eISSN: 09748369

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Biology and Medicine

Research Article

Volume 6, Issue 2, Article ID: BM-020-14, 2014
Indexed by Scopus (Elsevier)
Co-Publisher: OMICS Group, www.omicsonline.org

www.biolmedonline.com

Antioxidant pathospermia therapy for treatment of chronic bacterial prostatitis

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Received: 29th Aug 2014; Accepted: 15th Oct 2014; Published: 2nd Nov 2014

Abstract
The purpose of the research is to study the response of treating pathospermia correction in patients with chronic bacterial prostatitis by ethylmethylhydroxypyridine succinate. The patients with chronic bacterial prostatitis were divided into three groups – the first group included 20 patients with chronic bacterial prostatitis with pathospermia who received standard conservative therapy for 4 weeks, and after its completion they received medication aimed at the nonspecific stimulation of spermatogenesis. The second group consisted of 13 patients who along with the conventional therapy were treated with ethylmethylhydroxypyridine succinate (125 mg/day) for 4 weeks. The third group consisted of 18 patients who along with the conventional therapy and nonspecific stimulation of spermatogenesis (the total duration of therapy was 58 days) were treated with ethylmethylhydroxypyridine succinate (125 mg/day). It has been proved that the use of ethylmethylhydroxypyridine succinate for the correction of pathospermia caused by chronic bacterial prostatitis is pathogenetically reasonable.

Keywords: Chronic bacterial prostatitis; male infertility; semen analysis; prostate gland; ethylmethylhydroxypyridine succinate.

Introduction

The World Health Organization defines a conjugal infertility as a lack of pregnancy after a year of regular sexual intercourse. Infertility is a general medical and social problem affecting 15% of couples [1]. The infertility etiology is multifactorial. The male factor is the cause of 20% of pregnancy failure cases according to the data [2], and in 50% of infertility cases the male factor is mentioned as one of the components of the complex problems of couple infertility. Infection–inflammatory processes in the male reproductive system are significant in the development of male infertility. Infectious diseases of the male reproductive system, including prostatitis, epididymitis, and orchitis [3-5] account for 12% of the male infertility cases. There is no doubt that prostatitis is the leader of this list. It must be recognized that a negative impact of prostatitis on male fertility has remained controversial until now. Several studies have demonstrated the negative impact of infectious and inflammatory diseases of the male reproductive system of bacterial etiology, including chronic bacterial prostatitis, on the sperm fertilizing capacity [6]. At the same time, the results of the other studies have not shown any significant differences in the ejaculate standard parameters (sperm concentration, its motility, and morphology) in patients suffering from prostate inflammatory diseases as compared with the control group [7].

Regardless, the leading mechanisms of prostatitis progression (microbial inflammation, oxidative stress, production of antisperm antibodies) determine the possibility of various forms of pathospermia development in patients suffering from this disease. In this regard, the development of pathogenetic therapy of chronic bacterial prostatitis that can influence the prostate inflammation pathogenesis and neutralize its negative impact on the sperm fertilizing capacity seems relevant.

The aim of this study was to investigate the effectiveness of using the ethylmethylhydroxypyridine succinate as a part of complex therapy for treating chronic bacterial prostatitis and pathospermia.

Methods

The study included 51 patients with chronic bacterial prostatitis. In accordance with the NIH (1995) recommendations, the diagnosis of chronic prostatitis was made basing on the appropriate clinical signs, the increased number of white blood cells, and bacteria in the prostate secretion and ejaculate.

Inclusion criteria were chronic bacterial prostatitis, oligozoospermia, asthenozoospermia, teratozoospermia, or combinations thereof.

Exclusionary criteria with a history of scrotal injury in the past, surgeries on the scrotum organs, varicocele, and/or a reference to its surgical treatment, azoospermia, age exceeding 45 yrs.

The patients with chronic bacterial prostatitis were divided into three groups – the first group included 20 patients with pathospermia complicated chronic bacterial prostatitis (the group consisted of 20 people). The mean age was 27.2 $\pm$ 4.1 yrs. All patients received standard conservative therapy for 4 weeks, including antibiotics, a-adrenergic blockers, nonsteroidal anti-inflammatory drugs, biologically regulatory peptides, and immunomodulators; and after the therapy was over the unspecific stimulation of spermatogenesis (a standard doze of arginine, carnitine, coenzyme Q10, carnosine, selenium, zinc, vitamins A and E) was prescribed for 30 days. The second group included 13 patients with pathospermia complicated chronic bacterial prostatitis who, along with the conventional therapy, received ethylmethylhydroxypyridine succinate (daily dose 125 mg) for 4 weeks, and then were treated with unspecific stimulation of spermatogenesis similar in duration and content. The mean age was 24.8 $\pm$ 3.7 yrs. The third group consisted of 18 patients with pathospermia complicated chronic bacterial prostatitis who along with the conventional therapy received ethylmethylhydroxypyridine succinate (daily dose 125 mg) for 4 weeks, and then were treated with unspecific stimulation of spermatogenesis similar in duration and content which was also accompanied by receiving ethylmethylhydroxypyridine succinate (125 mg daily dose). The mean age was 26.4 $\pm$ 3.3 yrs.

To confirm chronic bacterial prostatitis the prostate fluid microscopic examination and ejaculate bacteriological examination were performed.

The sperm for assessing its fertility was obtained by masturbation; sex abstinence lasted from 3 to 5 days. The ejaculate was examined twice: first – before the beginning of the conventional conservative therapy and second – after 58 days. Such parameters as pH, the ejaculate volume, and viscosity were assessed. The ejaculate slides were stained by Romanovsky method. The semen analysis was assessed by manual method at $\times$1000 magnification. Agglutination, concentration, motility (progressive – PR, non-progressive – NP, immotile – IM), sperm morphology were assessed in accordance with the WHO 5th edition recommendations ("WHO laboratory manual for the examination and processing of human semen", 2010).

Results and Discussion

When studying the ejaculate it has been found that most patients suffered asthenozoospermia (88.2%), oligospermia (21.6%), and teratozoospermia in 39.2% of all cases.

The study of the ejaculate of the patients from the first group conducted before the beginning of the conservative therapy has shown the following results: the ejaculate volume was 3.32 $\pm$ 0.71 ml, pH was 7.81 $\pm$ 0.10, the viscosity was 3.41 $\pm$ 0.28 cm, and average concentration of sperm cells in the ejaculate was 32.75$\pm$1.97 mln/ml. The sperm motility parameters were as follows: PR 19.70 $\pm$ 2.26%, NP 21.10 $\pm$ 2.30%, and IM 59.10 $\pm$ 2.61%. Asthenozoospermia was observed in 90% of cases, oligozoospermia in 20% of cases. Normal morphological forms before treatment were only in 4.2 $\pm$ 0.48% of cases. Teratozoospermia was observed in 45% of cases. When studying the ejaculate 30 days after the conventional conservative therapy termination, the following results were obtained: ejaculate volume was 2.41 $\pm$ 0.17 ($p < 0.001$) ml, pH was 7.18 $\pm$ 0.20 ($p < 0.01$), the viscosity was 2.21 $\pm$ 0.11 cm ($p < 0.001$), and average concentration of sperm cells in the ejaculate was 34.98 $\pm$ 1.23 mln/ml. The sperm motility parameters were as follows: PR 22.82 $\pm$ 2.14%, NP 19.77 $\pm$ 3.13%, and IM 57.4 $\pm$ 4.46%. The same individuals in 20% of cases still had oligozoospermia. Normal morphological forms on the average were in 4.50 $\pm$ 0.46% of cases. Teratozoospermia was observed in 35% of cases.

Analyzing the results, we can conclude that there were no considerable changes in the key parameters of the ejaculate. We can only state about a considerable decrease in ejaculate volume and a reduction of its viscosity, which can be associated with a reduction of inflammatory changes in the prostate and prostatic secretory dysfunction neutralizing.

The study of the ejaculate of the patients from the second group conducted before the beginning of the conservative therapy has shown the following results: the ejaculate volume was 3.44 ± 0.54 ml, pH 7.93 ± 0.22, the viscosity – 3.35 ± 0.27 cm, the average concentration of sperm cells in the ejaculate was 36.14 ± 2.12 mln/ml. The sperm motility parameters were as follows: PR 21.81 ± 4.27%, NP 30.27 ± 4.26%, and IM 47.91 ± 3.08%. Asthenozoospermia was observed in 84.6% of cases and oligozoospermia in 23% of cases. Normal morphological forms before treatment were present in 4.6 ± 0.88% of cases. Teratozoospermia was observed in 38.5% of cases. After the termination of the complex therapy, the ejaculate study has shown the following results: the ejaculate volume was 2.06 ± 0.37 ml ($p < 0.05$), pH was 7.18 ± 0.20 ($p < 0.05$), the viscosity was 2.21 ± 0.11 cm ($p < 0.001$), and the average concentration of sperm in the ejaculate was 56.18 ± 3.01 mln/ml ($p < 0.001$). Sperm motility had the following parameters: PR 36.24 ± 3.34% ($t = 0.02$), NP 15.72 ± 2.04%, IM 48.05 ± 3.13%. Oligozoospermia remained in 15.4% of cases. Normal morphological forms on the average were in 7.22 ± 0.61% ($p < 0.05$) of cases. The analysis of ejaculate indicators has shown significant improvement in semen fertilizing capacity. In addition, asthenozoospermia has disappeared in 40% of cases; the percentage of morphologically normal forms now corresponds to normative values in all patients with previously teratozoospermia findings.

The study of the ejaculate of the third group of patients before the beginning of the conservative therapy has shown the following results: ejaculate volume was 3.62 ± 0.57 ml, pH 7.88 ± 0.16, the viscosity 4.41 ± 0.22 cm, and the average concentration of sperm cells in the ejaculate was 38.67 ± 6.21 mln/ml. Sperm motility had the following parameters: PR 24.83 ± 3.72%, NP 30.52 ± 3.76%, and IM 45.2 ± 3.29%. Asthenozoospermia was observed in 88.9% of cases, oligozoospermia in 22.2% of cases. Normal morphological forms before treatment were in 4.27 ± 0.68% of cases. Teratozoospermia was observed in 33.3% of cases. After the end of the complex therapy, the ejaculate study has shown the following results: ejaculate volume was 2.34 ± 0.23 ml ($p < 0.05$), pH 7.20 ± 0.32, the viscosity 2.19 ± 0.11 cm ($p < 0.001$), the average concentration of sperm cells in the ejaculate was 60.22 ± 4.08 ($p < 0.01$) mln/ml. Sperm motility had the following parameters: PR 40.22 ± 4.62% ($p < 0.02$), NP 15.47 ± 2.44%, IM 44.30 ± 4.19%. Thus, the response to the treatment demonstrates the normalization of almost all the key parameters of the ejaculate. Asthenozoospermia remained only in 16.6% of the cases. Phenomena of oligo and teratozoospermic were neutralized in all patients.

Conclusions

It is considered that cytokines play a role in the formation of autoimmune reactions and the development of an imbalance in the system of pro and antioxidant factors, leading to the sperm damage and the development of male infertility in patients with chronic bacterial prostatitis [8,9]. The studies [10] have established that an increase in the interleukins concentration (IL-1β, IL-6, IL-8, IL-12, IL-18) and TNF-α leads to a considerable deterioration of the semen quality, reduced sperm motility and count which is due to the oxidative stress development, according to the authors. Thus, it is clear that it is advisable to use antioxidants as one of the concepts of pathogenetic therapy of chronic bacterial prostatitis accompanied by the development of male infertility. Currently, there are studies demonstrating a statistically significant reduction in the number of leukocytes in the seminal plasma, improving sperm cells motility in the course of antioxidant therapy [7]. The present study has demonstrated the improvement in the sperm count, morphology, and motility after the combined use of ethylmethylhydroxypyridine succinate as a part of the traditional scheme of chronic bacterial prostatitis treatment and its subsequent combination with a nonspecific stimulation of spermatogenesis.

1. The development of male infertility is one of the complications of chronic bacterial prostatitis. There are violations not only in physical and chemical properties of the ejaculate but also in

the sperm cells count reduction, sperm cells reduced motility, and their pathological forms increase. The most common sperm pathology at patients with chronic bacterial prostatitis is asthenozoospermia.

2. The conventional therapy of chronic bacterial prostatitis with subsequent corrections of spermatogenesis against the background of the constant reception of ethylmethylhydroxypyridine succinate allows suppressing pathospermia and bringing the basic parameters of the ejaculate in accordance with guideline values (WHO, 2010) in more than 80% of cases.

Acknowledgment

The study was supported by the Grant of the Russian President for the state support of young Russian scientists – Doctors of Science MD-49.2014.7.

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Citation: Belyi LE, Konshin II (2014) Antioxidant pathospermia therapy for treatment of chronic bacterial prostatitis. Biol Med 6(2): BM-020-14.