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Status of lipid peroxidation (MDA), Antioxidants level(vitamin C, vitamin E) in infertile women of reproductive age group .

Biochemistry

KEYWORDS: Oxidative stress, infertility, Antioxidant, MDA, Lipid per oxidation .

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ABSTRACT

Background: Infertility is a medical problem that affects a vast proportion of the world's young population (10%-15%). A large proportion of the world has no access to medical treatment for infertility and even in developed and emerging economics there are great inequalities in access to proper diagnosis and treatment. **Materials and Methods:** This study was conducted on 250 subjects and controls in Geetanjali medical college and hospital, Udaipur. All biochemical parameters like TBARS (MDA) and Vitamin C and Vitamin E were measured by colorimetric method. **Results:** In our study we found increased level of MDA and decrease vitamin C and Vitamin E in infertile female patient as compared to controls. **Conclusion:** Oxidative stress, which is generally known to be present in women having infertility. Depletion of nutrient antioxidant in the body is associated with increased risk of female infertility

Introduction: Infertility has significant public health consequences, including psychological distress (social stigmatization, personal suffering economic constraints [1], Advances in assisted reproductive technologies, such as IVF, can offer hope to many couples where treatment is available, although barriers exist in terms of medical coverage and affordability. In many cultures, inability to conceive bears a stigma. In closed social groups, a degree of rejection (or a sense of being rejected by the couple) may cause considerable anxiety and disappointment. The incidence of infertility in a population has important demographic and health implications as well. Because high infertility has a dampening effect on overall fertility.

Causes of female infertility include disturbances in hormonal or endocrine level (menstrual irregularity), tubal factors (occlusions, pelvic adhesions and other tubal abnormalities), acquired non-tubal factors (cervical or uterine disturbances), sexual dysfunction and congenital abnormalities.[2]. Oxidative stress is essentially an imbalance between the production of Reactive oxygen species (ROS) and the ability of the body to counteract or detoxify their harmful effects through neutralization by antioxidants.

Free radicals are defined as atoms or species or groups of atoms with one or more unpaired electrons. This property makes them very unstable and highly reactive. Reactive oxygen species (ROS) can modulate cellular functions, and oxidative stress (OS) can impair the intracellular milieu, resulting in diseased cells or endangered cell survival. Reproductive cells and tissues remain stable when free radical production and the scavenging antioxidants remain in balance. [3]. Malonyldialdehyde (MDA) level is commonly known as a marker of oxidative stress and the antioxidant status. The physiological concentration of these products are low, however higher concentrations correspond to pathological situations. [4]

Ascorbic acid plays an important role in the regulation of the menstrual cycle and ovarian function. Ascorbic acid excretion is increased and declines immediately prior to ovulation, and then immediately increases again just after temperature rises post-ovulation. Uptake of ascorbic acid in the preovulatory ovary, then facilitates proper ovulation. These ascorbic acid levels are stimulatory to the hormones progesterone and oxytocin, and have been found in high concentrations in the corpus luteum.[5]

Vitamin E is a powerful chain breaking lipid soluble antioxidant that has shown tremendous benefits in boosting men's and women's fertility. vitamin E is the first line of defense against lipid peroxidation. α-**tocopherol is the chemi**cal name for the most active form of vitamin E.

vitamin E protects membranes from oxidation by reacting with lipid radicals produced in the lipid peroxidation chain reaction. This removes the free radical intermediates and prevents the propagation reaction from continuing. This reaction produces oxidised - tocopheroxyl radicals that can be recycled back to the active reduced form through reduction by other antioxidants, such as ascorbate, retinol or ubiquinol.

Till date very few study of this type has been conducted in the southern part of Rajasthan due to lake of aforementioned data we were planned to investigate the oxidative stress by measuring the lipid peroxidation marker (MDA) , role of various antioxidants like ascorbic acid (vitamin C) , and tocopherols(vitamin E) in young infertile female of reproductive age group.

Material and Methods:
This study was conducted on 250 subjects and controls in Geetanjali medical college and hospital, Udaipur . 10 ml blood sample was collected in a plain vial by vein puncture and allowed the blood to clot at room temperature and centrifuged at 3000 rpm for 10 min. Then all biochemical parameters like TBARS (MDA) and Vitamin C and Vitamin E were measured by colorimetric method.

Thiobarbituric acid reactive substances (TBARS) measured by Buege and Aust, 1978 method. Vitamin C was determined by the method of Natelson, (1971) and Vitamin E (- tocopherol) by Baker and Frank, 1968.

Results: Total 250 samples along with age matched control were measured in this study. Table no 1 shows the comparison of MDA level (moles/ml) between control group and study group. The mean ±SD of subjects came to be (6.78 ± 1.73) and that of control group was (3.04 ± 1.04) , ($p<0.0001$) and statistically significant. Table 2 Shows the comparison of vitamin C level (mg/dl) between control group and study group. The mean ±SD of subjects came to be (0.43 ± .21) and that of control group was (0.85 ± 0.18) ($p<0.0001$) and statistically significant.

Table 3 Shows the comparison of vitamin E level (mg/dl) between control group and study group. The mean ±SD of subjects came to be (0.50 ±. 25) and that of control group was (0.92 ± 0.14) , ($p<0.0001$) and statistically significant.

Table-1 MDA level (moles/ml)

Group	Mean ± SD	p –value
Subjects (n=125)	6.78 ± 1.73	<0.0001
Controls (n=125)	3.04 ± 1.04	

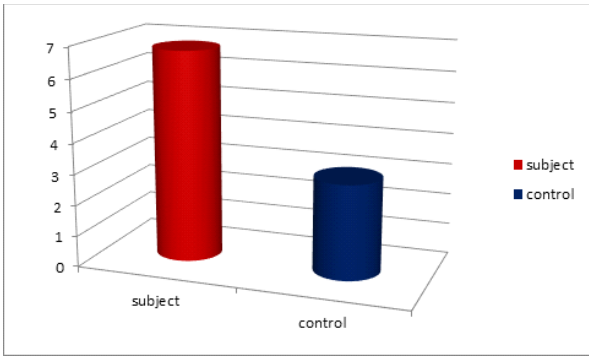

Figure 1 : shows comparison of MDA (moles/ml) between study group and control group

Table-2 vitamin C (mg/dl)

Group	Mean ± SD	p-value
Subject (n=125)	0.43 ± .21	<0.0001
Control (n=125)	0.85 ± 0.18	

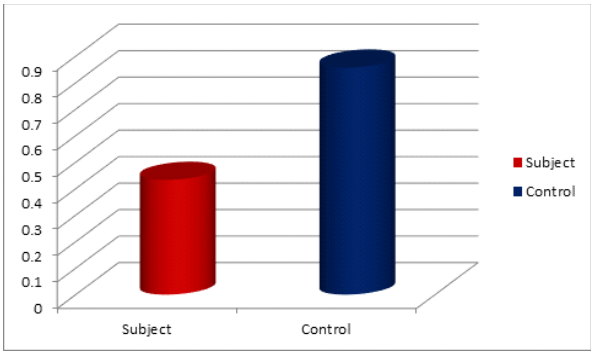

Figure 2 : shows comparison of vitamin C (mg/dl) between study group and control group

Table-3 vitamin E (mg/dl)

Group	Mean ± SD	p- value
Subject (n=125)	0.50 ±. 25	<0.0001
Control (n=125)	0.92 ± 0.14	

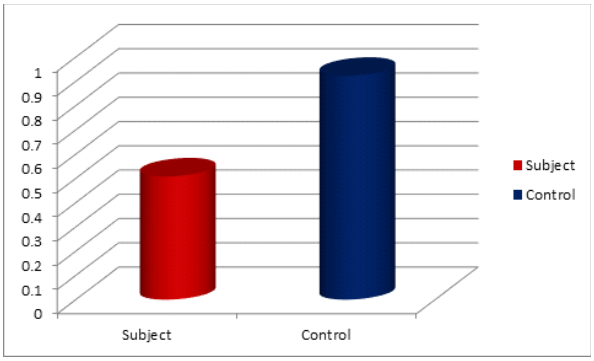

Figure -3 : shows comparison of vitamin E (mg/dl) between **study group and control group**

Discussion: The present case control study was conducted on 125 infertile female patient attended infertility clinic and department of obstetrics & gynaecology in Geetanjali Medical college & Hospital Udaipur (Raj.) In this study, a significant increase in plasma MDA level was observed in patient compared to control ($p<0.001$). A significant decreased level of vitamin C and vitamin E was observed in patient group compared to control group ($p<0.001$). The results indicate that infertile women have increased serum level of MDA and decreased serum levels of vitamin C and vitamin E as compared to fertile women. They are in agreement with previous reports. Veena Bhaskar S et al 2008 have found significantly higher concentration of MDA in serum of infertile women than in fertile women in this study It was suggested that OS is caused by ROS overproduction rather than antioxidant depletion [6]. Sane et al 1991 found that women undergoing induced or spontaneous abortions exhibited a maximum rise in serum MDA level [7].

Wilson CWMvLet al 1973 and Aplin JD et al 1986 has been suggested vitamin C as a regulator of female fertility. Large quantities of ascorbic acid are utilized during human conception [8] and are necessary to maintain the integrity of the fetal membranes [9]. Dietary supplementation during pregnancy may reduce the frequency of birth defects.

Naseer J.H. Al.Mukhtar et al 2014 stated that Vitamin E is a major chain breaking antioxidant in membranes, located mainly in the ovary specially in follicular fluid.[10] our results are in accordance with studies of other investigators. Makinde ,K.A. and Adedeji et al 1994 found significant decreased level of vitamin E in serum of infertile women when compared with fertile controls[11] this was corroborates with similar work done by Mehendale, S.S.; KilariBams et al 2009 where it has been concluded that plasma vitamin E level is greater in fertile women than in infertile women. [12] Savita, et al 2009 suggest that the increased OS are associated with the decrease of antioxidants and associated with infertility [13].

Conclusion: In our study we found increased level of MDA and decrease vitamin C and Vitamin E in infertile female patient as compared to controls.

References:

1. Wu AK, Elliott P, Katz PP, Smith JF. Time costs of fertility care: the hidden hardship of building a family.Fertil. Steril. 2013.
2. Jejeebhoy SJ. Infertility in India - levels,patterns and consequences: Priorities forsocial science research. Journal of FamilyWelfare 1998; 44: 15-24.
3. Benjamin N; Peter N; Rakesh K; Varicocele is associatedwith elevated spermatozoal reactive oxygen species production anddiminished seminal plasma antioxidant capacity. Urology, 1999 ;161:1831-1834.
4. Agarwal A, Gupta S, Sharma R. Role of oxidative stress in female reproduction. Reprod Biol Endocrinol 2005; 3.
5. Henmi, H., Endo, T., Kitajima, Y., Manase, K., Hata, H., & Kudo, R. (2003). Effects of ascorbic acid supplementation on serum progesterone levels in patients with a luteal phase defect. Fertility and sterility, 80(2), 459-461.
6. Veena Bhaskar S; Sharmila Upadhya; Satish Kumar Adiga; et al. Evaluation of oxidative stress,antioxidants and prolactin in infertile women. Indian Journal of Clinical Biochemistry, 2008 ; 23186-190.
7. Sane AS, Chokshi SA, Mishra VV, Barad DP, Shah VC, Nagpal S. Serum lipoperoxides in induced and spontaneous abortions. Gynecol Obstet Invest 1991; 31(3): 172-5.
8. Wilson CWMvL, oh HS. Vitamin C and fertility. Lancet 1973; 2:859-860.
9. Aplin JD, Campbell S, Donnai P, Bard JBL, Allen TD. Importance of Vitamin C in maintenance of the normal amnion: an experimental study. Placenta 1986; 7:377-386.
10. Naseer J.H. Al.Mukhtar1 Sahib Y.H.Al.Morshidy2 Ban J.Edan3:Vitamin E and C Status In The Sera and Cervical Mucus Secretion of Infertile Female With Unexplained Infertility. 1,3 College of Medicine, University of Babylon, Hilla, Iraq 2 College of Medicine, University of kufa, Al Najaf,Iraq Medical Journal of Babylon-Vol. 11- No. 3 -2014.
11. Makinde ,K.A. and Adedeji, O.O. (1994).Comparative study of vitamin E levels of Nigerian men and age-matched fertile and infertile women. J. Nutr. Med. , 4:39-42.
12. Mehendale, S.S.; KilariBams, A.S.; Deshmukh, C.S.; Dhorepatil, B.S.; Nimbargi, V.N. and Joshi, S.R.(2009). Oxidative stressmediated essential polyunsaturated fatty acid alterations in female infertility.Hum. Fertil.J.,12(1):28 33
13. Savita, S. M.; Anitha, S. K.; Chaya ,S. D. and Bharati,A . (2009).Oxidative stress-mediated essential polyunsaturated fatty acid alterations in female infertility. Human Fertility,12(1) 28 – 33. 77. Bayer, R. (1960).Treatment of infertility with vitamin E. Int. J. Ferti., 5:70–78.