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# Effect of antioxidants and myo-inositol on spermogram

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The male sterility factor with the demonstration of pathological spermogram represents a serious and recently worsening problem in treatment of infertile couples. There may be many reasons, but modern medicine is only in a few cases able to detect and also treat diseases leading to the worsening of spermatogenesis. Vitamins and antioxidants with variable effect have come to attention, based possibly on negative experiences with the classic treatment. The aim of the stated work is to analyze the effect of treatment with Folandrol preparation.

**Key words:** spermogram, myo-inositol, infertility

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## Introduction

About 15% of couples are affected by infertility in the reproductive period. It is estimated that 40% of the causes of infertility is of female origin. Another 40% is of male origin, 15% are combined factors, and in 5% of cases it is not possible to determine the reason – idiopathic infertility<sup>(1)</sup>. In the case of the male infertility factor there are different pathologies of sperm – expressed in the form of spermogram. In our centre for reproductive medicine, we focus on the treatment of sterile couples. Part of the initial examination is a thorough history focused on the identification of causes of infertility, ultrasound examination of the female patient with a transvaginal probe, blood collection of the female patient for examination of laboratory parameters focusing on the hormonal profile, and other parameters affecting the concept and course of pregnancy. Then we also evaluate the initial spermogram (In our laboratory we examine the spermogram in the standard way pursuant to the recommendations of the WHO classification of 2010. Before the examination, we recommend maintaining sexual abstinence for 3-5 days. Approximately one month prior to the taking of samples, the patient should not take any antibiotics or other drugs that may affect the actual outcome and in this period he should not have the disease with overall symptoms – such as influenza or other viral diseases. In the case of a pathological spermogram, we instruct the patients on the importance of lifestyle, eating habits, alcohol consumption, smoking, physical activity, stress etc. on sperm quality, and we also recommend taking nutrition supplements with antioxidant effects. It is recommended to conduct a control spermogram in about a 3 month period. In the evaluation of the control spermogram and also of the results of the laboratory tests of the woman we indicate adequate suitable method of assisted reproduction, or we consider the need for further diagnostic

procedures (for women, in particular laparoscopy, hysteroscopy and in severe spermogram pathology in men, urological examination and genetic examination of the couple, etc.) to find objective causes for the infertility.

## Examination of spermogram

In our conditions, the collection of the ejaculate is carried out in a room dedicated for this in the premises of the centre for assisted reproduction. After masturbation by the patient, the sample of the ejaculate is stored for its liquefaction in a sterile collection container in a thermostat with temperature of 37 °C. After liquefaction, the volume of ejaculate, viscosity, pH and odour are evaluated. Microscopic evaluation of the spermogram itself consists of a determination of sperm concentration, their motility, progression of movement, morphology, agglutination, and the presence of other cells. In our laboratory we determine the concentration of the sperm by counting in the Macler chamber, where the exact number of sperm per millilitre of native ejaculate is specified. Subsequently, motility is evaluated and the degree of progression is determined from the ratio of progressive to immobile sperm. With motility, sperm having progressive movement, slowly progressive movement, non-progressive movement and immobile sperm are evaluated in percentages. In the last step, the presence of agglutination of the sperm (assessed in percentage) and the presence of other cells (white cells, red cells, round cells...) are monitored. When evaluating the morphology, sperm pathology is determined microscopically from a streak stained with Papanicolaou and then by a subsequent counting of the different forms of pathological sperm.

Criteria for assessing sperm according to WHO 2010<sup>(2)</sup>:

- **Volume of ejaculate:**  $\geq 1.5$  ml
- **Sperm concentration:**  $\geq 15$  million/ml or 39 million/full volume of ejaculate
- **Motility:** 40% motile sperm (sperm with progressive, slowly progressive and non-progressive movement)  
32% (sperm with progressive and slow progressive movement)
- **Normal forms of sperm:**  $\geq 4\%$  (according to Kruger criteria for assessing the form of sperm)

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In comparison with the evaluation criteria for spermogram from previous years (1980-1999) the concentration of evaluated sperm per millilitre was significantly changed from the original normal value of 20 million per millilitre to 15 million per millilitre, and in the percentage of present normal forms of sperm it was from 80.5% to current 4%<sup>(2)</sup>.

Conclusions of the spermogram evaluation according to current criteria:

**Normozoospermia** – parameters of the WHO classification 2010 satisfied

**Asthenozoospermia** – total sperm motility less than 40%, less than 32% of sperm with progressive movement

**Oligozoospermia** – sperm count less than 15 million per a millilitre or less than 39 million per ejaculate

**Oligozoospermia gravis** – sperm count less than 5 million per millilitre

**Theratozoospermia** – more than 96% of pathological forms of sperm

**Azoospermia** – absence of sperm

**Parvosemia** – low volume of ejaculate

**Necrozoospermia** – only immobile sperm present

### Objectives of the work

This is a retrospective analysis of the effect of treatment and the effect of spermatogenesis by means of food supplements containing antioxidants (Myo-inositol, folic acid, L-carnitine, L-arginine, Vitamin E, Selenium) – Folandrol preparation.

### Materials and Methods

In the study, we included patients within the period from April 2014 to September 2014, in whom a variable degree of spermogram pathology was identified – and we attributed infertility only to the male factor. We compared spermograms before and after treatment with Folandrol preparation. In order to achieve the desired effect, we recommend the administration of 2 packs of the powder preparation daily. The treatment lasted three months and subsequently we evaluated changes in the concentration, motility and morphology of the sperm. At the same time we focused on the occurrence of spontaneous pregnancy.

**Table 1.** Results of sperm in individual patients before and after treatment

Patient No.:	Before treatment			After treatment		
	Konc mil/ml	Motility %	Normo %	Konc mil/ml	Motility %	Normo %
1	9.6	54	1	18.6	59	1
2	2.5	5	0	7.4	10	0
3	1.5	25	0	3.8	25	0
4	2.7	31	1	31.2	33	1,5
5	1.2	20	0	3.8	32	1
6	7.8	35	2	11.2	38	2
7	12.8	28	1	18.6	35	1,5
8	14.8	35	2	22.8	56	2
9	20.6	38	2	28.7	42	2
10	17.8	41	3	26.2	52	3
11	6.7	25	0	12.8	34	0,5
12	25.7	38	2	28	37	2

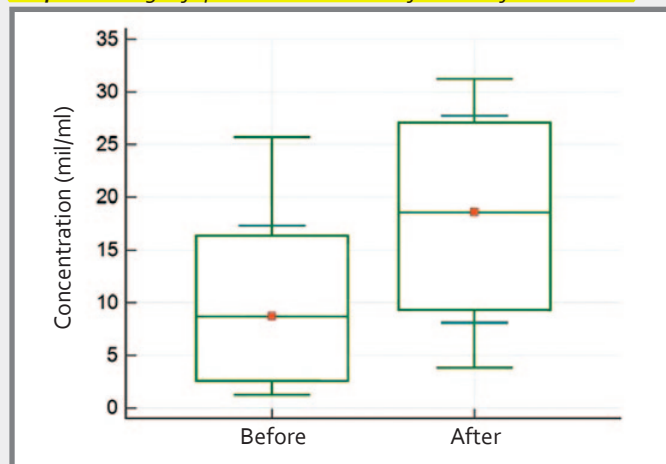
### Results

The monitored parameters of spermogram of individual patients are shown in **table 1**. With regard to the normal distribution of the data determined by the Kolmogorov-Smirnov test, we conducted all analyzes by the pair Student-t test. We found a significant increase in sperm concentration after the treatment  $P=0.0038$  (95% CI 2.95 to 11.95) – **graph 1** and also a significant improvement of sperm motility  $P=0.0035$  (95% CI 2.63 to 10.37) – **graph 2**. In the evaluation of sperm morphology, although there was an improvement, although this difference, due to the smaller number of patients, is at the limit of statistical significance  $P=0.054$  (95% CI -0,004-0,42) – **graph 3**. In one case we recorded spontaneous pregnancy.

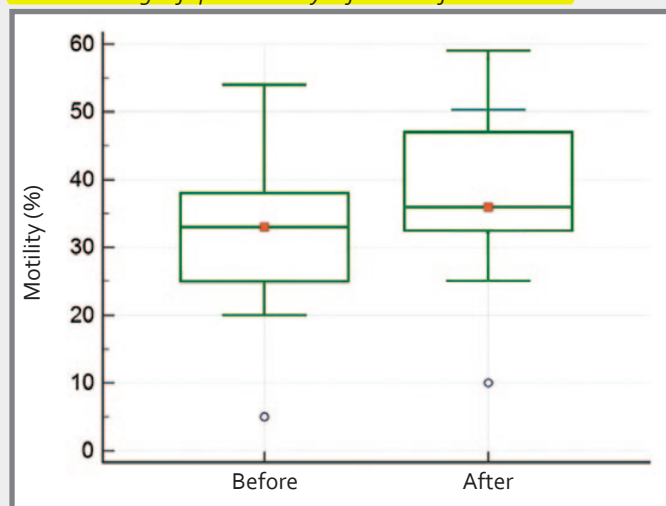
### Discussion

In our study, we pointed out the positive effect of the Folandrol preparation on sperm concentration and motility in particular. In the evaluation, changes in the morphology before and after the treatment were not significant. In interpreting the stated results, the potential – and positive – impact of other factors – e.g., change in lifestyle should, however, be stated<sup>(3)</sup>. After re-interviewing the patients, dietary changes, reduced physical activity and top sport, reduced consumption of alcohol, cigarettes and the like were recorded in a majority of the cases. Most patients combined the proposed treatment with other suggested

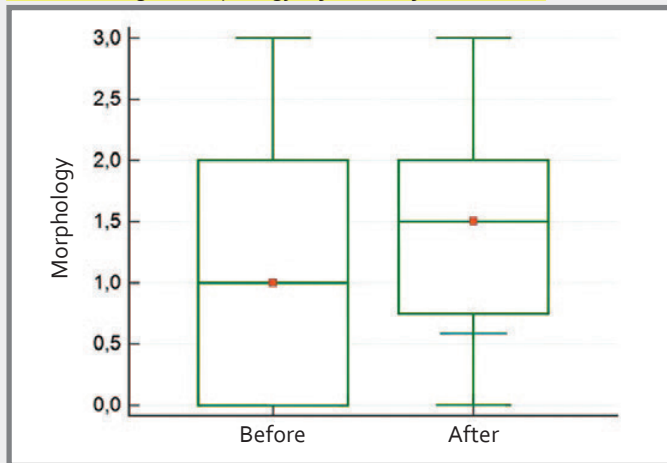
**Graph 1.** Change of sperm concentration before and after treatment



**Chart 2.** Change of sperm motility before and after treatment



**Chart 3. Change in morphology before and after treatment**



preparations – such as Vitamin C, preparations containing Tribulus Terrestris, etc. By means of our analysis it is very difficult, almost impossible, to evaluate the cumulative effect of the stated

#### Literature

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2. WHO laboratory manual for the examination and processing of human semen. Fifth edition, 2010, ISBN: 978 92 4 154778 9.

changes of lifestyle and the use of preparations beyond our recommendations. We also should not forget physiological changes in spermogram values – independent of external influences<sup>(4)</sup>. The final effect of the treatment is based mainly on achieving gravidity – in our case, we recorded one spontaneous pregnancy. Any improvement in spermogram, although not normalization, is a partial success. It reduces the need for complicated methods of assisted reproduction – a reduction of IVF (in vitro fertilization) occurs – possibility of IUI (intrauterine insemination) at achieving certain criteria of spermogram. At the same time even minimal improvement in spermogram, e.g., with oligoasthenoteratozoospermia, increases the chance of achieving pregnancy through IVF.

#### Conclusion

Based on the stated analysis, we proved the positive effect of a dietary supplement containing antioxidants (Myo-inositol, folic acid, L-carnitine, L-arginine, vitamin E, selenium) – Folandrol preparation for the improvement of spermogram.

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