Influence of Anti-Endometrial Antibodies on the Activity of Inflammatory Processes in Patients with Genital Endometriosis

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Abstract: *Background:* Genital endometriosis is characterized with the problems of immune homeostasis. The aim of present study was to determine the correlation between autoimmune and inflammation mediators in women with genital endometriosis.

Material and methods: 100 reproductive age women with genital endometriosis were included in present study. We have determined the levels of TNF-α as anti-inflammatory cytokine and antiendometrial antibodies (AEA) in peripheral blood of women by standard ELISA method.

Results: It was detected statistically significant positive correlation between AEA and TNF-α in women with genital endometriosis ($p<0.05$).

Conclusion: Increased inflammation stimulates the synthesis of autoimmune antibodies in women with genital endometriosis.

Keywords: Genital endometriosis, Cytokines, TNF-α, Autoimmune antibodies, Inflammation.

INTRODUCTION

Genital endometriosis remains one of the actual problems of today's clinical gynecology [1-3]. Researchers used to support the idea that genital endometriosis doesn't have significant importance till that time, now consider genital endometriosis as a disease of modern era due to the increased rate of the pathology and its role in the formation of infertility among women at reproductive age [4, 5].

In women at reproductive age, immune homeostasis disorders during genital endometriosis have particular importance. Hence, various studies prove that immune balance disorder leads to the development of endometriosis. As an example, we can show proofs presented by scientists such as Kira E.F. *et al*., who explain the contribution of numerous factors regarding immune system dysfunction in developing the pathological process [6]. However, it should be noted that the integrity of immune balance disorder is not the only factor to be considered in the development of the genital endometriosis. The fully integrated immune response during the pathology also plays a crucial role in preventing the formation of residues and complications. In recent years, the role of autoimmune antibodies is considered exceptional in the formation of the genital endometriosis along with a number of gynecological diseases. There are some opinions regarding the role of autoimmune anti-endometrial antibodies in the formation of infertility and also malignant diseases during the genital endometriosis [7, 8].

The aim of present study was to determine the correlation between the severities of autoimmune and inflammation processes. Regarding this, we have studied the levels of TNF-α as anti-inflammatory cytokine and antiendometrial antibodies (AEA) in patients with genital endometriosis.

MATERIALS AND METHODS

The research was conducted among 100 reproductive aged women with genital endometriosis. Based on clinical and laboratory examinations, all patients are divided into three main groups: 1st group – patients with peritoneal endometriosis, n = 53; 2nd group – patients with extraperitoneal endometriosis, n = 31; 3rd group – patients with a combined form of genital endometriosis, n = 16; 4th group – control group, consisting of 30 healthy fertile women without endometriosis.

Diagnostic criteria for endometriosis are based on regular gynecological and rectovaginal examinations, colposcopy, smear for cytology examination in the cervix and vaginal part of the uterus, and also transvaginal ultrasonic examination of the pelvis aimed to learn the changes in the structure of the uterine wall, large teratomas, size of the uterus and uterine tube.

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The most advanced and learned diagnostic method for genital endometriosis is laparoscopy. To determine the treatment tactics for the patient, it can diagnose any form or severity of the disease. Laparoscopy was performed on all patients by using Karl Storz's (Germany) laparoscopic equipment.

TNF-α and AEA levels in peripheral blood of all women with genital endometriosis were determined by standard ELISA technique. The accuracy of correlations between indicators is determined by the Spearmen correlation coefficient, which is mainly used in medical and biological researches. In all cases of $p<0.05$, the difference between groups was considered to be statistically accurate.

RESULTS

The localization of endometriosis according to research groups is presented in the Table **1**. As the table shows, ovarian endometriosis (34%) and endometriosis in the fallopian tube (58.5%) can mainly be found in Group 1. Cervical endometriosis and endometriosis on uterosacral ligaments can mostly be found in Group 2. Retro- cervical endometriosis is found in 7 patients (22.5%) from Group 2, ovarian and peritoneal endometriosis is found in 1 patient (6.25%).

The result of correlation relations between TNF- α and AEA is shown in Figure **1**. As it is shown, based on these indicators statistically accurate ($p<0.05$) and as well as positive correlation is found in all research groups.

DISCUSSION

As a result of the research, evaluation of correlation dependence between anti-endometrial antibodies and TNF- α was assessed in patients with genital endometriosis (Figure 1). Based on the findings, a positive correlation with statistical significance was determined between AEA and TNF-α, that reflects the activity of the autoimmune process in the background of increased inflammation. So, the dysfunction of cytokines (TNF-α) directly correlates with the level of AEA. It is obvious, that even a slight disbalance leads to significant changes in the immune system of patients with endometriosis. TNF-α diminishes the function of collagen synthesis [9]. Thus, it adjusts the determination of existing process along with the mechanism that prevents excessive growth of self-controlling endometrioid tissue in a positive or negative way. It is also known that TNF-α provides degradation of tissues and T-cell activity [10]. Thereby, the disbalance in the immune system causes the existing process to accelerate or decelerate on a cellular level. As a result, immunodeficiency processes may occur related to the unbalanced immune system. Finally, exhaustion of control mechanisms for immune response and development of autoimmune process take place [11]. It is known that in relation with tumor cells TNF-α has a higher selective toxicity characteristic. The tumorous factor is not capable of having type peculiarity, and it does not have a damaging effect on healthy cells [12, 13]. During endometriosis, the opposite action occurs. In the other

Table 1: The Localization of Endometriosis According to Research Groups

Types of Endometriosis (Position)	Peritoneal Endometriosis *Group 1 n=53*		Extraperitoneal Endometriosis *Group 2 n=31*		Mixed form of genital Endometriosis *Group 3 n=16*		Total *n=100*	
	N	%	N	%	N	%	N	%
Ovarian endometriosis	18	34	-	-	3	18,7	21	21%
Endometriosis in fallopian tubes	31	58,5	-	-	5	31,3	36	36%
Endometriosis in pelvic mesentery	4	7,5	-	-	1	6,25	5	5%
Vulvo-vaginal endometriosis	-	-	6	19,4	2	12,5	8	8%
Cervical endometriosis on vaginal part	-	-	9	29	2	12,5	11	11%
Endometriosis on uterosacral ligaments	-	-	6	19,4	2	12,5	8	8%
Retro-cervical endometriosis	-	-	7	22,5	1	6,25	8	8%
parametric endometriosis spread to urinary bladder, para-colpal tissue and to the rectum	-	-	3	9,7	-	-	3	3%

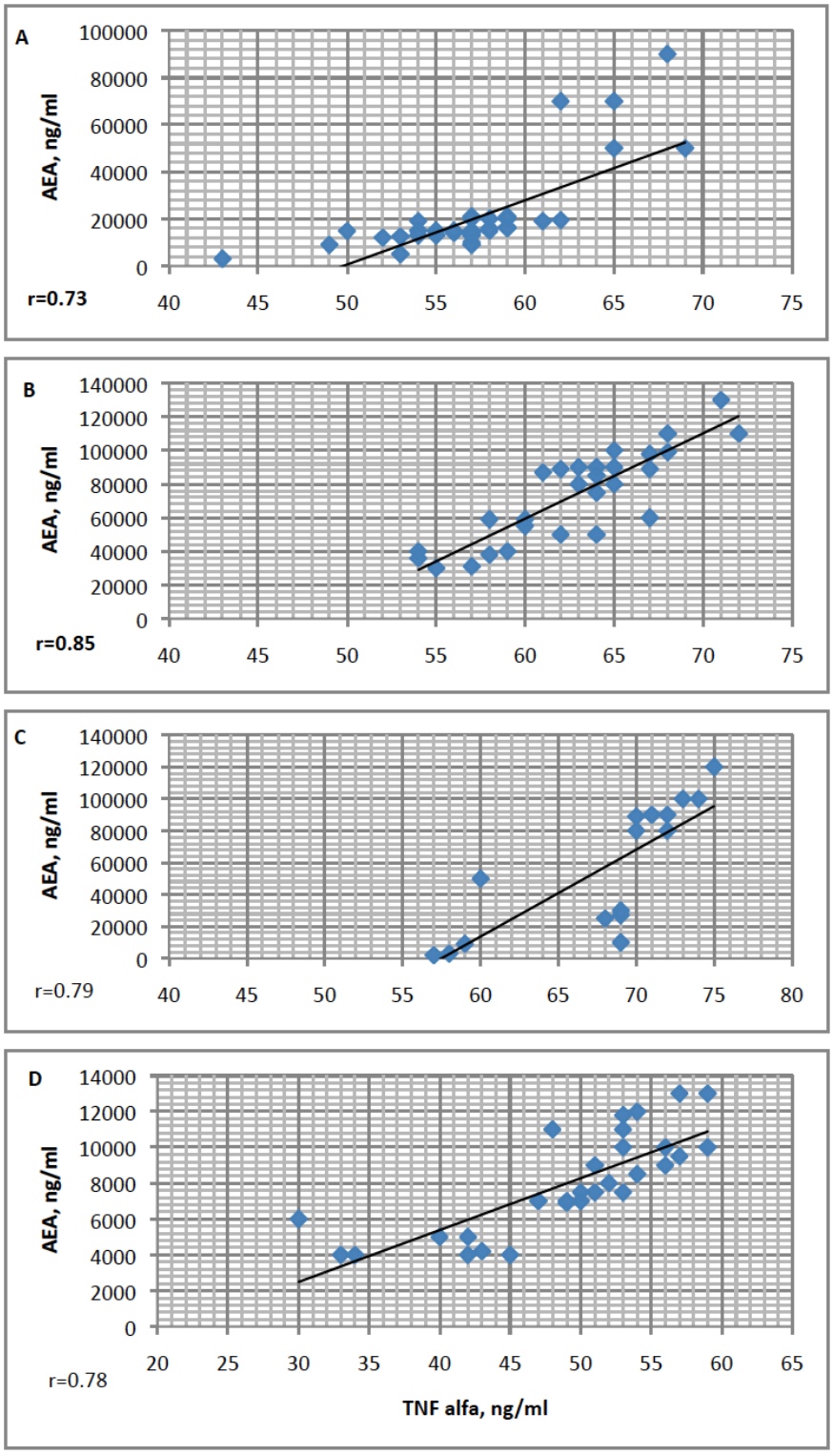

Figure 1: The results of correlation analysis between anti-endometrial antibodies and TNF- α in women with endometriosis (results are listed accordingly **A**-Group 1, **B**-Group 2, **C**-Group3, **D**-Group 4).

words, by the disruption of the balanced activity of endometrial cells, autonomous growth of endometrial tissue is observed.

CONCLUSION

Present study confirms the theories about the role of immune disbalance in the pathogenesis of genital

endometriosis. Increased inflammation stimulates the synthesis of autoimmune antibodies, which complicates the pathologic process. The positive correlation of antiendometrial antibodies with inflammatory cytokines gives the base to include immunsupressive therapy in addition to anti-inflammatory medicines.

REFERENCES

[1] Audu BM, Massa AA, Bukar M. *et al*. Prevalence of utero-tubal infertility. J Obstet Gynaecol 2009; 4: 326-328 https://doi.org/10.1080/01443610902803625

[2] Bulun SE. Endometriosis. N. Engl. J Med 2009; 360(3): 268-279 https://doi.org/10.1056/NEJMra0804690

[3] Child TJ, Tan SL. Endometriosis: aetiology, pathogenesis and treatment. Drugs 2001; 12: 1735-1750 https://doi.org/10.2165/00003495-200161120-00005

[4] Cramer DW, Missmer SA. The epidemiology of endometriosis. Acad Sci 2002; 955: 11-22. https://doi.org/10.1111/j.1749-6632.2002.tb02761.x

[5] D'Hooghe TM, Debrock S. Endometriosis, retrograde menstruation and peritoneal inflammation in women and in baboons. J. Hum. Reprod. Update 2002; 8: 84-88 https://doi.org/10.1093/humupd/8.1.84

[6] Bulletti C, Coccia ME, Battistoni S, Borini A. Endometriosis and infertility. Journal of Assisted Reproduction and Genetics 2010; 27(8): 441-447 https://doi.org/10.1007/s10815-010-9436-1

[7] Somigliana E, Vigano P, Parazzini FA. *et al*. Association between endometriosis and cancer: a comprehensive review and a critical analysis of clinical and epidemiological evidence. J Gynecol Oncol 2006; 101: 331-341 https://doi.org/10.1016/j.ygyno.2005.11.033

[8] Fernandez-Shaw S, Kennedy SH, Hicks BR, Edmonds K. *et al*. Anti-endotelial antibodies in women measured by an enzyme linked immunosorbent assay. Hum. Reprod 1996; 11(6): 1180-1184 https://doi.org/10.1093/oxfordjournals.humrep.a019351

[9] Yifei Q, Ren X. Roles of PLODs in Collagen Synthesis and Cancer Progression. Front. Cell Dev. Biol 2018; 6: 66 https://doi.org/10.3389/fcell.2018.00066

[10] Amit K. Mehta, Donald T. Gracias, Michael Croft. TNF- α activity and T cells. Cytokine 2018; 101: 14-18 https://doi.org/10.1016/j.cyto.2016.08.003

[11] Toubi E. Vadasz Z. Innate immune-responses and their role in driving autoimmunity. Autoimmunity Reviews 2019; 18: 306-311 https://doi.org/10.1016/j.autrev.2018.10.005

[12] Olszewski, *et al*. " TNF- α Trafficking to Human Mast Cell Granules: Mature Chain-Dependent Endocytosis". The Journal of Immunology. 2007; 178(9): 5701-5709. https://doi.org/10.4049/jimmunol.178.9.5701

[13] Feng P, Jyotaki M, Kim A, Chai J, Simon N, Zhou M, Bachmanov AA *et al*. "Regulation of bitter taste responses by tumor necrosis factor". Brain, Behavior, and Immunity 2015; 49: 32-42. https://doi.org/10.1016/j.bbi.2015.04.001

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