ejpmr, 2020,7(12), 235-239

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

PARAMETERS OF HUMORAL IMMUNITY IN WOMEN OF REPRODUCTIVE AGE WITH UTERINE MYOMA

Isanbaeva L. M., *Musakhodjaeva D. A. and Eshimbetova G. Z.

Tashkent Institute of Advanced Training for Doctors, Institute of Immunology and Human Genomics of the Academy of Sciences of the Republic of Uzbekistan.

***Corresponding Author: Musakhodjaeva D. A.**
Tashkent Institute of Advanced Training for Doctors, Institute of Immunology and Human Genomics of the Academy of Sciences of the Republic of Uzbekistan.

Article Received on 29/09/2020 **Article Revised on 19/10/2020** **Article Accepted on 09/11/2020**

ABSTRACT

Background. Key factors in the pathogenesis of uterine myoma are - stimulation of proliferation, impaired apoptosis processes in myometrics and the appearance of various growth factors. The immune system plays a significant role in maintaining tissue homeostasis in the body. Any processes associated with the enhancement of cell proliferation processes are accompanied by immune disorders and initially the disorders themselves in the immune system can lead to the initiation and growth of tumors. **Purpose of the study.** Study of some parameters of immunity in women of reproductive age with different growth rates of uterine fibroids. **Materials and Methods**. Studied parameters of humoral immunity and indicators of non-specific protection factors in 123 women of reproductive age, of which 65 patients had simple uterine myoma (1 group) and 58 patients had fast-growing uterine myoma (2 group). The control group consisted of 30 women of reproductive age without uterine fibroids. **Results.** An analysis of the results of the studies carried out indicates changes in all parts of the immune system. It was revealed that with uterine myoma, the level of the total pool of B-lymphocytes and an imbalance in the synthesis of immunoglobulins are increased. With a rapidly growing uterine myoma, the level of IgG and IgA is increased, and the synthesis of IgM and the level of killer cells is reduced. Apparently, these changes can be considered markers of the rapid growth of uterine fibroids.

KEYWORDS: uterine myoma, clinical course, the immune system, humoral link of immunity, factors of nonspecephical protection.

INTRODUCTION

Uterine fibroids are one of the most common hormone-sensitive benign tumors originating from smooth muscle cells of the cervix or uterine body. The immune system plays a significant role in maintaining tissue homeostasis in the body.[4,6,7] Any processes associated with the enhancement of the processes of cell proliferation are accompanied by immune disorders and sometimes, initially, the disorders in the immune system themselves can lead to the initiation and growth of tumors.

According to the clinical course, uterine fibroids are asymptomatic (findings by ultrasound), simple - in which there is no growth of the myomatous node or the nodes develop very slowly. In some women, there is a progressive growth of myomatous nodes - these are the so-called fast-growing uterine fibroids. In this regard, it can be assumed that it is the changes in the immune response that can act as trigger factors in the progression of the growth and development of uterine fibroids.[6,7] In connection with the above, the aim of the study was to study the parameters of humoral immunity in women of reproductive age with various clinical courses of uterine fibroids.

Material and research methods. The study included 123 women of reproductive age (31.3 ± 0.51 years) with uterine myoma.

Of these, 65 women had simple uterine fibroids, 58 had fast-growing uterine fibroids. The control group consisted of 30 apparently healthy women of comparable age (29.7 ± 0.42 years). Inclusion criteria: reproductive age, small and large uterine fibroids.

Exclusion criteria: concomitant gynecological pathology, somatic pathology in the stage of subcompensation and decompensation, autoimmune, endocrine diseases, as well as taking any drugs for the last 3 months.

Immunological methods included: quantitative determination of lymphocytes with phenotype CD16 and CD20 using monoclonal antibodies of the LT series (LLP "Sorbent", Moscow, RF). The phagocytic activity of neutrophils was assessed using latex particles, the level of circulating immune complexes (CIC) was determined in blood serum using PEG-600 (Nihol, Tashkent), the concentration of immunoglobulins G, A and M was determined by ELISA using test systems.

For statistical processing of the data obtained, the InStat 2.0 program was used. The results were considered significant at p <0.05.

Results and its discussion. As you know, in the course of the immune response, B-lymphocytes differentiate into plasma cells that secrete antibodies. In our studies, the B-system is represented by the quantitative content of CD20 + - lymphocytes and the level of IgG, IgA and IgM antibodies.

Table 1: Indicators of the B-system of immunity in the examined women, (M ± m).

Indicators	Groop of control, n=30	Weman with myoma	
		simple uterine myoma n=65	fast-growing uterine myoma, n=58
CD20+,%	24,7 ± 0,8	23,9 ± 1,0	31,2 ± 1,1*
IgG, g/l	9,5 ± 0,8	10,4 ± 0,9	12,7 ± 0,76*
IgA, g/l	1,4 ± 0,12	1,7 ± 0,16	2,3 ± 0,2*
IgM, g/l	1,3 ± 0,15	1,2 ± 0,11	0,8 ± 0,1*

Note: * Values are reliable in relation to the control group, (P <0.05 - 0.001)

B-lymphocytes can develop an adequate immune response only with the help of T-helpers. Our studies showed that in the peripheral blood of women with simple uterine myoma, the content of B-lymphocytes did not differ from the indicators of the control group (Table 1) and averaged 23.9 ± 1.0% versus 24.7 ± 0.8% in control. While in women with fast-growing uterine myoma, this indicator was 1.3 times higher than the control values and averaged 31.2 ± 1.1% (P <0.05).

The functional state of B-lymphocytes is represented by the activity of antibody production (IgG, IgA, IgM).

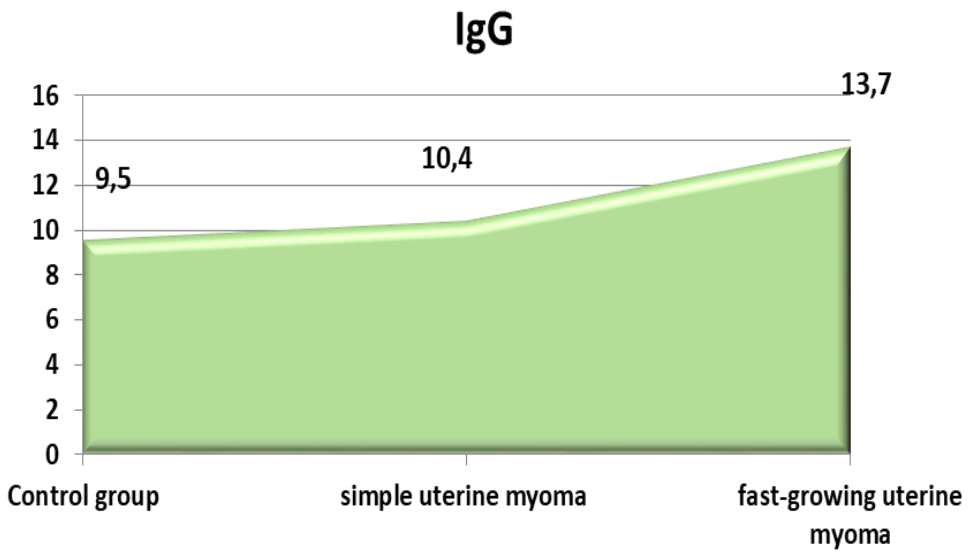

Figure: 1. IgG level in the examined women, g/l.

The study of the concentration of immunoglobulins in the blood serum of healthy women showed that IgG is synthesized in the range from 8.6 to 10.2 g/l with an average content of 9.5 ± 0.8 g/l. In women with simple uterine myoma, t g/l. Rapidly growing uterine myoma was characterized by increased IgG synthesis, averaging 13.7 ± 0.76 g/l (P <0.05).

In women in the control group, the serum IgA level varied from 1.1 to 1.6 g/l, which averaged 1.4 +-0,12 g/l (Fig. 2), while in women with fast-growing.

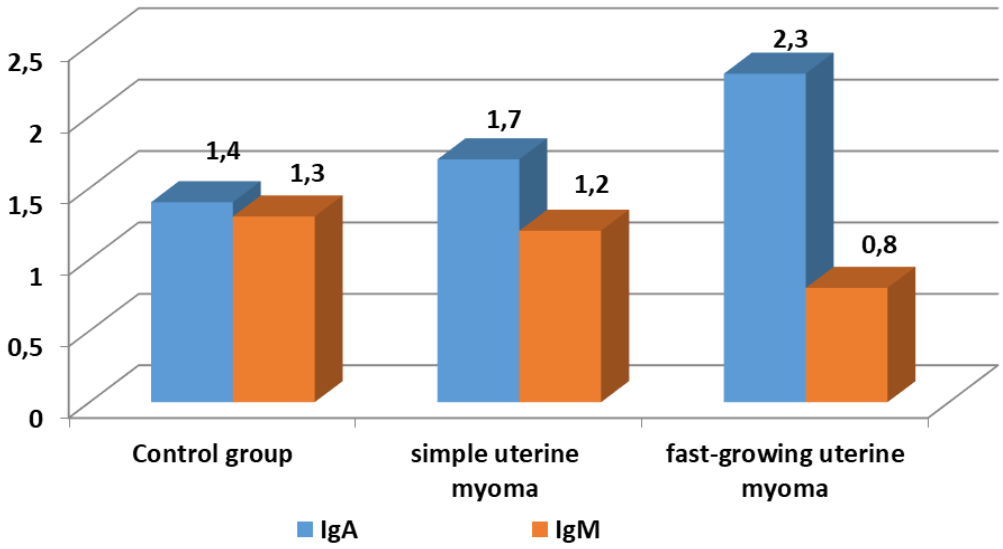

Figure: 2. IgA and IgM level in the examined women, g/l.

uterine myoma, a significant increase in its level was observed (2.3 ± 0.2 g/l), (P±<0.05). The IgA concentration in women with simple uterine myoma was slightly increased and ranged from 1.4 to 2.2 g/l with an average value of 1,7 ± 0,16 g/l., whereas in women with fast-growing uterine myoma there was a significant increase in its level (2.3 ± 0.2 g/l), (P <0.05).A significantly reduced IgM content was observed in women with fast-growing uterine myoma (P<0,05). In women with simple uterine myoma, the IgM level did not differ from the values of the control group. The study of the level of immunoglobulin M showed that in the blood serum of healthy women it contains from 0.9 to 2.0 g/l, with an average value of 1,3 ± 0,15 g/l.

According to experimental studies (Takasugi M., Klein E., 1971), immunoglobulins G are able to stimulate cell division and thereby potentiate tumor growth, while immunoglobulins M have the opposite effect. Thus, the analysis of the results of humoral immunity showed that with uterine fibroids there is an activation of the total pool of B-lymphocytes and an imbalance in the synthesis of immunoglobulins, depending on the form of uterine fibroids. With the rapidly growing form of uterine myoma, the level of B-lymphocytes and IgG and IgA increases, and the synthesis of IgM is reduced.

As you know, the main function of natural killer cells (NK) is the lysis and elimination of transformed, infected or proliferating cells from the body (Yarilin A.A., 1999). This determines the important role of NK in antitumor and anti-infectious immunity. There are data in the literature indicating that infection may be one of the factors inducing the development of uterine fibroids (Tikhomirov A.L., 2017). Apparently, the high content of NK in the peripheral blood that we identified in women with simple uterine myoma may be associated with the presence of infection, which is confirmed by the data of clinical characteristics. Specialized NK cells are lymphocytes devoid of T- and B-lymphocyte markers and their characteristic antigen-recognizing receptors. NK cells perform rapid cytolysis of virus-infected host cells upon initial contact. They are important factors of antiviral defense, especially in the early stages of immune processes. A subfraction of NK cells - K cells carries out antibody-dependent cell cytolysis. The marker of K cells is the CD16-low-affinity IgG receptor, or FcγRIII, which binds aggregated IgG1 and IgG3.[5,6,7]

A quantitative study of CD16 + lymphocytes showed that in women with simple uterine myoma, the peripheral blood contains from 12 to 20% of the relative number of these cells, with an average value of 15.5 ± 0.9%, which is 1.3 times higher than the control values (11.8 ± 0.7%) (P <0.01). In women with fast-growing uterine myoma, the level of killer activity was reduced and averaged 7.3 ± 0.5%, which was significantly lower not only the values of the control group (P <0.05), but also the values of the group of women with simple uterine myoma (P <0.01), (Fig. 3).

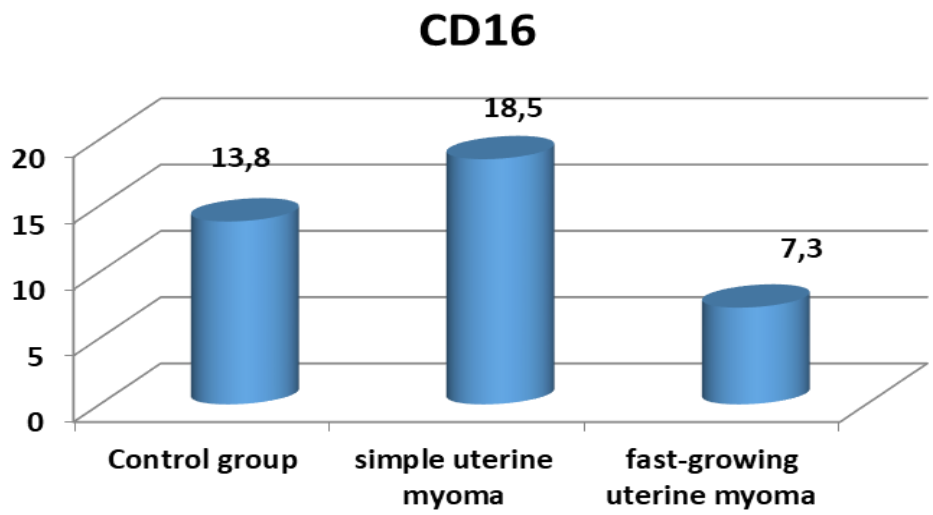

Figure: 3. CD16 level in the examined women, %.

Both in patients with simple uterine myoma and in women with rapidly growing uterine myoma, the level of circulating immune complexes in the serum of the peripheral blood increased in comparison with the data of the control group (Fig. 4).

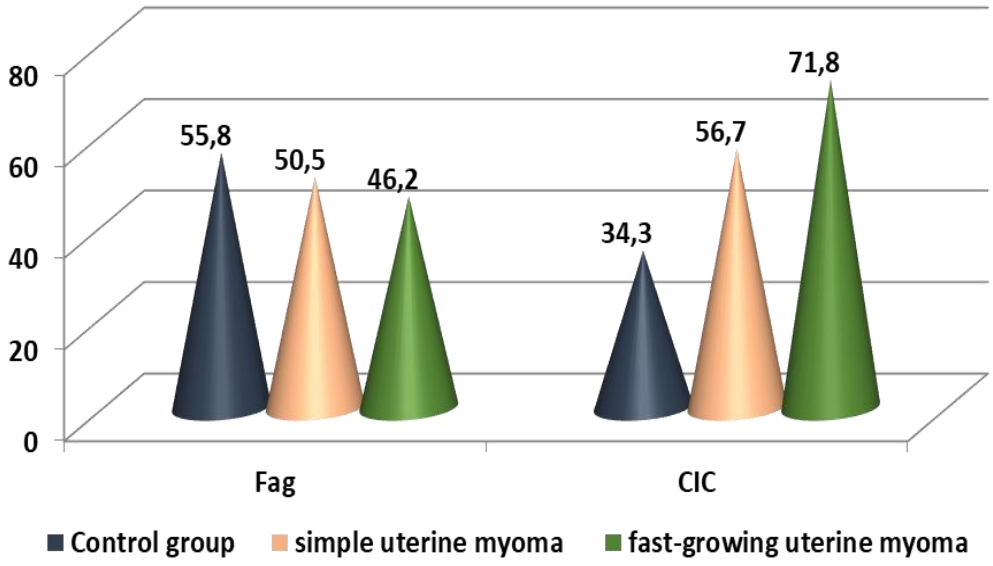

Figure: 4. Phagocite (%) and circulating immune complexes (CIC) (conventional units) level in the examined women.

Thus, in women with simple myoma, this indicator averaged 56.7 ± 2.5 conventional units, which is 1.65 times higher than the control values (P <0.05), and in women with fast-growing uterine myoma, the level of CEC was 2.1 times higher than the control (71.8 ± 2.9 conventional units), (P <0.01). Comparative analysis showed that women with a rapidly growing tumor had a higher CEC level than women with simple myoma (P <0.05)

As is known, circulating immune complexes (CIC) are an integral indicator of the state of activation of the humoral link of the immune system. Our results indicate a pronounced increase in the level of formation of antigen-antibody complexes in the studied pathological process. Despite the nonspecificity and lability, phagocytic activity plays an important role in maintaining cell homeostasis and antitumor protection. Taking part in the regulation of the processes of angiogenesis, regeneration, differentiation, and cell proliferation[5,6,7], they quickly respond to various pathogens even before the appearance of detailed signs of the disease.[6] 1.4% with a range of individual values from 45 to 55%/ Quantitative study of phagocytic activity in our women showed that the blood of healthy women contains from 50% to 65% of phagocytic cells,

which average 55,8 ± 1,3%. With uterine myoma, this activity is markedly suppressed. So, in women with simple uterine myoma, this indicator averaged 50,5 ± 1,4%. In women with rapidly growing uterine myoma, phagocytic activity was even more suppressed (46.2 ± 1.2%) (P <0.01).

CONCLUSIONS

Thus, the analysis of the results of humoral immunity showed that with uterine myoma there is an activation of the total pool of B-lymphocytes and an imbalance in the synthesis of immunoglobulins.

With a rapidly growing uterine myoma, the level of B-lymphocytes and IgG and IgA significantly increases, and the synthesis of IgM decreases.

In women with rapidly growing uterine myoma, the level of killer activity is significantly reduced, which, along with the disruption of T-cell immunoregulation, their generation into mature cell forms, promotes the development and growth of the tumor.

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