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Evaluation of Antioxidant (GSH, Vitamin A, E, C) and MDA in Iraqi Women with Toxoplasmosis

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Abstract

Background: Pregnancy loss, also referred to as a miscarriage or spontaneous abortion, is generally defined as a nonviable intrauterine pregnancy up to 20 weeks gestation. Early pregnancy loss, which occurs in the first trimester, is the most common type.

Objective: The aims of the study were to assess the role of (MDA, GSH, and levels of antioxidant vitamins, C, E and IgG, IgM of Toxoplasma gondii) causes of Abortions.

Materials and Method: For this study, 45 aborted women have been selected in first – trimester, and 25 well-matched women as control group their ages range from (20 – 33 years).

Results: The study shows is an increasing level of Malondialdehyde (MDA) in women with toxoplasmosis. Furthermore, there is a decreasing level of antioxidant vitamins (A, C, and E), and Glutathione (GSH).

Keywords: *vitamin A, E, and C, Toxoplasmagondii, GSH, MDA, Abortion women.*

Introduction

Abortion is the term refers to the ending of pregnancy by loss of a fetus before it can be outside the uterus after 9 months. An abortion which occurs spontaneously is called miscarriage or may be caused purposely and is called induced abortion [(1)]. Infectious toxoplasmosis is a specific type of toxoplasmosis in which a fetus is infected by the placenta is associated with fetal death and abortion, and in an infant, it is associated with a defect in neurons, neurocognitive deficits, and chorioretinitis Early pregnancy loss, which occurs in the first trimester, is the most common type. The nonspecific symptoms of vaginal bleeding and uterine cramping associated with pregnancy loss can occur in normal, ectopic, and molar pregnancies, which can be a source of frustration for patients and clinical confusion for care providers [(2,3)].

Toxoplasma gondii belongs to coccidia, habit the domestic cat and other fields as its definitive host and wide range of birds and mammals as intermediate hosts [(4,5)].T. gondii specific IgM antibody production, and low numbers of concanavalin A binding sites have been located on the surface of tachyzoites. Glycoproteins that bind specific IgG and IgM have been identified on the surface of T. gondii, and it appears that T. gondii is capable of both N. and O. glycosylation [(5)].

Glutathione is a sulfhydryl-containing compound making out of three amino acids: L-cysteine, glycine, and glutamate [(6)]. play the main role in many metabolic processes polyunsaturated fatty acids (PUFAs) oxidizes by ROS in the cell membrane. This reaction will results in lipid peroxidation, that yields free radicals [(7)].

Malondialdehyde (MDA) in cells of the human body and tissue is an indicator of the oxidative stress arising from the lipid peroxidation [(8)]. The Lipid peroxide is the derivative enzyme of feeble unsaturated fatty acid produced from the result of deposition of a set of complex component [(9)].

The antioxidant vitamin C, A, and E play a significant role in keeping cells and neutralizing free radicals. Cancer prevention agents are found in many plants based foods inclusive leafy vegetables. Normal doses are safe during pregnancy. Vitamin C is a fundamental supplement involved in the repair of tissue [(10)]. Vitamin E is a fat-soluble antioxidant, it interrupts

the propagation of reactive oxygen species [11].

Materials and Method

For this study, 45 aborted women have been selected in first – trimester, and 25 healthy normal group their ages range from (20 – 33 years). from the in-patients and out-patients of Kamal Al- Samarrai Hospital from the first of March 2019 till the end of May 2019. Tenmlof blood was taken under aseptic technique and sent for virological and parasitological investigations including IgM and IgG antibodies detection by using enzyme-linked immunosorbent assay (ELISA) kits by abnova. com< 0.9 negative 0.9-1.1 Equivocal >1.1 positives. Glutathione (GSH) mg/dl is measured glutathione by the method [12]. Malondialdehyde [MDA] has been measured level (umol/l) [13]. Vitamin C,(mg /dl), vitamin E (mg / dl), vitamin A (mg / dl) are measured by (14-16) respectively.

Statistical Analysis

The analysis is carried out data utilizing the SPSS – 18 (statistical packages for social sciences – version 18 PASW statistics).

Results

The result shows significantly change ($p<0.05$) levels of Glutathione (GSH), and Malondialdehyde MDA when comparing between aborted women and the control groups, as seen in Table (1), and figure (1).

Table (1): The mean ± SD of Glutathione (GSH), Malondialdehyde levels for patients and control groups.

Parameters	Patients group n= 45	Control group n= 25	P value
GSH(mg / dl)	40.78±3.5	46.60 ± 3.63	0.05
MDA(µ mol / L)	5.06± 9.4	3.73±7.70	0.05

Table 2, and figure (2) shows levels of vitamin E, C, A for the patients and control group which shows a decreased level of these vitamins in patients compared with the control group.

Table (2) The mean ± SD of serum levels of vitamin E, C, A (mg / dl) for Patients and control groups.

Parameters	Patients group(n= 45)	Control group (n = 25)	P Value
Vitamin E (mg / dl)	0.43 ± 0.582	0.57 ± 0.74	0.05
Vitamin C (mg / dl)	1.20 ± 0.235	1.46 ± 0.163	0.05
Vitamin A (mg / dl)	2.39 ± 0.547	2.82 ± 0.455	0.05

Discussion

Repetitive pregnancy forfeit is usually characterized as at least 3 or more miscarriages roughly 5% of couples endeavoring pregnancy have recurrent pregnancy loss. Newly, the advance has been made in understanding recurrent pregnancy loss approximately 10-15% of all first-time pregnancies bring about an unsuccessful miscarriage. In many instances, a similar miscarriage rate in subsequent pregnancies is expected [7]. Jaslow [17] and Rai [18]. Found there is a significant relationship between the history of miscarriage in the family and the studied group this is may be estimated to be due to the lifestyle in the family.It is well known that the most important anti-parasite influential mechanisms is produced of NO and the most important products of lipid [17, 18] peroxidation which is that MDA arises from fatty acids peroxidation. The products of MDA can reason

cross-linkage of membrane elements by influencing the ion exchange from the cell membrane [19, 20].

In the present study, reported the increase in MDA in toxoplasma women. It is reported the increase of MDA action in lymphocyte and erythrocyte in the dust mite positive or skin positive group which show the oxidative stress in patients with dust mite [20]. Another study shows an increase of MDA which refers to the increment of lipid peroxidation, due to the decreasing activity of the defense system protecting tissues from the free radical (21). The Free radicals have been implicated in the pathogenesis of a variety of diseases. Thus, the large amount of lipid accumulates produced in the placenta in many diseases, involving toxoplasma infestation and must be prevented through the production of antioxidants [21].

In Iraq, there is a study shows the increased level of MDA in toxoplasma seropositive patients who agree with the present study [22].

The alteration of serum glutathione in patients with toxoplasmosis which shows a significant increase in serum glutathione concentration in pregnant women infected by toxoplasmosis [23]. This increasing of glutathione in pregnant women do not enough to decrease the detoxication capacity of the pregnant uterus. The increasing of glutathione simultaneous in response to the increase of radical and electrophilic compounds this disagreement with our study another study which shows a decrease of serum glutathione this agreement with our study [22].

Antioxidant vitamins play a major role in the health of human rather than intoxication the decrease in the levels of vitamins A, E and E (nonenzymatic antioxidant) in women with toxoplasmosis may be turnover to increase for preventing oxidative damage [23,24].In a study has reported an increased vitamin E resulted in trends toward increased tissue cyst number, tissue pathology and weight loss during infection [25]. In Iraq, there is the first study that shows decreased the levels of antioxidant vitamins A, E and C during infection with toxoplasmosis in pregnant women which agrees with our result [26].

Conclusion

In conclusion, there is an increasing level of Malondialdehyde and decreased levels of antioxidant vitamins (A, C, E), and Glutathione in patients with toxoplasmosis.

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Ethical Clearance: This study is ethically approved by the Institutional ethical Committee.

References

1. Sepidarkish M, Almasi-Hashiani A, Maroufizadeh S, Vesali S, Pirjani R, Samani RO. Association between previous spontaneous abortion and pre-eclampsia during a subsequent pregnancy. International Journal of Gynecology & Obstetrics. 2017 Jan;136(1):83-6.
2. Flegr J, Prandota J, Sovičková M, Israeli ZH. Toxoplasmosis–a global threat. Correlation of latent toxoplasmosis with specific disease burden in a set of 88 countries. PloS one. 2014 Mar 24;9(3):e90203.
3. Clement EG, Horvath S, McAllister A, Koelper NC, Sammel MD, Schreiber CA. The Language of First-Trimester Nonviable Pregnancy: Patient-Reported Preferences and Clarity. Obstetrics & Gynecology. 2019 Jan 1;133(1):149-54.
4. Alvarez C, De-La-Torre A, Vargas M, Herrera C, Uribe-Huertas LD, Lora F, Gómez-Marín JE. Striking divergence in Toxoplasma ROP16 nucleotide sequences from human and meat samples. The Journal of infectious diseases. 2014 Dec 23;211(12):2006-13.
5. Gomez-Marín JE. Evidence based guideline for toxoplasmosis during pregnancy. Infectio. 2017 Mar 24;21(2).
6. Mleiki A, Marigómez I, El Menif NT. Effects of dietary Pb and Cd and their combination on Glutathion-S-Transferase and Catalase enzyme activities in digestive gland and foot of the green garden snail, Cantareus apertus (Born, 1778). Bulletin of environmental contamination and toxicology. 2015 Jun 1;94(6):738-43.
7. Dilokthornsakul W, Dhippayom T, Dilokthornsakul P. The clinical effect of glutathione on skin color and other related skin conditions: A systematic review. Journal of cosmetic dermatology. 2019 Mar 20.
8. Ito F, Sono Y, Ito T. Measurement and clinical significance of lipid peroxidation as a biomarker of oxidative stress: oxidative stress in diabetes,

atherosclerosis, and chronic inflammation. Antioxidants. 2019 Mar;8(3):72.

9. Lopresti AL, Maker GL, Hood SD, Drummond PD. A review of peripheral biomarkers in major depression: the potential of inflammatory and oxidative stress biomarkers. Progress in Neuro-Psychopharmacology and Biological Psychiatry. 2014 Jan 3;48:102-11.
10. Razmkon A, Sadidi A, Sherafat-Kazemzadeh E, Mehrafshan A, Jamali M, Malekpour B, Saghafinia M. Administration of vitamin C and vitamin E in severe head injury: a randomized double-blind controlled trial. Neurosurgery. 2011 Sep 1;58(CN_ suppl_1):133-7.
11. Bouamama S, Merzouk H, Medjdoub A, Merzouk-Saidi A, Merzouk SA. Effects of exogenous vitamins A, C, and E and NADH supplementation on proliferation, cytokines release, and cell redox status of lymphocytes from healthy aged subjects. Applied Physiology, Nutrition, and Metabolism. 2017 Jan 23;42(6):579-87.
12. Beutler E. Improved method for the determination of blood glutathione. J. lab. clin. Med.. 1963;61:882-8.
13. Buege JA, Aust SD. [30] Microsomal lipid peroxidation. InMethods in enzymology 1978 Jan 1 (Vol. 52, pp. 302-310). Academic Press.
14. Pesce AJ, Kaplan LA, Bircher S. Methods in Clinical Chemistry, CV Mosby, St. Louis, MO. 1987:35-45.
15. HASHIM SA, SCHUTTRINGER GR. Rapid determination of tocopherol in macro-and microquantities of plasma. Results obtained in various nutrition and metabolic studies. American Journal of Clinical Nutrition. 1966;19:137-45.
16. Al-Ruba SH, Jasim RK, Al-Rawaq KJ. Serum antioxidant status in Iraqi women with endometrial cancer. Journal of the Faculty of Medicine Baghdad. 2016 Jan 3;58(4):378-83.
17. Jaslow CR, Carney JL, Kutteh WH. Diagnostic factors identified in 1020 women with two versus three or more recurrent pregnancy losses. Fertility and sterility. 2010 Mar 1;93(4):1234-43.

18- Rai R, Cohen H, Dave M, Regan L. Randomised controlled trial of aspirin and aspirin plus heparin in pregnant women with recurrent miscarriage associated with phospholipid antibodies (or antiphospholipid antibodies). Bmj. 1997 Jan 25;314(7076):253.

19- Yazar S, Kilic E, Saraymen R, Ozbilge H. Serum malondialdehyde levels in patients infected with Plasmodium vivax. The West Indian medical journal. 2004 Jun;53(3):147-9.

20. Atambay M, Karabulut AB, Aycan OM, Kilic ES, Yazar S, Saraymen RE, Karaman U, Daldal NI. Dust mites: Effect on lipid peroxidation. NATIONAL MEDICAL JOURNAL OF INDIA. 2006 Jan 1;19(2):75.
21. Karaman U, Celik T, Kiran TR, Colak C, Daldal NU. Malondialdehyde, glutathione, and nitric oxide levels in Toxoplasma gondii seropositive patients. The Korean journal of parasitology. 2008 Dec;46(4):293.
22. Al-Taee AF, Hassan AA. Effect of aflatoxin on malondialdehyde, glutathione levels, and stress index in Toxoplasma gondii infected mice. Iraqi Journal of Veterinary Sciences. 2012;26(1):5-9.
23. Droge W. Free radicals in the physiological control of cell function. Physiological reviews. 2002 Jan 1;82(1):47-95.
24. Matés JM, Pérez-Gómez C, De Castro IN. Antioxidant enzymes and human diseases. Clinical biochemistry. 1999 Nov 1;32(8):595-603.
25. McCarthy SM, Davis CD. Prooxidant diet provides protection during murine infection with Toxoplasma gondii. Journal of parasitology. 2003 Oct;89(5):886-95.
26. Al-Fartusie FS. Study of some trace elements and antioxidant vitamins in sera of Iraqi women with toxoplasmosis. Al-Mustansiriyah Journal of Science. 2012;23(3):199-206.