ORIGINAL ARTICLE

Neutrophil-Lymphocyte Ratio in Patients with Retinitis Pigmentosa Patients

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ABSTRACT

Purpose: Intraocular inflammation in RP eyes, which might be related to its pathophysiology.To evaluate the neutrophil to lymphocyte ratio (NLR) in patients with retinitis pigmentosa and to compare with this the control group.

Materials and Methods: This retrospective study included 31 patients with retinitis pigmentosa and 25 healthy subjects. Complete ophthalmological examination and complete blood count measurement results of all subjects were evaluated. The NLR was calculated in all of the individuals and compared between the retinitis pigmentosa patients and the healthy controls.

Results: The mean NLR±SD was 2.46±1.01 in the retinitis pigmentosa patients group. The mean NLR±SD was 1.87±0.58 in the control group. There was a significant difference in NLR between retinitis pigmentosa and control groups (p=0.003).

Conclusion: NLR could be considered a quicker and a cheaper marker detected only routine CBC analysis an inflammatory marker for retinitis pigmentosa patients. Further studies are needed in order to come up to more definite results.

Keywords: Retinitis pigmentosa, Inflammation, neutrophil, Lymphocyte, neutrophil, Lymphocyte ratio.

INTRODUCTION

Retinitis pigmentosa (RP) is a hereditary degenerative disease of the retina.[1,2] The worldwide prevalence of RP is about 1 in 4000.[3,4] RP a cause of visual impairment, which is characterized by slowly progressive, concentric constriction of the visual field.[2,5] Although the pathophysiology of RP has not been established, there have been some reports about intraocular inflammation in RP eyes, which might be related to its pathophysiology.[6,8] The neutrophil to lymphocyte ratio (NLR) is an easy way to analyze inflammation biomarkers using complete blood count (CBC). The neutrophil-to-lymphocyte ratio (NLR) was found to be a useful inflammatory marker in various diseases.[9,10] Papers from the ophthalmology clinics related to NLR have a trend of increase and NLR has been increasingly used as an early biomarker of some ocular diseases such as age-related macular degeneration (AMD), keratoconus and pseudoexfoliation syndrome (PEX), studies investigating the predictive value of these markers.[11,12,13]

Thus, this study was designed to investigate the place of NLR in the RP, of which inflammation plays an important role in the etiopathogenesis.

To the best of our knowledge, this is the first study to evaluate the NLR in patients with retinitis pigmentosa.

MATERIALS AND METHODS

The study was conducted by the ophthalmology department at Afyon Kocatepe University, after obtaining institutional review board and ethics committee approval. The current study included 31 patients diagnosed with retinitis pigmentosa (RP) and 25 age and sex- matched subjects in the control group without any systemic and ocular disease.Characteristics of all patients were obtained from the electronic medical record including age, gender, ocular findings, systemic diseases, drug history and laboratory findings. Control group with the best-corrected visual acuity of 20/20 were included. The diagnosis of RP was based on history of night blindness, impairment of

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peripheral visual fields, reduction of electroretinogram rod and cone amplitudes, and presence of characteristic fundus pigmentary changes. Patients with hematologic disorders, history of past ocular surgery, maculopathy, acute or chronic infection, other inflammatory ocular and systemic disease, any ocular medication use, current steroid therapy and/or history of steroid use 3 months prior to admission were excluded from the study.

The complete ophthalmological examination was including best corrected visual acuity (BCVA) measured by Snellen chart at the initial examination was recorded by logMAR, intraocular pressure (IOP) measurement, anterior segment, fundus examination, spectral domain optical coherence tomography (SD-OCT, Heidelberg Spectralis, Heidelberg Engineering, Heidelberg, Germany). Venous blood samples were drawn into EDTA tubes. The hematological measurements were obtained by using an automated blood cell counter (Beckman-Coulter LH 780 Analyzer, Miami, Florida, USA). WBC (white blood cell), neutrophil, lymphocyte, and NLR levels were recorded. The following reference values were accepted as: for WBC: 4–10×10^3/mm^3, neutrophil: 1.5–7×10^3/mm^3, lymphocyte: 1–3.7×10^3/mm^3. The count of neutrophils and lymphocytes were extracted from the blood samples. NLR was calculated as the ratio of neutrophil and lymphocyte countand obtained from the same blood sample.

Statistical analysis

All statistical analysis used the Statistical Package for the Social Sciences (SPSS) software (v18.0 for Windows; SPSS Inc., Chicago, IL, USA). The data were evaluated with descriptive statistics (arithmetic mean, median, standard deviation, and percent distributions). When the mean between the groups was compared, normality of data assumed by the Kolmogorov Smirnov and Shapiro-Wilks tests. Independent sample t-test test was used to compare the average of independent groups. The p-values <0.05 were considered statistically significant. Spearman correlation analysis was performed to evaluate the correlation between NLR values and BCVA.

RESULTS

Among retinitis patients, 18 were males and 13 were females. Among control group, 10 were males and 15 were females. The mean age±SD of retinitis pigmentosa patients was 38.32± 13.21 years,the mean age±SD of control group was 34.36± 8.75 years. There were no significant age and gender differences between the patients and controls (p>0.05).

The mean BCVA±SD of the retinitis pigmentosa patients in right eyes were 1.12±1.17log MAR,in left eyes were 1.38±1.23 log MAR. The mean BCVA ±SD of the control group in right eyes were 0±0 log MAR, left eyes were 0±0 log MAR. BCVA was significantly lower in retinitis pigmentosa patients compared to the control group (p<0.001).

The mean neutrophil, lymphocyte, WBC count were higher in the retinitis pigmentosa patients compared to that of control group but there was no significant difference between the patients and the control groups in the count of neutrophil, lymphocyte, WBC. Laboratory findings showed Table 1. (p=0.068, p= 0.081, p=0.391).

The mean NLR±SD was 2.46±1.01(range 1.52-6.14) in retinitis pigmentosa patients. The mean NLR±SD was 1.87±0.58(range 0.96-3.35) in control group.The mean NLR±SD was significantly higher in the retinitis pigmentosa patients compared to that of the control group (p=0.003). There wasn't a significant correlation between NLR and BCVA in retinitis pigmentosa patient (r=339, p=0.12).

DISCUSSION

In this study, we investigated NLR in patients with RP and in control subjects. NLR is a simple, cost-effective and reliable indicator of inflammation. In recent years, many studies have confirmed that the neutrophil-to-lymphocyte ratio (NLR) is an indicator of systemic and ocular inflammation. Akil et al. showed that patients with Parkinson's disease have higher NLR compared to healthy controls.[9] Dirican et al. showed that there was a correlation between NLR

Table 1. *Laboratory findings*.

	RP mean±SD	Control mean±SD	
	n=31	n=25	P values
WBC (10^3/mm^3)	6.95±1.23	6.82±1,57	0.391*
Neutrophil (10^3/mm^3)	4.38±1.08	3.97±1.13	0.068*
Lymphocyte (10^3/mm^3)	2.20±0.59	1.90±0.45	0.081*
NLR	2.46±1.01	1.87±0.58	0.003*

RP: retinitis pigmentosa; WBC: white blood cell; SD: Standard deviation; p: Mann-Whitney U test

and ESR in patients with sarcoidosis.[10] Also, the NLR has been evaluated in many studies performed on ocular disease. Karaca et al.reported that the NLR is associated with progression of keratoconus.[11] Ozgonul et al. reported that the NLR and PLR(platelet to lymphocyte ratio) are associated with progression of PSG (pseudoexfoliative glaucoma).[12] Ilhan et al. reported that patients with age-related macular degeneration have higher NLR compared to healthy subjects.[13] Dursun et al. showed that NLR was found to be significantly higher in RVO patients compared to the controls.[14] Although the pathophysiology of RP has not been established yet, there have been some reports about intraocular inflammation in RP eyes, which might be related to its pathophysiology.Yoshida et al reported increased expression of proinflammatory cytokines and chemokines, activation of microglia, and photoreceptor apoptosis during retinal degeneration of rd10 mice with RP.[7] Mukarami et al reported that aqueous flare values are increased in patients with RP, and increased aqueous flare is correlated with worse central visual function.[15]

In addition to these studies; we also detected that NLR is significantly higher in RP patients compared to control group.However there was no significant correlation between NLR and BCVA.

As a result, elevated NLR level is a potential indicator of increased inflammatory activity in patients with RP. The main limitation of our study is the small sample size and no genetic analysis was performed in the subjects included in the study. Further prospective studies are needed to evaluate NLR as a predictor for the assessment of visual acuity and prognosis in RP.

CONCLUSION

NLR could be considered a quicker and a cheaper marker detected only routine CBC analysis as an inflammatory marker for retinitis pigmentosa patients. Further studies are needed in order to come up to more definite results.

Finally, there is no conflict of interest in connection with this submitted article, and the manuscript has been read and approved byall the authors.

Informed consent was obtained from all individual participants included in the study.

This manuscript has not been previously published or simultaneously submitted for publication elsewhere, and the manuscript has been read and approved by all the authors. The manuscript has no prior present at our part of the work in a conference/seminar.

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