UDC 616

THE EFFECT OF ECHINACEA PURPUREA IN PATIENTS WITH INFLAMMATORY DISEASES OF THE TESTICLES

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Abstract. This paper presents information about the process of formation of germ cells in men with inflammatory diseases of the genital organs, who received a tincture of Echinacea purpurea. Observations of sperm showed that there were more living cells than non-living ones (respectively - 52.83% and 47.17%). During the observation process, a violation of cell motility was found in the direction of increasing number of immobile cells up to 38.4% and sedentary cells up to 48.45%. The influence of Echinacea purpurea tincture led to an improvement in the process of spermatogenesis at the stage of formation of late spermatids and spermatozoa. As a result of the corrected divergence of the acrosomes of the germ cells, cells of the correct natural structure were formed. Germ cells were deformed, because of the inflammatory process, were restored in comparison with patients who did not receive the immunomodulatory tincture. The violation of the head structure was observed in 28.4%, the neck structure - 6.8%, the tail structure - 7.5%.

Key words: inflammatory process, sperm, acrosome, motility.

Introduction. In modern conditions of industrial production, diseases of the genitourinary system are quite common. Inflammatory processes of the male genital organs in 30-40% of cases can lead to infertility in marriage. Male infertility is caused mainly by changes in sperm (its insufficient number), low sperm activity, changes in the shape and motility of sperm.

The reasons of male infertility:

1. Pathological condition of sperm: insufficient number of sperm in the ejaculate, immobility or lack of motility of germ cells, as a result of it they are unable to fertilize the ovum; newly formed cells with pathology of the head, neck and tail.

2. Anatomical abnormalities that interfere with normal ejaculation, for example, adhesions after surgery on the pelvic organs or prostate, blockage of the vas deferens due to inflammatory diseases.

3. Decreased immune system due to the transfer of autoimmune diseases (for example, cryptorchidism, parotide orchitis) or surgery (vasectomy, etc.), when the patient's body produces antibodies to its own germ cells.

There are quite a large number of herbal medicines that can improve sexual function that has been impaired due to inflammatory diseases. These include Hedysarum (red root), leuzea/Rhaponticum (maral root), anchors, hawthorn/alba, chestnut, ginkgo biloba extract, plantain (goose grass), knotgrass, St. John's wort, Echinacea purpurea. Fees, that include and combine plantain leaves, nettle, coltsfoot/Tussilago, lingonberry, birch buds, tansy flowers, St. John's wort, oregano (marjoram), yarrow, milfoil, birdweed, goose cinquefoil, marsh dried flowers and dandelion root, have properties that can inhibit autoimmune processes. [1, 34].

To restore the normal functionality of the reproductive system, it is necessary to act on the cause in all directions. Medicinal herbs have been widely used in the treatment of infertility. Decoctions and infusions for oral administration prepare on the basis of organic components and make baths with them.

The use of plantain seeds is a good way for men to help increase sperm motility and activity. On the basis of plantain leaves and roots prepare medicinal fees, take baths.

In case of impaired men fertility, the mumijo (Shilajit) helps well. The substance is formed in mountain caves where there are colonies, for example, cave dwellers, bats. The second component is represented by medicinal herbs, pollen, insect parts. The third part is the soil. The remedy has anti-inflammatory, antioxidant, regenerating, antibacterial and immunostimulating properties.

To enhance the effectiveness of therapy, Shilajit can be mixed with the juice of medicinal plants - sage, yarrow, stinging nettle. The substance has a positive effect on erectile function - potency, sexual desire and erection quality increase.

Adherents of alternative treatment for infertility recommend to take the centaury plant. Most often, a medicinal plant is added in small quantities to herbal preparations. In the complex, the herb acts more efficiently. In case of impaired fertility, this remedy can be added to salads, borsch, soups, and used as a filling for culinary products.

S. John’s wort is an effective herb for male infertility. The plant has many medicinal properties and it is widely used in alternative medicine. Mild-antiseptic, anti-inflammatory, regenerating and immunostimulating effects characterize this herb.

Practice shows that the use of herbs for infertility is one of the most effective methods of therapy, because the combination of medicinal plants enhances the therapeutic effect of each other.

For the treatment of autoimmune male infertility, it is recommended to use a medicinal fee - nettle and lingonberry leaves, tansy inflorescences. S. John's wort, marsh cinquefoil, cinquefoil goose, birch buds, plantain leaves, coltsfoot are also added to the mixture. Dandelion root, yarrow, oregano and melilot are needed for a sufficient effect.

Fees with pine tops, Irish moss, walnut and white mulberry leaves will also help to cure men infertility [2,154; 3, 241].

Treatment of male infertility usually involves the use of various plant components, as well as bee products that activate the body's natural functions. Sometimes honey, pollen, tincture of wax moth, Shilajit, propolis and royal jelly are used in combination with apple cider vinegar, sea buckthorn or carrot juice and herbs. Bee products help with infertility for many reasons, because they contain many vitamins, trace elements and acids, due to which they perfectly strengthen the immune system, soothe and heal, restore metabolism, relieve inflammation, itching and edema, have analgesic effect and prolong remission of chronic diseases [4, 1254].

Long-term practice of treatment with medicinal plants shows that if the disorders, present in the body, are correctly assessed and the components of the phytocomposition are adequately selected, most of the disorders can be corrected and, in severe cases, the probability of achieving of the main desired pharmacological effect can be increased. Probably, it is happened due to duplication of pharmacological effects (the use of plants with the same direction of action), increased probability of induction of the main desired effect by indirect actions; the use of all pharmacological potential of the used medicinal plants (thousands of chemical compounds), full-scale use of multiple duplication of functions in organism.

Treating the disease with herbal medicines will not help to eliminate all the existing problems, as there are a number of points that require the use of drugs or even surgical treatment. But, nevertheless, these methods help in the basic infertility therapy and perfectly restore the general health [5,68; 6,190].

Complex herbal preparations have fortifying, tonic, anti-inflammatory and antisclerotic effects, regulate the functions of the nervous and endocrine systems, reduce the risk of vegetative disorders, improve hematopoiesis and peripheral circulation, blood filling of the organs and tissues of the genital area, have a positive effect on spermatogenesis, erection and libido. It is an effective remedy of preventing inflammatory diseases of the urinary system and sexual disorders, prevents structural and functional changes in the prostate, testicles, epydidymis and reduction of sexual function. Correcting hormonal balance, herbal medicines support sexual capabilities, relieve excessive psycho-emotional load, increase self-esteem, alleviate the symptoms of discomfort associated with andropause [7,396; 8,298].

One of the most effective immunomodulatory drugs that can help in the treatment of infertility is Echinacea purpurea. Echinacea purpurea tincture has pronounced anti-inflammatory, reparative, analgesic, antioxidant, antispasmodic, antiandrogenic and antimicrobial properties, which makes it possible to use it as a means of treating diseases of the male genital area - prostatitis, orchitis, orchoepidimitis. This remedy also has antioxidant, radioprotective and positive endothelial properties. The use of the immunomodulator Echinacea purpurea in the

treatment of diseases of the male genital organs leads to the fact that the body's immune response is activated in the case of inflammatory diseases of the testicles. As a result, the effects of autoimmune processes that occur in the testicles are reduced, the blood supply to the male reproductive gland is improved, spermatogenesis is restored and erections are enhanced.

The aim of the research was to determine the number of deformed forms of germ cells in men with inflammatory diseases of the testicles who received an immunomodulator - 7% alcohol tincture of Echinacea purpurea.

The aim of the research was to determine the number of deformed forms of germ cells in men with inflammatory diseases of the testicles who received an immunomodulator - 7% alcohol tincture of Echinacea purpurea.

Materials and methods. Under supervision were 40 patients aged from 17 to 48 years with inflammatory diseases of the genital organs, who received 7% alcohol tincture of Echinacea purpurea in complex treatment. Spermograms of men who took tests in the laboratory "In Vitro" in Dnipro were evaluated. The destruction of the process of spermatogenesis was assessed by the degree of appearence of pathological forms of sperm at all stages of the spermatogenic cycle. During the analysis processing such indicators were being taken into account as the number of epithelial cells of the urethra, prostate, leukocytes in 1 ml of sperm, the number of sperm in 1 ml, the total number of sperm, the number of normal and pathological forms of cells in percentage.

The count of viable and non-viable cells was performed. Living cells were evaluated by the degree of motility. The cells were counted: active but sedentary; cells without translational movements and immobile; inanimate sperm were counted.

Cells with normal structure and appearance of pathological forms of sperm were also observed. From the pathological forms of male germ cells, cells with pathology of the head, neck and tail were counted as a percentage.

Results and discussion. People under supervision had inflammatory testicular diseases of varying severity. The cause of inflammatory processes in the testicle were injuries, urological diseases, congenital malformations, and patients could also feel

the effects of harmful environmental factors, both at work and at home. The cause of inflammatory diseases was also the carrying of mobile phones in the pockets of clothes.

Microscopic examination of sperm revealed that in the analysis of men with acute and chronic inflammatory diseases, in the field of view, there were single epithelial cells of the urethra and prostate in a state of fatty dystrophy, lecithin grains and amyloid bodies in small quantities, single spermatozoa. «Bether crystals» were not detected in any analysis.

Factors such as the presence of a large number of leukocytes in 1 ml of fluid in sperm tests testified to a pronounced inflammatory process in men testicles. Their number ranged from 60,000 to 220,000 cells.

The study also found that in the analysis of patients, the average value of the number of spermatozooa in male sperm was 56.8 million in 1 ml, the total number of sperm reached an average of 274.63 million in 1 ml.

In sperm analyzes, the number of living and non-living sperm had approximately the same values, but there were still more live germ cells than inanimate (live - 53.82%, inanimate - 46.18%).

Further analysis of sperm showed that the viable active germ cells but sedentary accounted for 37.5%, cells without translational movements - 3.01% and immobile sperm - 57.53%. After counting inanimate sperm, the indicator had an average value of 46.18%. (Table 1).

The largest share in the structure of viable germ cells had sedentary sperm, due to inflammatory diseases of the male genitalia caused by various factors, i.e. there was the greatest loss of the ability of germ cells to translational movements. This information is more likely to be one of the causes of men infertility and determine the role of the male factor in infertile marriage.

Table 1.

Percentage of viable human testicular sperm with inflammatory diseases of the testicles

The number of sperm, mil/ml	The total number of sperm, mil	Sperm mobility, %			
		Alive			Inanimate/ dead
		immobil	without translational motion	fixed	
56,8	274,63	37,5	3,01	57,53	46,18

When studying the structure of sperm in the analysis of sperm of men with inflammatory diseases of the genital organs, cells formed sequentially at all stages of the spermatogenic cycle, there was an average of 56.8%. Cells that had abnormalities in the process of chromosomal divergence and atypical acrosome divergence at the stage of formation of second-order spermatids and spermatozoa were also counted. As a result of non-synergistic divergence of acrosomes, spermatozoa with a bifurcated head, an atypically formed neck and double flagella were formed. Germ cells with a double head accounted for 28.4%, neck pathology - 7.8%, double flagella - 7.0% (Table 2).

Table 2.

Percentage of normal and pathological forms of sperm of testes man with inflammatory diseases of the testicles

Spermatozoids with normal form, %	Spermatozoids with pathological form, %		
	heads	necks	tail
56,8	28,4	7,8	7,0

After consumption of 7% alcohol solution of Echinacea purpurea by patients with inflammatory testicular diseases, we obtained the following results. In sperm analysis, a large number of leukocytes in 1 ml of fluid was observed. The number of leukocytes of most patients ranged from 56,000 to 216,000 cells.

The study also found that in the analysis of patients, the average value of spermatozoa in men sperm was 54.6 million in 1 ml, the total number of sperm reached an average of 224.67 million in 1 ml, that is, it increased in comparison with those patients who did not receive the tincture of Echinacea.

In sperm analysis, the number of living and non-living sperm had almost the same values. However, in comparison with the group of patients who did not use an immunomodulator, live germ cells increased to 52.83%, and non-living, respectively, decreased to 47.17%.

Further analysis of sperm showed that the viable active germ cells, but sedentary sperm accounted 36.4%, cells without translational movements - 2.94% and immobile sperm - 48.45%. When counting inanimate sperm, the indicator had an average value of 47.17% (Table 3). The patient's number of sedentary germ cells, who took the drug was increased, the number of cells without translational movements was increased and immobile sperm was decreased. Sedentary sperm determine the ability of germ cells to translational movements. Therefore, the increase of spermatozoa indicates that the fertilizing ability of sperm after consumption of 7% alcohol solution of Echinacea purpurea improves.

Table 3.

Percentage of viable human testicular sperm with the echinacea purpurea tincture

The number of sperm, mil/ml	The total number of sperm, mil	Sperm mobility, %			
		Alive			Inanimate/ dead
		immobil	without translational motion	fixed	
54,6	224,67	36,4	2,94	48,45	47,17

When studying the structure of sperm in the analysis of men sperm with inflammatory diseases of the testicles, who used a solution of immunomodulator, the cells formed sequentially at all stages of the spermatogenic cycle, there was an average of 57.3%. Cells that had abnormalities in the process of chromosomal divergence and atypical acrosome divergence at the stage of formation of second-order spermatids and spermatozoa were also counted. As a result of non-synergistic divergence of acrosomes, spermatozoa with a bifurcated head, an atypically formed neck and double flagella were formed. There were 28.4% of double-headed germ cells, 6.8% of cervical pathology, and 7.5% of double flagella (Table 4).

Table 4.

Percentage of normal and pathological forms of sperm of testes man with the echinacea purpurea tincture

Spermatozoids with normal form, %	Spermatozoids with pathological form, %		
	heads	necks	tail
57,3	28,4	6,8	7,5

Conclusions. As a result of the research, the following conclusions can be drawn:

1. The use of Echinacea purpurea and drugs based on them in the process of research confirms that the proposed plant is a whole complex that is biogenetically formed, a complex that exists in a living cell, has a greater resemblance to the human body than individual chemicals. Therefore, it is easier to assimilate and gives fewer side effects.

2. Echinacea purpurea has immunomodulatory properties, for example, when a person has inflammatory diseases of the genitals, decreased immunity, it is advisable to use a tincture of this plant. At the same time, the process of spermatogenesis in the testicles is more intense, cell motility increases, fewer dead and deformed cells appear.

3. In patients with inflammatory diseases of the testicles, who used 7% alcohol tincture of Echinacea purpurea, sperm analysis showed an increase in live sperm cells to 52.83%, cells without translational movements decreased to 2.94%.

4. The influence of Echinacea purpurea in patients with inflammatory diseases of the testicles led to the resumption of spermatogenesis at all stages - germ cells with normal structure increased to 57.3%, cells with pathology of the head and neck decreased to 28.4% and 6.8%.

5. Thus, the use of Echinacea purpurea by men with inflammatory diseases of the testicles improves spermatogenesis and reduces the percentage of male factor in the structure of infertile marriage.

Prospects for further research. In further studies, it is possible to study the quantitative and qualitative components of human and mammal sperm tests after using other drugs that improve spermatogenic function of the testicles.

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