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INVESTIGATION OF LEVEL OF SERUM INTERLEUKİN 17 IN AGE-RELATED MACULAR DEGENERATİON

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Abstract

Age-related macular degeneration (AMD) is a non-recyclable visual disorder among elderly people worldwide and AMD is one of the leading causes of blindness. Former studies, interleukins were found to be effective in patients with AMD. This study's object, the relationship of serum interleukin 17 with age-related macular degeneration was evaluated. Interleukin 17 levels were measured by ELISA method using the blood serum of 100 patients diagnosed with age-related macular degeneration and 100 healthy individuals in the control group. Acording to the results of the study, the differences between the patient and control groups of interleukin 17 levels was found statistically significant (p:0,001; p>0,05). It was found that gender difference in patients did not affect interleukin 17 levels (p=0,649; p>0,05). In the study, there was a significant relationship between age-related macular degeneration and serum interleukin 17.

Key Words: Age-related macular degeneration, ELISA, Interleukin 17

Özet

Yaşa bağlı makula dejenerasyonu (YBMD), dünya genelinde yaşlılar arasında geri dönüşümü olmayan görme bozukluğu olup körlüğün önde gelen nedenleri arasında yer almaktadır. Önceki araştırmalarda YBMD'li hastalarda interlökinlerin etkili olduğu bulunmuştur. Bu çalışmanın amacı, serum interlökin 17'nin yaşa bağlı makula dejenerasyonu ile olan ilişkisi

değerlendirmekti. Yaşa bağlı makula dejenerasyonu tanısı alan 100 hasta birey ile 100 sağlıklı bireyin oluşturduğu kontrol grubu kişilerin kan serumları kullanılarak interlökin 17 düzeylerine ELİSA yöntemi ile bakılmıştır. Çalışma sonucuna göre, interlökin 17 seviyesinin hasta ve kontrol grupları arasında istatistiksel olarak anlamlı bir fark olduğu belirlenmiştir (p:0,001; p > 0,05). Hasta bireylerde ise cinsiyet farklılığının interlökin 17 seviyesini etkilemediği bulunmuştur (p=0,649; p > 0,05). Yapılan çalışmada, yaşa bağlı makula dejenerasyonu ile serum interlökin 17 arasında anlamlı ilişki bulunmuştur.

Anahtar Kelimeler: Yaşa bağlı makula dejenerasyonu, ELISA, İnterlökin 17.

1. Introduction

Age-related macular degeneration (AMD) is a disease that causes irreversible visual impairment and blindness in elderly people (Taipale et al., 2018). While it constitutes 8.7% of legal blindness worldwide, it ranks 3rd after cataract and glaucoma, which are other visual disorders (Batman and Çalış, 2017; Spooner et al., 2018). The biggest risk factor for AMD is aging, and it is thought that the number of people who will be affected by this disease in the USA in 2050 will increase to 22 million, and 288 million worldwide. It has been reported that the prevalence of AMD is equal to the sum of all invasive cancers and more than twice as high as Alzheimer's disease (Yılmaz, 2017). In AMD, in addition to genetic factors such as age and gender, various environmental factors such as smoking and alcohol consumption, nutrition, obesity and diabetes are risk factors that affect the occurrence and development of the disease (Buschini et al., 2015; Thapa et al., 2017). When the evidence obtained from family histories and genetic analyzes of individuals with AMD is evaluated, it has been shown that genetic factors play an important role in the physiology of this disease (Canter et al., 2008). Studies have shown that many genes have an effect on the formation and progression of AMD, and it has been revealed that T cell, which produces IL-17, plays a role in the formation and development of various autoimmune diseases (Park et al., 2005; Liu et al., 2011). In this study, we aimed to investigate whether there is a possible relationship between Age-Related Macular Degeneration and serum Interleukin-17 level.

2. Material and Methods

Our study was included in the group of 100 patients aged 60 and over, who applied to the Tokat Gaziosmanpaşa University Department of Ophthalmology outpatient clinic with the complaint of visual impairment, were diagnosed with Age-Related Macular Degeneration (AMD) as a result of the ophthalmological examination and various measurements and healthy individuals, who applied to the Ophthalmology Department, were not diagnosed with Age-Related Macular Degeneration (AMD), did not have diabetes, did not have any eye disease, and who agreed to participate in this study, were included in the control group. Our study was approved by the Gaziosmanpaşa University Faculty of Medicine Clinical Research Ethics Committee, and also the consent of the patients and control group participating in the study was obtained.

The blood samples of the individuals to be included in the patient and control groups were taken into blood collection tubes. After the blood samples were centrifuged at 3600 rpm for 10 minutes, the serum portions were transferred to 1.5 µl eppendorf tubes and labeled, and then stored in a deep freezer at -20°C for a week and then at -80°C. They were retained until the date of the ELISA study.

On the day of the ELISA test, after the blood serum went through the appropriate thawing stages, the tests were carried out by following the protocol included in the Human IL-17 ELISA kit.

For the statistical analysis of the results of the study, the evaluation was made using the SPSS 12.0 program. The Mann Whitney U Test (25%-75%: IAA: Interquartile range) was used to determine the level of interleukin 17 in the blood serum of the individuals in the control and patient groups. $P<0.05$ was accepted as statistically significant. Independent Sample T Test was used in the data results of the patient group by gender.In drawing the graphics, the results were evaluated by using the EXCEL program.

3. Results

In the study, the levels of interleukin 17 in the blood serum of the group with Age-Related Macular Degeneration and the control group are given in the table (Table 1 and Table 2).

Table 1. Average IL 17 levels of the patient group

	Group				
	Patient				
	N	**Average**	**Standard Deviation**	**Minimum**	**Maximum**
IL17	100	83,5496447	92,9367456	,3666730	370,7279720

Table 2. Average IL 17 levels of the control group

	Group				
	Control				
	N	**Average**	**Standard Deviation**	**Minimum**	**Maximum**
IL 17	100	59,0585617	98,9247121	,1362432	425,9756287

The p value of IL 17 in individuals with age-related macular degeneration and in the control group is given in Table 3.

Table 3. The p value of IL 17 in the patient and control groups

	GRUP						**Z**	**p**
	Patient			**Control**				
	Median	**%25**	**% 75**	**Median**	**%25**	**% 75**		
IL17	42,7491720	15,4773531	136,2193352	14,1711783	3,8057052	54,1275464	3,206	**0,001***

As a result of our laboratory studies, our p value was found to be 0.001.

Since this value was below the value of 0.05, it was determined that there was a significant relationship. (significant for $p < 0.05$)

The relationship between the gender of the individuals in the patient group and IL 17 was evaluated with the Independent Sample T Test (Table 4).

Table 4. The p value of the patient group according to gender

Gender	IL17					t	p
	n	Average	Standard Deviation	Minimum	Maximum		
Male	56	87,3227820	101,6504821	,3666730	370,7279720	0,456	0,649
Female	44	78,7474700	81,4076129	,8226909	302,7101305		

There is no correlation between the gender difference of the individuals in the patient group and IL 17.

4. Discussion

Age-related macular degeneration is among the leading causes of irreversible visual impairment and blindness among the elderly worldwide. Since the number of individuals aged 65 and over will increase by approximately 80% in the next 25 years, it is estimated that the prevalence of AMD will increase (Pauer et al., 2010). AMD is a common disease in which both environmental and genetic factors are effective (Bojanowski et al., 2005). It is thought that common multifactorial diseases such as AMD are caused by genetic and environmental risk factors. For this reason, it is thought that a single gene cannot be responsible for the development of this disease alone (Bojanowski et al., 2005; Ferrara et al.,). It is thought that examining the interactions between genes and gene-environment interactions is very important in the prevention, diagnosis and treatment of AMD (Bojanowski et al., 2005; Stone et al., 2001). Various studies carried out recently; suggests that dysregulation of complement activity may play an

important role in the pathogenesis of AMD (Patel and Chan, 2008). According to data from a 2018 study by Mahr et al., among approximately 28 238 660 Medicare beneficiaries (Social Security Administration-provided health insurance for Americans aged 65 and over in the US) 2 210 000 (7.8%) were diagnosed with AMD in 2014. Among beneficiaries diagnosed with AMD, 360,640 (16.3%) received 1 or more intravitreal injections of anti-VEGF for AMD. After adjusting for age and sex, the race- and sex-adjusted rates of AMD and the use of anti-VEGF agents for AMD increased with age (P<0.001). In addition, African Americans, Latinos, and Asian Americans were 19%-74% less likely to be diagnosed with AMD than other races, and were 48%-86% less likely to receive anti-VEGF anti-intravitreal injections for AMD (Mahr et al., 2018).

In a study by Hallak et al. in 2019, 686 eyes analyzed belonged to female individuals and the mean age was 78.12 years; drusen features were observed in one eye that developed into neovascular AMD despite treatment. It was found that female gender was significantly associated with the conversion to neovascular AMD (Hallak et al., 2019). In our study, it was found that the gender difference of patients with AMD did not affect the level of interleukin 17 (p=0.649; p>0.05). In studies, IL17 is thought to contribute to the development of various autoimmune diseases such as rheumatoid arthritis (RA), systemic lupus erythematosus, Behçet's disease, allograft rejection, nephritic syndrome, asthma, multiple sclerosis (MS), psoriasis, Crohn's disease and ulcerative colitis (Komiyama et al., 2006; Shen and Shi, 2019). In a study, serum IL-10 levels were found to be significantly lower in rheumatoid arthritis patients and significantly higher in healthy IL-17 and 14-3-3η protein levels. It has been found that IL-17 has better sensitivity and specificity than IL-10 for the diagnosis of rheumatoid arthritis and plays an important role in the diagnosis, treatment and pathogenesis (Qu et al., 2019). In a study by Ardeljan et al., it was found that while IL17A was 8.2 times higher in AMD patients than in normal tissue, IL17RC was 6.2 times higher. These results show that mRNA of IL17A and IL17RC is significantly aberrant in AMD lesions (Ardeljan et al., 2014). In our study, the IL 17 level of the patient group was 1.5 times higher than the IL 17 level of the control group. It was thought that C5a expression increased in the serum of AMD patients in line with many cohort observations, and the results suggested that C5a might be one of the factors contributing to serum IL-22 and IL-17 levels in AMD patients. As a result, it was found that C5a supports the expression of Th17 cytokines from human CD4 + T cells (Liu et al., 2011). In our study, when the interleukin 17 levels of the individuals with age-related macular degeneration and the control group were compared, a significant correlation was found (p=0.001; p < 0.05).

5. Conclusion

The results of the study showed that Age-Related Macular Degeneration and interleukin 17 were significantly and significantly related. Factors such as education level, smoking and alcohol use of the patient and control groups in the study were not considered. We think that examining such factors in studies examining the relationship between this disease and interleukin 17 will contribute to the treatment and prevention of the disease.

Conflicts of interest

The authors declare that there are no potential conflicts of interest relevant to this article.

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