetuin-a concentration and carotid intima-media thickness in women with polycystic ovary syndrome. European Journal of Obstetrics & Gynecology and Reproductive Biology 169: 45-49.

23. Gulhan I.; Bozkaya G, Oztekin D, Uyar I, Kebapcilar A. and Pamuk B. (2012). Serum Fetuin-A levels in women with polycystic ovary syndrome. Arch Gynecol Obstet. 286: 1473-1476.

24. Pasquali R.; Gambineri A. and Pagotto U. (2006). The impact of obesity on reproduction in women with polycystic ovary syndrome. BJOG. 113:1148-1159.

25. Erdogan M.; Karadeniz M.; Berdeli A, Alper G, Caglayan O. and Yilmaz C. (2008). The relationship of the interleukin-6 -174 G>C gene polymorphism with oxidative stress markers in Turkish polycystic ovary syndrome patients. J Endocrinol Invest. 31(7):624-9.

26. Gonzalez F.; Rote NS.; Minium J. and Kirwan JP. (2006). Reactive oxygen species-induced oxidative stress in the development of insulin resistance and hyperandrogenism in polycystic ovary syndrome. J Clin Endocrinol Metab. 91:336-40.

27. Turan V, Sezer ED, Zeybek B and Sendag F. (2015). Infertility and the presence of insulin resistance are associated with increased oxidative stress in young, non-obese Turkish women with polycystic ovary syndrome. J. Pediatric and Adolescent Gynecology. 28 119–123.

28. Orellana IS, Villota BV, Palacios CJ, Altamirano IZ, Paredes MG, Crespo DO, Yaucan GQ, Altamirano JA, Carrasco AM, Vela VR, Villacreses GO. Infección por bacterias multirresistentes en pacientes con trauma cráneo encefálico del servicio de terapia intensiva del hospital Luis Vernaza, Ecuador. Archivos Venezolanos de Farmacología y Terapéutica. 2020;39(6):721-7.

29. Tibanta DL, Ortiz AG, Yumiseba MA, Caisaguano AT, González RG, Haro TB, Granja AP, Bohórquez GB, Jiménez EB, Morales DC, Buenaño FM. Incidencia y características clínicas de lactantes menores con neumonía adquirida en la comunidad ingresados en el Hospital Pediátrico "Baca Ortiz", Ecuador. Archivos Venezolanos de Farmacología y Terapéutica. 2020;39(4):410-3.