World Applied Sciences Journal 31 (8): 1427-1430, 2014
ISSN 1818-4952

DOI: 10.5829/idosi.wasj.2014.31.08.83166

Changing of Lipid Peroxide Cascade Products and a Ferments of Antioxidant Protection in Spermatozoids of Men with Helminthic Invasion

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Abstract: Antioxidant system of the human body is represented by a complex of enzymes and low molecular weight compounds of non-protein nature. The main functions of the antioxidant defense system are the control and inhibition of free radical processes in all organs and tissues, neutralization of toxic products that can contribute to the degradation of cell membranes. From the literature it is known that the effect of helminth infection on products lipoperoxide cascade and antioxidant defense enzymes in the ejaculate of men have hardly been studied. Aims and scope - evaluation of reproductive function changes with the accounting violations of redox processes in men ejaculate infested with helminthic invasion before and after healing. The object of the study was to ejaculate men ascaridiasis invasion, which was determined by the primary, secondary and final products of lipid peroxidation and antioxidant defense enzymes of purine metabolism before and after treatment.Results - as a result of clinical and laboratory studies found that men ejaculate with ascaridiasis invasion revealed change products lipoperoxide cascade and inhibition of antioxidant enzymes and purine metabolism.

Key words: Ejaculate · LipidPeroxidation · Antioxidant Protection · Helminthic Invasion

INTRODUCTION

Antioxidant system of the human body organism is presented by complex of ferments and low molecular conjunctions of no protein feature. The main functions of antioxidant protection (AOP) are manifested in control and deceleration of free-radical processes at all organs and tissues and neutralization of toxic products that can contribute cell membrane destruction [1]. Studying of indexes LPO-AOP are using for the determination of the main body condition with different diseases and as a criteria that control healing effectives.

On intensive process LPO in cell nucleus are affecting structural changes of the cell chromatin in regenerating liver, taking place during transcription and replication. In its way, LPO can bring changes in qualitative and quantitative lipid content, fluid features, lipid charge of the DNA micro surrounding and connected proteins with it. That's why LPO in cell, including nucleus, is regulating by the antioxidant system, so acidified lipids in depend of the measures in developing process can be regarded asone of the genetic process mechanisms regulating activity or bring to genome destruction process [2].

In recent studies, it was set that many chronic diseases developing of the gastrointestinal tract are supported by insufficient function of AOP system that can bring to oxidative stress. The sufficient disturbances of LPOand AOP organism during the chronic gastroduodenitis and duodenal ulcer disease of children was studied [3]. A hypothesis was proposed that disturbance of peroxide homeostasis can determine relapse process of these diseases [4].

Studying those indicators as LPO - AOP, as conjugated dienes, malonicdialdehyde, main antioxidant activity, superoxide dismutase, glutathione peroxidase, catalase in patients with chronicgastroduodenitis and chronic pyelonephritis proved, that antioxidant and

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energetic therapy, using coenzyme Q10 contributes of the repairing damaged changing process and reaching membrane stable effect, helps in liquidation of bioenergetics and functional insufficiency of the cell structure and a hole organism at all [5].

Several works were dedicated to study changes in LPO - AOP system during different infertility types [6,7].

In that case, analysis of literature sources proved that, LPO - AOP indicators are used as criteria of organism stability in different diseases types. There is no information in literature sources about LPO - AOP system changing during parasite diseases. At the same time, it is known that different types of parasites are influencing the organism system: reducing immunity, supporting of inflammatory diseases developing and finally causing intoxication. It seems probably, that influence of parasites is calling significant changes in LPO - AOP system work. That's why seems probably the research work, dedicated in studying of the parasites invasions on LPO - AOP function ferment system and developing of the correction ways of these disturbances during the antiparasitic treatment.

Aims and scope:Evaluation of reproductive function changes with the accounting violations of redox processes in men ejaculate infested with helminthic invasion before and after healing.

MATERIALS AND METHODS

The investigating subjects of the present study were men and women with an age range between 18 to 45 years suffering from "Ascaridiasis". Twenty diagnosed men had been proved of finding eggs in their feces with native smear. Biochemical analysis have been provided in 20 men's ejaculate infested with ascaridiasis, comparative to a group of 20 men without ascaridiasis invasion. After standard anti helminthic treatment with " Mebendasol " medicament for 1.5 month, biochemical indexes with men of experimental group were repeated.

Determination of the conjugative dienes (CD), ketodienes (KD), total primary product (TPP), total secondary product (TSP), the Schiff bases, provided according to unified method by Ushkalova and Kadochnikova [8]. Determination of the malonicdialdehyde (MDA) provided according to Korobeinikov method [9]. Determination of the adenosinedeaminase activity (ADA) provided by method Nemechek *et al*. [10]. Determination of the glutathione peroxidase activity (GPO) provided according to Vlasova *et al*. [11]. Catalase (CAT) determination activity provided by Korolyk [12]. Data were processed by the main methods of statistical variation and expressed as an arithmetic average (M) and its standard error ($\pm$ $S.E.$). For evaluation in differences at main tendentious the Student (t) criteria has been used.

RESULTS AND DISCUSSION

Formerly, the influence of ascaridiasis invasion on morphophysiological indexes for men spermatogenesis was studied. According to clinical and laboratory results, men with helminthic invasion showed destructive disorders in morphological and physiological indexes of spermatogenesis, characterized by decreasing in spermatozoids active forms, increasing number of unstable forms and appearing of the atypical forms of spermatozoids. This destruction of the morphological differentiation may be connected with endogenic intoxication processes and accumulation of the toxic products of lipid peroxidation cascade.

Therefore, to confirm the later hypothesis, the state of redox processes in the ejaculate of men with helminthic infestation before and after treatment was studied.

To assess the state of oxidative metabolism in the germ cells in ascaridiasis held definition of primary, secondary and end products of lipid peroxidation and antioxidant enzymes in 20 men with ascaridiasis and 20 apparently healthy men.

In Table 1 presented the main results of contamination catabolism of the peroxide cascade in men ejaculate with ascaridiasis compared to apparently healthy men.

In the study of lipid peroxidation indicators showed a significant increase in the content of these products in the ejaculate of men with ascaridiasis invasion.

Analysis of the data showed an excess of the level of conjugateddienes and ketodienes 1.3 and 1.5 times in men with ascaridiasis, respectively, compared with the control.

Analysis of the total primary products of lipid peroxidation showed a significant increase in men with ascaridiasis compared with control values. The level of total primary products in those of the comparison group is 3.5 times higher than that of the main group of persons.

The level of total secondary products significantly decreased in patients with ascaridiasis in comparison with control and by 6% in relation to parameters of the comparison group.

Table 1: Indexes of LPO in men ejaculate with ascaridiasis invasion

Indexes of units measurements	Control (n=20)	Ascaridiasis before treatment(n=20)	Ascaridiasis after treatment (n=20)
CD, relative units / mole	307.7±33.4	394.2±26.8*	314.5±32.3
KD, relative units / mole	152.8±20.0	223.0± 27.8*	166.0± 21.8
ShB standard units	0.08±0.009	0.33±0.11*	0.09±0.010
TPP, standard units	0.50±0.05	1.84±0.06**	0.53±0.051
TSP, standard units	0.89±0.03	0.79±0.01*	0.84±0.02
MDA, micromoles/ml	27.8±1.4	35.0±1.2**	29.9±1.3

Note: * significant in comparison with the control, $p < 0.01$; $p < 0.05$

** significant in comparison with the control, $p < 0.001$

Table 2: Performance of antioxidant protection in the ejaculate of men with ascaridiasis invasion

Indexes of units measurements	Control (n=20)	Ascaridiasis before treatment(n=20)	Ascaridiasis after treatment (n=20)
GPOmicromoles GSH/ ml/min	67,3±4,5	50,4±5,6*	64,8±5,9
CAT, micromolesH_2O_2 ml/min	0,13±0,02	0,9±0,01**	0,10±0,01
ADA, nano molesadenosine /ml/min	5,1±0,7	3,85±0,5	4,8±0,6

Note: * significant in comparison with the control, $p < 0.01$; $p < 0.05$

** significant in comparison with the control, $p < 0.001$

The content of Schiff bases significantly increased in individuals with a comparison to the control.

Men with ascaridiasis invasion malonicdialdehyde level tends to increase in comparison with the main group, but the content of malonicdialdehyde in patients with significant increases ascaridiasis invasion relative to control.

Results of the study of enzyme activity and the antioxidant defense system of purine metabolism in men ejaculate ascaridiasis invasion are shown in Table 2.

As seen from the table, an analysis of enzyme activity of the first and second line of antioxidant defense in semen of men examinees showed inhibition of glutathione peroxidase and catalase in both groups compared to the control, this change has been reliable.

Activity of the enzyme adenosine deaminase tended to be lower in those in the comparison group, but these differences were not of significant nature.

Calculation of catalase / glutathione peroxidase showed a downward trend in both groups compared to control.

CONCLUSION

The sperm of men surveyed in an accumulation of free radicals may lead to destabilization of the membrane, resulting in a pool of chemically defective sperm deprived of motor activity and morphologically defective sperm maturation. From the present data, it is concluded that an increase in free radicals and toxic catabolizes lipid peroxidation (LPO) and enzyme inhibition of AOP in spermatogonia, spermatocytes and spermatids is very dangerous, because it leads to reproductive disorders in men suffering ascaridiasis invasion.

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