Antioxidants And Male Infertility

Wasan K. Ali, Amal T. Yassen and Rayan A. Ahma
Department of Chemistry, College of Science *Researcher*
Mosul University

(NJC)

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Abstract

This research includes study of the effect of antioxidants in sperm plasma in male infertility . Fifty three patients with male infertility the range age (25-50) years living in mousl city were selected . The level of sperm plasma malondialdehyde (MDA) ,glutathione (GSH) , peroxinitrate (PN) ,ceruloplasmin (CP), uric acid (UA) and albumin (Alb) were measured . The results showed a significant increased in MDA level (as an index of lipid peroxidation) in patients with male infertility comparison with control group ,on the other hand , patients with male infertility had decrease GSH level ,PN , CP, UA andAlb when compared with apparently healthy control group.

Keyword : male infertility , antioxidants

الخلاصة

تضمن البحث دراسة تأثير مضادات الاكسدة في مرضى العقم لدى الرجال ,تم قياس مستويات بعض مضادات الاكسدة والتي شملت :مستوى كل من المالوندايالديهايد والكلوتاثايون والسيروبلازمين وبيروكسي نتريت وحامض اليوريك والالبومين في 53 عينة من المرضى المصابين بعقم الرجال والتي تتراوح اعمارهم مابين 25–50 سنة .وقد اظهرت النتائج وجود زيادة معنوية في مستوى المالوندايالديهايد (كدليل على بيروكسدة الدهن)في مرضى عقم الرجال عند مقارنتهم مع مجموعة السيطرة . ولوحظ ايضا انخفاض معنوي في مستوى كل من الكلوتاثايون والسيروبلازمين وبيروكسينتريت وحامض اليوريك والالبومين في مرضى عقم الرجال عند مقارنتهم مع مجموعة السيطرة.

كلمة المفتاح: العقم لدى الرجال,مضادات الاكسدة

Introduction

Infertility issues impact approximaety 15%of all trying to conceive couples . Male infertility issues are a contributing factor in about half of these cases [1]. With numerous studies some antioxidant , vitamins supplements , amino acid , and herbal medicines on the book , medical formulas for the treatment of male infertility and the enhancement of specific sperm parameters(count , morphology , motility) are no based clear clinical science and established research . Among primary suspected causes of male infertility is seminal oxidative stress [2] . High concentration of oxidative-stress-causing agents have been identified in 30-80%of infertile men. can improve male fertility and sperm health[3].

The role of oxidative stress and antioxidants in male infertility include :oxygen toxicity is an inherent challenge to aerobic including spermatozoa , the cells responsible for propagation of the species , How this toxicity affects the spermatozoa in its interaction with the ovum is still unknown . An increase in oxidative damage to sperm membranes proteins , and DNA is associated with alteration in signal transduction mechanisms that affect fertility . Recent evidence suggest that spermatozoa and oocytes process an inherent but limited capacity to ROS to aid in the fertilization process [2] .Though a variety of defense mechanisms encompassing antioxidant enzymes(SOD catalase ,and GSH peroxidase are available necessary for the survival and functioning of spermatozoa [4,5].An assay system for the evaluation of OSS needs to be developed .Such as assay will assist the clinician in the assessment of fertility status of both male and female partners . The determination of this OSS value will also the erotically identify the subgroup of responders and non-responders to any putative antioxidant therapy .

Though the therapeutic use of antioxidants appears attractive. Clinicians need to be aware of exaggerated claims of antioxidant benefits by various commercial supplements for fertility purposes until proper multicenter clinical trial have been completed [6,7,8].

Subject and Methods

Fifty three with male fertility and twenty four menapparently healthy as a control with age ranging of (25-50) years living in Mosul city were participation in this study .Sperm plasma sample were collected from the nontreated patients .The patients group divided into three group (depended on the moving and activity of semen's), the first group enrolled infertile patient but with normal sperm movement and activity , the second group including infertile patient with week spermmovement and activity ,and there'd group including patient with infertile male patient with no sperm movement and activity.A general information about each patient were recorded ,included age , living area ,smocking ,and main job .Glutathione was measured by a modified procedure utilizing Elmans reagent [9,10], while

the level of malondialdehyde was carried out using the modified method of [11],peroxy nitrate was measured by modified method of [12] . Cereloplasmin was measured by a modified method of [13] . Albumin and uric acid was determined by colorimetric method using manufactured kit by Bilabo .

Statistical analysis

The results are expressed as mean±SD our date were analyzed statistically using paired parameters different groups tested in the considered significant at(0.5≥P) .

Results

The effect of antioxidant on male infertility is shown in table(1,2,3).The results showed that there were a significant decrease in(GSH , PN ,CP ,Alb ,UA)and there was a significant increased in MDA in sperm plasma in male infertility compared with control group as shown in table(1) .

Table (1):comparison between group 1 with control group

Groups / parameters	Mean±SD		P-value
	Control group	Group (1)	
MDA µmol/L	2.57±0.1	2.75±0.2	<0.0001
GSH µmol/L	5.09±0.4	4.67±0.7	<0.5
PN µmol/L	63.27±7.04	43.21±6.2	<0.0001
CP µmol/L	222.05±22.4	141.93±28.05	<0.01
Alb g/L	8.58±0.66	7.1±0.52	<0.01
UA µmol/L	191.6±16.6	110.48±23.7	<0.01

The results in table(2) showed that there were a significant decrease in (PN , CP , Alb , UA),no significant in GSH, and a significant increased in MDA in sperm plasma in male infertility compared with control group .

Table (2):comparison between group 2 with control group

Groups / parameters	Mean±SD		P-value
	Control group	Group (2)	
MDA µmol/L	2.57±0.1	3.1±0.3	<0.0001
GSH µmol/L	5.09±0.4	4.67±0.7	<0.5
PN µmol/L	63.27±7.04	59.15±5.23	<0.01
CP µmol/L	222.05±22.4	202.35±17.44	<0.01
Alb g/L	8.58±0.66	7.28±0.62	<0.01
UA µmol/L	191.6±16.6	126.75±36.9	<0.01

The resultsin table(3) showed that there were a significant decrease in (PN , CP , Alb , UA) no significant in GSH,and a significant increased in MDA in sperm plasma in male infertility compared with control group.

Table (3):comparison between group 3 with control group

Groups / parameters	Mean±SD		P-value
	Control group	Group (3)	
MDA µmol/L	2.57±0.1	5.45±0.1	<0.001
GSH µmol/L	5.09±0.4	5.35±0.2	<0.5
PN µmol/L	63.27±7.04	39.57±3.38	<0.01
CP µmol/L	222.05±22.4	192.89±54.22	<0.05
Alb g/L	8.58±0.66	7.97±0.95	<0.01
UA µmol/L	191.6±16.6	124.0±39.7	<0.5

The comparison effect of antioxidant in male infertility between group (1,2) , (1,3) and (2,3) is shown in table (4,5,6). Table (4): The results showed that there were a significant decrease in (GSH,PN , CP , UA) no significant in Alb,and a significant increased in MDA in sperm plasma in male infertility compared with Group(2) .

Table (4):comparison between group(1) with group(2)

Groups / parameters	mean±SD		P-value
	Group (1)	Group (2)	
MDA µmol/L	2.75±0.2	3.10±0.3	<0.0001
GSH µmol/L	4.67±0.7	4.67±0.7	<0.5
PN µmol/L	43.21±6.2	59.15±5.23	<0.01
CP µmol/L	141.93±28.05	202.35±17.44	<0.01
Alb g/L	7.1±0.52	7.28±0.62	<0.01
UA µmol/L	110.48±23.7	126.75±36.9	<0.01

Table (5): The results showed that there were a significant decrease in (GSH, CP,Alb , UA) ,and a significant increased in(MDA , PN) in sperm plasma in male infertility in group (1) compared with Group(3) .

Table (5):comparison between group(1) with group(3)

Groups / parameters	Mean±SD		P-value
	Group (1)	Group (3)	
MDA µmol/L	2.75±0.2	5.45±0.1	<0.0001
GSH µmol/L	4.67±0.7	5.35±0.2	>0.5
PN µmol/L	43.21±6.2	39.57±3.38	<0.01
CP µmol/L	141.93±28.05	192.89±54.22	<0.01
Alb g/L	7.1±0.52	7.97±0.95	<0.01
UA µmol/L	110.48±23.7	124.0±39.7	<0.01

Table (6): The results showed that there were a significant increased in (GSH,PN , CP , UA) ,and a significant decreased in(MDA ,Alb) in sperm plasma in male infertility in group (2) compared with Group(3) .

Table (6):comparison between group(2) with group(3)

Groups / parameters	Mean±SD		P-value
	Group (2)	Group (3)	
MDA µmol/L	3.1±0.3	5.45±0.1	<0.0001
GSH µmol/L	4.67±0.7	5.35±0.2	<0.5
PN µmol/L	59.15±5.23	39.57±3.38	<0.01
CP µmol/L	202.35±17.44	192.89±54.22	<0.01
Alb g/L	7.28±0.62	7.97±0.95	<0.01
UA µmol/L	126.75±36.9	124.0±39.7	<0.01

Discussion

Free radical activity has been implicated in the pathogenesis of diseases , and many infectious diseases have been proved to be a direct and indirect sources of large numbers of male infertility [13,14] . Seminal oxidative stress in the male reproductive tract is known to result in peroxidative damage of the sperm plasma membrane and loss of its DNA integrity . Normally ,a balance exists between concentration of reactive oxygen species and antioxidant scavenging system [15] . This study found that there is a significant increased in MDA level in sperm plasma in all group ,these obtained by other investigated [16,17]. Increase lipid

peroxidation in exposed subjects warns that oxygen free radicals have increased in the body and thus might attack cells which in the long term results in multi -organ damage [18,19] . On the other hand , the antioxidant defense system was affected by free radical injury in male infertility , in the present study (GSH,CP,PN)were decreased significant in all patients ,which is in agreement with our finding have also been reported [20,21] ,this results may indicate a degradation of these antioxidant enzyme by free radical during detoxification processes and it appears that increased level of superoxide and other radicals are not detoxified in patients with male infertility due to decreased efficiency of antioxidant enzymatic and non enzymatic mechanisms and acts as mediators of tissue damage[22,23] . Another antioxidant parameters , uric acid ,and albumin were included in the present study ,uric acid was decreased significantly in patients with male infertility similar results was obtained by [24,25] in which there are many factors that cause infertility in both men and women .One cause of male infertility can be the oxidative stress to amales sperm . Any where from 30 -80 %of infertility causes can be due to this factor [26,27]. In the normal physiological status of the organism , lipid peroxidation is strictly regulated by the antioxidative system . Metal binding proteins ,such as ceruloplasmin and albumin can exhibit this antioxidative properties [14,4].Accordingly ,albumin and ceruloplasmin were decreased significantly in patients with male infertility in the present study , this may be contributed to increased free radical and deficiency of antioxidant in sperm plasma in patients in this study,Male smokers also have approximately 30% higher odds of infertility [28,29,30]. This study found that there is a significant lower level of antioxidant parameters in group (1)with male infertility comparison with groups (2 ,3)with male infertility , and a significant higher level of antioxidant parameters in group (2)comparison with group (3) , this may due to patients use of dose treatment for male infertility , this results is in conformable with several studies which observe also that supplementation with antioxidants yield a significantly decreased plasma MDA concentration and disease activity and significantly increase in total antioxidant capacity (TAC)level [13,21] . And found that high-dose treatment in male infertility

leads to an increased plasma antioxidant level[25,22,23].

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