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Editorial

Ophthalmology is a branch of science that constantly updates itself in parallel with microsurgery-imaging techniques and developments in technology and the pharmaceutical industry.

We aim to publish original articles of high scientific and clinical value in all fields of ophthalmology in the Archives of Ophthalmological Research journal. We will effort to become a journal that is indexed first in national indexes and then in international indexes.

The target audience of the journal is ophthalmologists, specialist students, and healthcare professionals interested in this field. We are pleased to present the first issue of our magazine, which will be published 4 times a year (January, April, July and October).

We would like to thank our valuable colleagues who were on the advisory board and served as referees to increase the scientific value of the articles, and the Medihealth Academy Publishing house for their support in this process.

Sincerely,

Editor-in-Chief
Prof. Uğur ACAR

Archives of
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Original Article

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The effect of strabismus surgery on psychosocial and functional quality of life

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ABSTRACT

Aims: To evaluate the effect of strabismus surgery on psychosocial and functional quality of life.

Methods: 50 adult strabismus patients who presented to our outpatient clinic with the complaint of strabismus in one eye were included in the study. Routine ophthalmologic examinations and strabismus controls were performed. With the diagnosis of monocular fixed eso/exotropia, unilateral horizontal muscle retraction and resection surgery were planned, and preoperative adult strabismus score (AS-20), Rosenberg self-esteem, body perception, and social appearance anxiety questionnaires were applied. A postoperative PD of 10 or less was considered success, and the questionnaires were repeated at the 2nd postoperative month.

Results: The mean age of the patients was 21.54±3.95 (16-32) years. Twenty-two of the patients were female, and 28 were male. Pre-operative and post-operative strabismus AS-20 score, Rosenberg self-esteem, body perception, and social appearance anxiety scales showed statistically significant differences ($p<0.05$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$).

Conclusion: Strabismus is an important disease that can cause difficulties in social life both in childhood and adulthood. The aim of strabismus surgery is to restore normal facial appearance as well as functional correction. Our study results showed that successful strabismus surgery can improve the psychosocial and functional quality of life.

Keywords: Strabismus, AS-20 score, Rosenberg self-esteem, body perception, social appearance anxiety

INTRODUCTION

Strabismus is a disease that occurs when the visual axes of the eyes are not parallel in any direction of gaze.[1] It may cause physiopathologic changes, including diplopia, confusion, and amblyopia, and may also lead to psychosocial developmental disorders.[2,3] Surgical treatment has an important place in the treatment of strabismus. The aim of surgery is to correct the shift in the visual axes and restore both binocular vision and a normal facial appearance. Individuals with strabismus have social problems, such as finding a job and a spouse, because of their appearance in society. There are studies showing that self-confidence decreases in patients with strabismus.[4]

The aim of our study was to evaluate the effect of strabismus surgery on psychosocial and functional quality of life.

METHODS

The study was carried out with the permission of the Fırat University Hospital Scientific Researches Evaluation and Ethics Committee (Date: 27.07.2023, Decision No: 2023/10-20). We obtained an informed consent form from all patients for procedure. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. 50 strabismus patients over 16 years of age who applied to our outpatient clinic with the complaint of inward or outward shift in one eye and underwent surgery were included in the study. Routine ophthalmologic examinations and strabismus controls were performed. Patients with deep amblyopia (VA:<0.2 snellen) and sensorial strabismus were excluded from the study. With the diagnosis of monocular fixed eso/exotropia, unilocular horizontal muscle retraction and resection surgery were planned, and preoperative adult strabismus score (AS-20), Rosenberg self-esteem, body perception, and social appearance anxiety questionnaires were applied. A postoperative 10 PD of deviataion or less was considered success, and the questionnaires were repeated at the 2nd postoperative month.

The Rosenberg Self-Esteem Scale was developed in 1963 and is a self-report scale consisting of 63 multiple-choice questions.[5] The scale consists of twelve subcategories. For the purpose of the study, the first "ten" items of the scale were used to measure self-esteem. Items 1, 2, 4, 6, and 7 question positive self-evaluation and are scored from 3 to 0. Items 3,

5, 8, 9, and 10 question negative self-evaluation, and those who score 0-1 in the "Self-Esteem" subtest are considered to have "high" self-esteem; those who score 2-4 are considered to have "moderate" self-esteem; and those who score 5-6 are considered to have "low" self-esteem.

The Social Appearance Anxiety Scale (SAAS) is a self-report scale developed to measure emotional, cognitive, and behavioral concerns about one's appearance and validated and reliably validated by Doğan et al.[6] in 2010. The validity and reliability studies of the scale were conducted on three different samples of university students. Exploratory factor analysis (EFA) was conducted with the data obtained from the first sample of 512 participants, and confirmatory factor analysis (CFA) was conducted with the data obtained from the second sample of 853 participants. With the data obtained from the third sample of 541 participants, convergent validity and test-retest reliability were calculated. The internal consistency coefficient of the scale was found to be .94, .95 and .94 for the three samples, respectively. The test-retest reliability coefficient obtained as a result of two applications one month apart was found to be .84. The scale contains 16 items and is related to how they feel about their appearance. The total score of the scale, which has scores ranging from 1 to 5 for each item and has response options such as "not at all appropriate," "not appropriate," "somewhat appropriate," "appropriate," and "completely appropriate," varies between 16 and 80, and a high score indicates a high level of appearance anxiety.[7]

The body perception scale (BPS) was developed by Secord and Jourand[8] in 1953, and its validity and reliability were tested in 1989. The reliability of the two halves of the scale was found to be 0.89. ($p<0.05$) This finding shows that the reliability of the scale is high. When Cronbach's alpha values were analyzed, it was found that the internal consistency coefficients of the two halves of the scale were 0.79 and 0.87, respectively. The internal consistency coefficient of the whole scale was 0.95.[9]

The scale contains 40 items, and each item is related to an organ or a part of the body (such as an arm, leg, or face) or a function (level of sexual activity). The total score of the scale ranges between 40 and 200, with scores ranging from 1 to 5 for each item and response options such as "I don't like it at all", "I don't like it", "I don't like it", "I am undecided", "I like it", "I like it" and "I like it very much", and a high total score indicates a high level of satisfaction. The cut-off score of the scale was 135, and those with a score below 135 were defined as the group with low body perception.[9]

The adult strabismus (AS-20) questionnaire, a strabismus-specific questionnaire developed by Hatt et al.[10] is used for the psychosocial and functional effects of strabismus in adults. The AS-20 scale consists of a total of 20 questions, including 10 questions about psychosocial status and 10 questions about functional status. Patients are asked to mark the appropriate option under each question in the form of a proposition. Scoring is done as never (100 points), rarely (75 points), sometimes (50 points), frequently (25 points), and always (0 points). The scores of the answers given to all questions are summed and divided by the number of questions answered, and a total score is obtained. The average of the first 10 questions related to psychosocial status is used to determine the psychosocial score, and the average of the second 10 questions related to functional status is used to determine the functional score. In addition, the total AS-20 score is obtained by considering all 20 questions.

Statistical Analysis

The study data were computerized and evaluated using "SPSS (Statistical Package for Social Sciences) for Windows 22.0 (SPSS Inc., Chicago, IL)". Descriptive statistics were presented as mean±standard deviation, median (25%-75%), frequency distribution, and percentage. Pearson's chi-square test was used to evaluate categorical variables. The conformity of the variables to a normal distribution was examined using visual (histogram and probability plots) and analytical methods (Kolmogorov-Smirnov test). Mann Whitney The U test was used as a statistical method for determining statistical significance between two independent groups for variables that were found not to conform to a normal distribution. The relationship between the variables was evaluated by the Spearman test. A statistical significance level of $p<0.05$ was accepted as significant.

RESULTS

The mean age of the patients was 21.54±3.95 (16-32) years. 22 of the patients were female (44%) and 28 were male (56%). Pre-operative and post-operative strabismus AS-20 score, Rosenberg self-esteem, body perception, and social appearance anxiety scales showed statistically significant differences ($p<0.05$, $p<0.001$, $p<0.001$, $p<0.001$, respectively) (**Table 1**, **2**, **3**, and **4**).

Table 1. Strabismus surgery and AS-20 scale

AS-20	Preoperative	Postoperative	P value
Psychosocial	48.71±16.02	65.40±15.10	P<0.012
Functional	45.03±13.88	59.40±14.81	P<0.033
Total score	46.40±13.45	62.56±15.21	P<0.028

AS-20: Adult strabismus-20

Table 2. Strabismus surgery and Rosenberg self-esteem scale

Self-esteem	Preoperative	Postoperative	P value
High	12 (40%)	27 (90%)	P<0.001
Mid-level	15 (50%)	3 (10%)	
Low	3 (10%)	0	

Table 3. Strabismus surgery and body perception scale

Body image	Preoperative	Postoperative	P value
High	7 (23.3%)	26 (86.6%)	P<0.001
Low	23 (76.6%)	4 (13.4%)	

Table 4. Strabismus surgery and Social Appearance Anxiety Scale (SAAS)

Social appearance anxiety	Preoperative	Postoperative	P value
Mean	2.2	1.41	P<0.001
Standard deviation	0.43	0.36	

DISCUSSION

Strabismus is observed in 4% of the general population.[11] Strabismus surgery is primarily performed to correct the disease and provide visual rehabilitation. In addition, surgical correction has social and psychological effects. Strabismus also causes effects on patients' educational lives, social relationships, self-care, and work environments.[12-14] Patients with strabismus may engage in behaviors such as wearing glasses and covering their shifting eyes with their hair due to their hesitation to make direct eye contact in their social relationships.[15]

Patient-reported outcome measures are standardized and validated instruments to measure patients' perceptions of their health conditions according to specific parameters or

at specific time points. Patients self-assess their health status on these scales and can compare their pre-treatment and post-treatment status. The psychosocial impact of strabismus was first demonstrated in a study conducted in 1993.[12] Burke et al.[13] evaluated 31 strabismus patients postoperatively and reported that self-confidence, attractiveness, self-esteem, and communication with the opposite sex were positively affected after surgery. In a study by Jaskson et al.[15] 46 cases were prospectively analyzed, and it was reported that the anxiety levels of the patients decreased and the social anxiety score decreased after surgery. In a study conducted by Menon et al.[16] it was found that 95% of 40 patients had improved self-confidence and personal relationships after surgery.[16]

Strabismus surgery has also important psychosocial consequences.[17,18] Previous studies have shown that strabismus surgery reduces social anxiety.[19] However, strabismus patients may have functional visual problems that may lead to diplopia, depth perception problems, ligament pain, dizziness, and loss of balance.[20] It has also been reported that strabismus patients have more vision-specific mental health problems compared to other ophthalmologic diseases such as glaucoma and cataract. Correction of strabismus should not only consist of restoring the eyes to their normal positions. Strabismus surgery also improves head position, stereopsis, visual field enlargement, correction of diplopia, and psychomotor development.[21-26]

The adult strabismus-20 (AS-20) questionnaire is designed to assess health-related quality of life and functional vision in strabismus patients. The AS-20 score assesses both the physiologic and functional consequences of strabismus. It has been shown to be superior to existing assessment tools with high retest reliability.[27-29] In their study, Hatt et al.[30] compared strabismus patients with the AS-20 score with the normal population and patients with other ophthalmologic pathologies other than strabismus in one eye. The AS-20 score was found to be 98 in the normal population, 88 in patients with ophthalmologic pathology other than strabismus in one eye, and 56 in strabismus patients. In our study, the preoperative AS-20 score was 46.40±13.45 in strabismus patients. Postoperative AS-20 score increased to 62.56±15.21. There was a statistically significant difference between preoperative and postoperative AS-20 scores (P<0.028).

In our study, when the preoperative and postoperative results of the patients were evaluated with self-esteem, social appearance anxiety, and body image scales, we found that the scores of the patients changed statistically significantly after surgery (p<0.001, p<0.001, p<0.001, p<0.001). The present findings suggest that the postoperative psychosocial status of the patients improved. The data we obtained in the AS-20 score and the data we obtained in the self-esteem, social appearance anxiety, and body image scales seem to be compatible with each other.

The AS-20 score may be low in some postoperative patients. However, no postoperative decrease in the AS-20 score was detected in our study. Postoperative diplopia, a predisposition to depression, and accompanying facial anomalies were detected in patients with low postoperative AS-20 scores. Therefore, a comprehensive postoperative evaluation of the patients is important. In the Jackson et al.[31] series, postoperative diplopia persisted in 11 of 18 patients with preoperative diplopia, and this result was reported to negatively affect the AS-20 score. Hatt et al.[32] also showed that 80 of 106 patients with a low AS-20 score postoperatively had diplopia. In our study, we did not detect postoperative diplopia; therefore, we did not find a postoperatively low AS-20 score. Beauchamp et al.[33] reported in a retrospective study of 101 cases that patients' postoperative uncorrected misalignments did not cause an increase in quality-of-life scores, including specific health, social communication, and daily activities. Dickman et al.[34] also discovered that the success of strabismus surgery had an impact on the postoperative score and that poor surgical outcomes were associated with poor quality of life scores. Hatt et al.[32] divided the postoperative results as successful (orthophoric or <10 PD, no diplopia), partially successful (10-20 PD, mild symptomatic), and unsuccessful (>20 PD), but they did not find significant results in the AS-20 score in the postoperative results. They explained this with the placebo effect of strabismus surgery. In our study, our postoperative results were <10 PD in patients without diplopia. Therefore, we did not detect any decrease in the AS-20 score. However, patients should be evaluated in detail before surgery, and postoperative conditions should be explained in detail. This is important for postoperative patient satisfaction.

In their study, Hatt et al.[35] found the AS-20 score to be 78 at the 6th postoperative week, continued to follow up with the patients, and reported that the score increased to 86 at the end of 1 year. This shows that the postoperative improvement in the AS-20 score is not limited to the early postoperative period but continues even in the long term in patients' social and work lives. In our study, the AS-20 scores at the 2nd postoperative month were significantly higher than the preoperative period but relatively lower than the literature. The reason for this is that the preoperative AS-20 score was lower than the literature, and the test was repeated at postoperative month 2, as mentioned before. We think that in longer-term follow-ups, the AS-20 score will increase as the patients' satisfaction in social life increases.

Limitations

Among the shortcomings of our study are that our relatively small number of cases. It is important to support the findings in studies with larger patient participation and including postoperative complicated cases.

CONCLUSION

Strabismus is an important disease that can cause difficulties in social life both in childhood and adulthood. The aim of strabismus surgery is to restore normal facial appearance as well as functional correction. Our study results showed that successful strabismus surgery can improve the psychosocial and functional quality of life.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Fırat University Hospital Scientific Researches Evaluation and Ethics Committee (Date: 27.07.2023, Decision No: 2023/10-20).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Original Article

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The effect of cataract surgery on quality of life and sleep in geriatric patient group

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ABSTRACT

Aims: Investigation of the effects of cataract surgery on quality of life and sleep in geriatric patient group.

Methods: Ninety four patients who were diagnosed with cataract and operated were included. Preoperative and postoperative best corrected visual acuity (BCVA) was measured with the Snellen chart. Cataract types were divided into 3 categories as nuclear, cortical and posterior subcapsular. The VFQ-25 (vision-related quality of life) questionnaire and the Pittsburgh Sleep Quality Questionnaire were administered to the patients before and after the surgery.

Results: One hundred thirty-eight eyes of 94 patients were operated. 45.7% of the patients had nuclear, 16% had cortical, 38.3% had posterior subcapsular cataracts. VFQ 25 questionnaire scores increased from 70.70±3.46 (42-89) to 85.65±7.09 (70-97) postoperatively (p<0.001). While the preoperative Pittsburgh sleep quality index (PSQI) score of the patients was 8.70±2.99 (2-17), it was 6.26±3.19 (1-17) postoperatively (p<0.001). There was a positive correlation between the increase in postoperative visual acuity (Δ) and the VFQ 25 questionnaire score increase (Δ) (r=0.891, p=0.000). ΔVFQ 25 and Δ PSQI values were higher in patients who underwent bilateral cataract surgery, but this difference was not statistically significant (p=0.199, p=0.808). ΔVFQ 25 after posterior subcapsular cataract surgery was greater than nuclear and cortical type. Δ PSQI values were similar in nuclear, posterior subcapsular and cortical cataracts.

Conclusion: Geriatric patients with posterior subcapsular cataracts had a higher postoperative vision-dependent quality of life than patients with other cataract types. Cataract surgery has positive effects on sleep quality of geriatric patients, regardless of cataract type and laterality (bilateral/unilateral).

Keywords: Life quality, sleep quality, cataract surgery, VFQ 25, Pittsburgh sleep quality index

INTRODUCTION

Cataract is the loss of transparency of the crystalline lens and is the most common reason of preventable blindness in the World.[1] Although the major risk factor for cataract development is age; diabetes, uveitis, trauma, ultraviolet exposure and various drug use (steroid, amiodarone, tamoxifen, etc.) can be counted among other risk factors. The increase in the elderly population in the world has also increased the number of cataract surgery performed.

One of the most important criteria of success in cataract surgery is the increase in visual acuity after surgery, but this is not enough to evaluate the effect of surgery on the quality of life of patients. In the Japanese patient population with a mean age of 81.8 (61-90) years, cataract surgery has been shown to improve cognitive functions.[2] Ishii et al.[3] reported that the cognitive functions of elderly patients improved and their depressive mental findings regressed with the increase in quality of life after cataract surgery. Knudtson et al.[4] also reported that the decrease in visual function, regardless of the cause, is associated with decreased quality of life.

A component of a healthy life is healthy sleep. Blue light (short wavelength light) is the strongest stimulus that keeps the circadian rhythm synchronized. It is thought that the concentration in the crystalline lens prevents light from reaching the eye and disrupts the circadian rhythm. Therefore, cataract surgery may have positive effects on the circadian rhythm.[5,6]

In this study, the effect of cataract surgery on quality of life in geriatric patients was evaluated with the Turkish translation of the VFQ 25 questionnaire, and the effect on sleep quality was evaluated with the Pittsburgh Sleep Quality Index (PSQI) questionnaire at least 1 month after surgery. The relationship of the changes with the laterality of the cataract, the type of the cataract and the increase in visual level were examined.

METHODS

The study was carried out in accordance with the Helsinki Declaration approval was obtained from the Bursa Yüksek İhtisas Training and Research Hospital Local Ethics Committee (Date: 27.07.2022, Decision No: 2011-KAEK-25 2022/07-03) and informed consent was obtained from participants.

Ninety four patients who were diagnosed with cataract and operated on between 1 August 2022 and 1 December 2022 were included in the study. The study is a prospective and cross-sectional survey study. Patients with diabetic retinopathy, glaucoma, macular degeneration, patients undergoing retinal surgery and refractive surgery, patients with dry eyes, those with serious systemic diseases that impair their quality of life and sleep (cancer, rheumatic disease, chronic kidney failure, hypertension, etc.), during surgery, patients who developed complications but did not improve their visual acuity, mixed type cataracts (corticonuclear, etc.), and those with different types of cataracts in both eyes (for example: nuclear cataract in one eye, posterior subcapsular in other, etc.) were excluded from the study. Phacoemulsification surgery was performed by a single surgeon. A single type of intraocular lens (hydrophilic-acrylic) was implanted to the patients.

A detailed eye examination was done before cataract the surgery. Preoperative and postoperative best corrected visual acuity (BCVA) was measured with the Snellen chart. Dilated fundus examination was done. Intraocular pressures were determined by applanation tonometry. Cataract types were divided into 3 categories as nuclear, cortical and posterior subcapsular by biomicroscopic examination. Demographic data and comorbidities of the patients were recorded.

The NEI-VFQ (National Eye Institute Visual Function Questionnaire 25 (VFQ-25-vision related quality of life) and the PSQI questionnaire were applied preoperatively and at least 1 month after the operation.

In the VFQ 25 questionnaire, Toprak et al.[7] translated into Turkish was used. The areas of this test are listed as follows; common health, common vision, eye pain, near vision, farsightedness, visual and mental health, visual social interaction, vision related role difficulties, visual dependency, peripheral vision, driving and color vision.

The PSQI questionnaire is a 19-title questionnaire that evaluates sleep quality and disturbance. 18 questions consist of 7 components: sleep quality, latency, duration, habitual sleep efficiency, sleep disturbance, use of sleeping pills, and daytime dysfunction. Each component is scored between 0-3 points and the total score is between 0-21. If the total score is above 5, this indicates worse sleep quality. It was adapted into Turkish by Agargun et al.[8]

Statistical Analysis

Continuous variables were presented as mean±standard deviation and median [min-max] values. Categorical variables were given as n (%). Data normality was confirmed using the Shapiro-Wilk test. Paired-sample t-test was used in dependent groups. The correlation between the variables was analyzed by Spearman analysis. Mann-Whitney-U was used to compare cataract laterality and changes and Kruskal Wallis was used to compare cataract types and changes in VFQ-25 and PSQI, with post-hoc paired Tamhane's T2 test. SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0.Armonk, NY: IBM Corp.) software was used for statistical analysis and a p value of <0.05 was considered statistically significant.

RESULTS

Fifty three % (n=50) of the patients were female. The mean age was 69.98±5.44 (67-86) years. 45.7% (n=43) of the patients had nuclear, 16% (n=15) had cortical, 38.3% (n=36) had posterior subcapsular cataracts. 138 eyes of 94 patients were operated. The mean BCVA before surgery was 0.14±0.08 (0.01-0.6) according to the Snellen chart, and 0.61±0.15 (0.4-1) postoperatively (Table 1).

Table 1. Demographic data and general characteristics of the participants

	n=94
Mean age (years)	69.98±5.44 (67-86)
Female/Male	50 (53%)/44 (47%)
Type of cataract (NC/CC/PSCC)	43/15/36
Laterality of cataract (unilateral/bilateral)	50/44
Mean preoperative BCVA	0.14±0.08 (0.01-0.6)
Mean postoperative BCVA	0.61±0.15 (0.4-1)

NC: Nuclear cataract, CC: Cortical cataract, PSCC: Posterior subcapsular cataract, BCVA: Best corrected visual acuity; mean±standard deviation (range)

Preoperative BCVA was 0.13±0.06 (0.01-0.3) in nuclear cataract eyes, 0.11±0.06 (0.01-0.3) in cortical cataract eyes, 0.16±1.11 (0.05-0.6) in posterior subcapsular cataract eyes (p=0.194). Postoperative BCVA was 0.60±0.13 (0.4-1.0) in nuclear cataract eyes, 0.63±0.16 (0.4-1.0) in cortical cataract eyes, 0.62±0.16 (0.5-1.0) in posterior subcapsular cataract eyes (p=0.751). Postoperative visual acuity improvement was 0.46±0.13 (0.2-0.8) in nuclear cataract eyes, 0.51±0.13 (0.3-0.8) in cortical cataract eyes, and 0.44±0.16 (0.1-0.8) in posterior subcapsular cataract eyes. There was no significant difference between the groups in terms of visual acuity improvement (p=0.324).

The mean age was 71.14±6.45 (65-86) in nuclear cataract patients, 67.87±3.66 (65-74) in cortical cataract patients, 69.47±4.42 (60-79) in posterior subcapsular cataract patients (p=0.103). There were 27 (62.7%) female in nuclear cataract group, 10 (66.6%) female in cortical cataract group, 13 (36.1%) female in posterior subcapsular cataract group (p=0.054).

When the VFQ 25 questionnaire scores before and after cataract surgery were compared, it was seen that the preoperative total score of 70.70±3.46 (42-89) increased to 85.65±7.09 (70-97) postoperatively (p<0.001). General health (p<0.001), general vision (p<0.001), distance vision (p<0.001), well-being-distress-dependence (p=0.041), driving (p<0.001), color vision (p<0.001) and peripheral vision (p<0.001) score increases were statistically significant; difficulties in activities (p=0.335), near vision (p=0.065) and role restriction (p=0.053) score increases were not statistically significant (Table 2).

While the preoperative PSQI score of the patients was 8.70±2.99 (2-17), it was 6.26±3.19 (1-17) postoperatively (p<0.001). In addition, the difference between sleep quality, sleep duration, sleep latency, habitual sleep efficiency and sleep disturbances scores was statistically significant (Table 3).

Table 2. Comparison of VFQ 25 questionnaire scores before and after surgery

Preoperative total score Postoperative total score	70.70±3.46 (42-89) 85.65±7.09 (70-97)	p<0.001
Preoperative general health Postoperative general health	62.85±16.06 (20-80) 73.70±12.07 (45-90)	p<0.001
Preoperative general vision Postoperative general vision	40.17±15.78 (30-55) 70.18±18.28 (55-88)	p<0.001
Preoperative activity difficulties Postoperative activity difficulties	74.34±11.99 (64-88) 89.33±17.15 (75-100)	p=0.335
Preoperative near vision Postoperative near vision	73.13±1.82 (70-76) 76.89±2.18 (72-80)	p=0.065
Preoperative distance vision Postoperative distance vision	65.25±12.68 (51-75) 90.51±17.57 (87-100)	p=0.001
Preoperative role restriction Postoperative role restriction	72.05±13.82 (60-87) 76.62±9.63 (65-86)	p=0.053
Preoperative well-being-distress-dependence Postoperative well-being-distress-addiction	89.85±10.46 (78-100) 91.98±15.17 (80-100)	p=0.041
Preoperative driving Postoperative driving	71.78±15.25 (50-79) 93.34±10.98 (83-100)	p<0.001
Preoperative color vision Postoperative color vision	82.67±17.58 (78-94) 96.12±5.87 (90-100)	p<0.001
Preoperative peripheral vision Postoperative peripheral vision	80.89±11.48 (70-93) 98.12±3.17 (95-100)	p<0.001

Paired simple t-test, p<0.05 significant

Table 3. Pittsburgh sleep quality index (PSQI) scores before and after surgery

Preoperative PSQI score Postoperative PSQI score	8.70±2.99 (2-17) 6.26±3.19 (1-17)	p<0.001
Preoperative sleep quality Postoperative sleep quality	1.83±0.54 (0-3) 1.20±0.59 (0-3)	p<0.001
Preoperative sleep latency Postoperative sleep latency	1.76±0.86 (0-6) 1.20±1.04 (0-4)	p<0.001
Preoperative sleep duration Postoperative sleep duration	1.68±0.76 (0-3) 1.06± 0.81 (0-3)	p<0.001
Preoperative habitual sleep efficiency Postoperative habitual sleep activity	1.72±0.55 (0-3) 1.21±0.50 (0-2)	p<0.001
Preoperative sleep disorder Postoperative sleep disorder	0.88±0.73 (0-2) 0.82±0.70 (0-2)	p=0.033
Preoperative use of sleeping pills Postoperative use of sleeping pills	0.07±0.25 (0-1) 0.09±0.28 (0-1)	p=0.323
Preoperative diary dysfunction Postoperative diary dysfunction	0.74±0.64 (0-2) 0.70±0.59 (0-2)	p=0.323

PSQI: Pittsburgh sleep quality index; paired simple t-test, p<0.05 significant

While there was a positive correlation between postoperative visual acuity improvement (Δ) and VFQ 25 questionnaire score increase (Δ) (r=0.891, p=0.000); There was no correlation between decrease in PSQI score (Δ) (r=0.019, p=0.853) (Table 4). No correlation was found between Δ VFQ 25 and Δ PSQI (r=-0.045, p=0.664).

Table 4. Correlation between increase in visual acuity (Δ) and postoperative VFQ 25 score (Δ) and decrease in Pittsburgh Sleep Quality Index (PSQI) score (Δ)

		Δ VFQ 25	Δ PSQI
Δ Visual Acuity	r p	0.891 0.000	0.019 0.853

Δ Visual Acuity: improvement in postoperative visual acuity, Δ VFQ 25: change in postoperative VFQ 25, Δ PSQI: change (decrease) in postoperative Pittsburgh Sleep Quality Index score, analyzed by the Spearman test.

Δ VFQ 25 and Δ PSQI values in patients who underwent bilateral cataract surgery were higher than in patients who underwent unilateral surgery, but this difference was not statistically significant (p=0.199 and p=0.808) (Table 5). Δ VFQ 25 after posterior subcapsular cataract surgery was greater than nuclear and cortical type. Δ PSQI values were similar in nuclear, posterior subcapsular, and cortical cataracts (Table 6).

Table 5. The relationship between Δ VFQ 25 and Δ PSQI in patients who underwent unilateral and bilateral cataract surgery

	Δ VFQ 25	p value	Δ PSQI	p value
Unilateral cataract Bilateral cataract	14±7.30 16.03±6.99	0.199	2.53±1.88 2.64±2.19	0.808

Δ VFQ 2: change in postoperative VFQ 25, Δ PSQI: change in postoperative Pittsburgh Sleep Quality Index score, Mann Whithey-U test performed.

Table 6. Relationship between cataract type and Δ VFQ 25 and Δ PSQI

	Δ VFQ 25	Δ PSQI
Nuclear cataract	12.90± 6.61	2.72±2.36
Posterior subcapsular cataract	19.19± 6.33*	2.53±1.89
Cortical cataract	13.33± 6.66	2.47± 1.80

*p<0.000 posterior subcapsular cataract compared with nuclear cataract; p=0.001 posterior subcapsular cataract compared with cortical cataract p=0.023 (post hoc Tamhane T2 test); Δ VFQ 25: change in postoperative VFQ 25, Δ PSQI: change in postoperative Pittsburgh Sleep Quality Index score

DISCUSSION

Cataract surgery is among the most frequently performed surgeries in the world with the increase in the elderly population. Since mobilization, postoperative care and wound healing of patients are difficult in advanced ages, cataract surgeries can be postponed by both patient relatives and physicians considering the patient's benefit. In this study, we investigated the effects of cataract surgery performed in the geriatric patient group on the quality of life and sleep of the patients.

According to the VFQ 25 survey results we applied, the patients' general health, general vision, distance vision, well-being-distress-addiction, driving, color vision and peripheral vision scores increased significantly after cataract surgery. Gray et al.[9] showed that consecutive cataract surgery on both eyes resulted in significant improvement in the visual and general health of the patients. Makabe et al.[10] reported that the vision-dependent quality of life score increased significantly in both patient groups who had unilateral and bilateral cataract surgery. While there are studies showing that cataract surgery increases the postural stability and mobility of elderly patients,[11] there are also studies reporting that it reduces the risk of falling.[12] Yotsukura et al.[13] determined that patients with cataract had lower subjective happiness scores and showed that cataract surgery for posterior subcapsular cataract and improved postoperative sleep quality were associated with postsurgical satisfaction. Also, Ishii et al.[3] reported depressive symptoms and cognitive status in patients and found a correlation between NEI-VFQ 25 scores and both Mini Mental State Examination and Beck depression test before and after surgery.

Photosensitive retinal ganglion cells are very important in the formation of the circadian rhythm. These cells are particularly sensitive to short wavelength light (blue light-480 nm).[14] The place where the light stimulates after the ganglion cells is the suprachiasmatic nucleus. The cataract creates a concentration in the pupillary gap, preventing the passage of light to the suprachiasmatic nucleus. Cataract surgery can remove this obstacle and make positive contributions to the circadian rhythm.[15] In the study of Ayaki et al.[16] reported that sleep quality after cataract surgery increased after the 2nd postoperative month and found that the increase in postoperative VFQ-25 was correlated with the decrease in PSQI. Shenshen et al.[17] reported that PSQI and ESS scores decreased significantly in the 1st month after cataract surgery, and melatonin release at 23.0 hours increased

significantly. Alexander et al.[18] reported that cataract surgery significantly improved sleep quality one month after surgery. However, in another longitudinal, population-based study, it was suggested that cataract extraction did not have a significant effect on sleep quality.[19] In this study, the scores of the patients in the post-operative PSQI general score, sleep quality, sleep duration, sleep latency, habitual sleep efficiency and sleep disorders were statistically significantly decreased. But there was no correlation between decrease in PSQI score and visual acuity improvement. Cataract surgery may have improved sleep quality in our patients by affecting the circadian rhythm.

Patients with posterior subcapsular cataracts had a higher postoperative VFQ 25 increase than patients with nuclear and cortical cataracts. Posterior subcapsular cataract occurs most frequently in the optic axis and impairs contrast sensitivity and close vision more than other types of cataracts and causes glare.[20] Non-dense posterior subcapsular cataracts can be very uncomfortable for patients. For this reason, the quality of life score due to vision may have increased more than other types of cataract, probably because these symptoms of patients disappeared after cataract surgery.

Kokune et al.[21] reported that surgical removal of the posterior subcapsular cataract affects sleep quality better than other types of cataracts. There is also a different study emphasizing that nuclear cataract is the type of cataract that most impairs sleep quality by preventing blue light transmission due to the urochrome in its structure.[22] However, the decrease in PSQI scores was similar in all three cataract types (nuclear-cortical-posteriorsubcapsular) in our study. Again in this study, there was a correlation between the increase in visual acuity and the increase in the quality of life score, but there was no correlation between the decrease in the sleep quality score.

Limitations

Limitations of the study; objective measurements were not made for contrast sensitivity, visual field and depth sense, which are the other components of vision other than visual acuity. Polysomnography is the gold standard and has objective results in investigating sleep quality. Polysomnography could not be performed on the patients. Data from larger patient groups are needed to generalize the results to the general population.

CONCLUSION

Cataract surgeries can be delayed because mobilization, postoperative care and wound healing of patients are difficult in advanced ages. However, increased visual acuity is not the only benefit of this surgery applied to the geriatric population. Applied cataract surgery may have positive effects on both the quality of life of geriatric patients and the quality of sleep regardless of cataract type and laterality (bilateral/unilateral).

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Bursa Yüksek İhtisas Training and Research Hospital Local Ethics Committee (Date: 27.07.2022, Decision No: 2011-KAEK-25 2022/07-03).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Current use of aflibercept 8 mg (Eylea HD) in retinal diseases

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ABSTRACT

Aflibercept 8 mg (Eylea HD) has emerged as a pivotal agent in the treatment of retinal diseases and has begun to showcase its efficacy and innovation in the field of ophthalmology. This article delves into the current use of aflibercept 8 mg, exploring its applications, mechanisms of action, and impact on the treatment landscape for various retinal conditions. This review provides an overview of recent clinical studies and highlights the key findings and advancements associated with the use of 8 mg aflibercept.

Keywords: Aflibercept 2 mg, aflibercept 8 mg, eylea HD, ophthalmology, retina, vascular endothelial growth factor

INTRODUCTION

The relentless pursuit of advances in medical science continues to bring groundbreaking innovations. Among these, aflibercept 8 mg (Eylea HD; Regeneron Inc., Tarrytown, NY) holds the hope of reshaping the landscape of retinal disease management. Aflibercept 8 mg is one of the results of the search for effective and targeted interventions in retinal diseases, representing a paradigm shift.[1]

This article explores the multifaceted facets of aflibercept 8 mg, investigating its current applications, mechanisms of action, and dynamic impact on the treatment landscape. Through an in-depth examination of recent clinical studies and emerging trends, we aimed to unravel the potential challenges associated with the utilization of aflibercept 8 mg in diverse retinal diseases.

MECHANISM OF AFLIBERCEPT 8 MG

Aflibercept 2 mg (Eylea; Regeneron Inc., Tarrytown, NY, USA) is commonly used to treat certain eye conditions, particularly neovascular age-related macular degeneration (nAMD), diabetic macular edema (DME), diabetic retinopathy (DR), macular edema following retinal vein occlusion (RVO), myopic choroidal neovascularization (mCNV), and retinopathy of prematurity (ROP). The drug works by targeting vascular endothelial growth factor (VEGF), a protein that plays a crucial role in the formation of abnormal blood vessels in the eye.[2]

Aflibercept acts as a VEGF-A and placental growth factor (PlGF) inhibitor. By binding to these proteins, aflibercept inhibits their ability to stimulate the growth of abnormal blood vessels in the retina.2 Aflibercept is a fusion protein of VEGFR-1 (second portion) and VEGFR-2 (third portion), and the Fc portion of human immunoglobulin G (Ig-G). It contains entirely human amino acid sequences and binds to VEGF-A and PlGF. The second Ig fragment of VEGFR-1 was chosen because it showed high binding properties with VEGF. PlGF binds to VEGFR-1, facilitating VEGF-A activity primarily through VEGFR-2. In addition to aflibercept directly binding and inhibiting VEGF-A, it also has the effect of binding to PlGF and reducing the effect of VEGF-A.[3]

While aflibercept 2 mg is effective in the treatment of nAMD, DME, DR, RVO, mCNV and ROP, it has not completely solved the problem of frequent admission to outpatient clinics due to its short duration of action, and the search for a longer-acting drug has emerged.[3]

The "HD" in aflibercept 8 mg (Eylea HD) indicates a higher dose. The maximum feasible dose, constrained by solubility considerations, was 8 mg, administered in 70 µL. This represents a slightly larger volume than that of the typical anti-VEGF injection (50 µL). Aflibercept 8 mg has been approved for the treatment of various eye conditions, including nAMD, DME, and DR. Its mechanism of action revolves around targeting specific proteins called VEGF and PlGF.[4]

By inhibiting VEGF activity, aflibercept 8 mg can reduce fluid buildup in the macula, stabilizing and potentially improving vision, preventing further vision loss, and increasing the interval between treatment injections. Additional important points about the mechanism of aflibercept 8 mg are as follows. a)Broader targeting: Compared to some other anti-VEGF medications, aflibercept binds to a wider range of VEGF molecules (VEGF-A, VEGF-

B, and PlGF), offering potentially more comprehensive inhibition. b) Longer-lasting effect: Aflibercept 8 mg allows for longer-lasting VEGF inhibition and potentially less frequent injections compared to other medications.[4]

CLINICAL STUDIES WITH AFLIBERCEPT 8 MG IN AGE-RELATED MACULAR DEGENERATION

Aflibercept (8 mg) was approved by the Food and Drug Administration (FDA) and the European Medicines Agency (EMA). The FDA approved an aflibercept injection 8 mg for the treatment of nAMD, DME, and DR in August 2023. The EMA has recommended the approval of 8 mg aflibercept for the treatment of nAMD, DME, and DR in November 2023. In addition, the European Commission granted marketing authorization for 8 mg of aflibercept in January 2024. Here, we summarize key clinical studies investigating the use of 8 mg aflibercept in AMD.

1. CANDELA Trial

This was a randomized, single-blinded, multicenter study involving 106 eyes with nAMD. Patients were randomly assigned to receive 3 monthly doses of aflibercept (8 mg, 70 µL) or aflibercept (2 mg, 50 µL), followed by doses at weeks 20 and 32. The main outcome measures were the percentage of eyes lacking fluid (defined as the absence of intraretinal and subretinal fluid) in the central subfield on spectral-domain optical coherence tomography (SD-OCT) at week 16 and safety, evaluated by the occurrence of ocular treatment-emergent adverse events (TEAEs) and serious TEAEs up to weeks 4 and 44. Additional exploratory endpoints included the percentage of eyes without fluid in the central subfield at week 44 and in the macula at weeks 16 and 44; the percentage of participants experiencing vision loss or gain at week 44; and changes from baseline in central retinal thickness, total lesion size, choroidal neovascularization size, and best-corrected visual acuity (BCVA) score at week 44. In the study results, it was observed that at week 16, 50.9% of eyes in the 8-mg group showed no fluid, whereas only 34.0% in the 2-mg group exhibited the same. By week 44, the percentage of eyes without fluid was 39.6% in the 8-mg group compared to 28.3% in the 2-mg group, accompanied by a mean change in BCVA of +7.9 vs. +5.1 letters, respectively. Notably, no discernible safety differences were noted between the two groups. It is important to note that CANDELA was primarily a safety study, and the results suggest that 8 mg of aflibercept is well tolerated with extended dosing intervals. However, further research is necessary to definitively compare its efficacy against the standard aflibercept regimen.[5]

2. PULSAR Trial

This Phase 3, double-blinded, randomized study compared aflibercept 8 mg and aflibercept 2 mg in 1009 patients with nAMD. Participants received either: a) aflibercept 2 mg every 8 weeks after three initial monthly injections b) Aflibercept 8 mg every 12 weeks after three initial aflibercept injections c) Aflibercept 8 mg every 16 weeks after the three initial monthly injections. The primary endpoint analysis of PULSAR at 48 weeks demonstrated the non-inferiority of the 8-mg dose compared to the 2-mg dose. The results at 60 and 96 weeks indicated that 91.5% of all patients in the PULSAR completed the 60-week assessment, with an average discontinuation rate of 7.9% before 60 weeks. In terms of BCVA, all three treatment arms exhibited similar improvements and maintenance at 48, 60, and 96 weeks. The gains, measured in Early Treatment Diabetic Retinopathy Study (ETDRS) letters, were 7, 6.1, and 5.9 in the aflibercept 2 mg every 8 weeks, aflibercept 8 mg every 12 weeks, and aflibercept 8 mg every 16 weeks arms at 48 weeks; 7.2, 6.4, and 6.3 letters at 60 weeks; and 6.6, 5.6, and 5.5 letters at 96 weeks. The reduction in the central retinal subfield thickness (CST), measured using SD-OCT, followed a similar pattern. The reductions were 136 µm in the aflibercept 2 mg every 8 weeks arm and 147 µm in the aflibercept 8 mg every 12 weeks and aflibercept 8 mg every 16 weeks arm at 48 weeks; 155, 154, and 151 µm arm at 60 weeks; and 147, 152, and 149 µm arm at 96 weeks. Aflibercept 8 mg demonstrated a similar safety profile to aflibercept 2 mg.[6]

CLINICAL STUDIES WITH AFLIBERCEPT 8 MG IN DIABETIC MACULAR EDEMA AND DIABETIC RETINOPATHY

Several clinical studies have investigated its efficacy and safety under these conditions, providing valuable insights for healthcare professionals and patients. A summary of the key trials is as follows:

PHOTON Trial

This Phase 3, double-masked, randomized study compared 8 mg aflibercept with 2 mg aflibercept in patients with DME. Participants received: a) aflibercept 2 mg every 8 weeks after five initial monthly injections b) Aflibercept 8 mg every 12 weeks after three initial monthly injections c) Aflibercept 8 mg every 16 weeks after the three initial monthly injections. The PHOTON trial successfully achieved its primary endpoint, demonstrating that patients receiving aflibercept 8 mg attained vision gains equivalent to aflibercept 2 mg, with approximately 90% maintaining 12- and 16-week dosing regimens during the first year. The mean number of injections administered were 9.5 for the 12-week aflibercept 8 mg group, 7.8 for the 16-week aflibercept 8 mg group, and 13.8 for the aflibercept 2 mg groups. A significant majority of aflibercept 8 mg patients sustained extended dosing intervals.[7]

The key findings from the study are as follows:

- 89% of patients maintained ≥12-week dosing intervals, compared to 93% in one year.
- 84% maintained ≥16-week dosing intervals, compared to 89% maintaining a 16-week dosing interval through one year, among those randomized to a 16-week dosing interval at baseline.
- At week 96, 44% met the criteria for ≥20-week dosing intervals, including 17% and 27% eligible for 20- and 24-week dosing intervals, respectively.
- The safety profile of aflibercept 8 mg remained similar to that of aflibercept 2 mg over two years and aligned with the known safety profile of aflibercept 2 mg from prior clinical trials for DME.
- TEAEs, including cataracts, vitreous floaters, and conjunctival hemorrhage, occurred in 5% of patients in any treatment group.
- No cases of retinal vasculitis, occlusive retinitis, or endophthalmitis have been reported. The rate of intraocular inflammation was 1.2% in both the aflibercept 2 mg and aflibercept 8 mg groups.

- Arterial thromboembolic TEAEs, as defined by the Anti-platelet Trialists' Collaboration, occurred in 7.2% of patients treated with aflibercept 2 mg and 6.7% of patients treated with aflibercept 8 mg.[7]

CLINICAL STUDIES WITH AFLIBERCEPT 8 MG IN MACULAR EDEMA WITH BRANCH AND CENTRAL RETINAL VASCULAR OCCLUSION

Aflibercept 8 mg has not been approved for the treatment of macular edema (ME) with branch or central retinal vein occlusion (BRVO and CRVO). Although it shows promise and is being investigated in this area, further research is needed before it becomes a standard treatment option. Although Aflibercept 8 mg has not received official approval for BRVO/CRVO, ongoing clinical studies are assessing its efficacy and safety. A promising study includes the following.

QUASAR Phase 3 Trial

While primarily focused on ME secondary to CRVO, the QUASAR study also included a small subgroup of patients with ME secondary to BRVO. This trial evaluates the efficacy and safety of 8 mg aflibercept compared to standard aflibercept 2 mg, with BCVA change at year 1 as the primary endpoint. Early data may emerge by late 2024, offering further insights into the potential of 8 mg aflibercept in both BRVO and CRVO-related ME.

The QUASAR trial is a global, randomized, double-masked, active-controlled phase III study designed to assess the efficacy and safety of aflibercept 8 mg when used with extended dosing regimens in cases of macular edema secondary to retinal vein occlusion. The primary endpoint of the study was to record the change in BCVA, measured using the ETDRS letter score, from the date of randomization through 36 weeks of treatment. In this trial, BCVA changes were compared between two groups of patients: those who received aflibercept 8 mg with extended treatment intervals following initial monthly doses and those who received aflibercept 2 mg every 4 weeks. The treatment intervals may be further adjusted based on the response to treatment. Patients will be treated for up to week 60, followed by a monitoring period extending to week 64. The trial aims to enroll approximately 800 patients.[8]

CONCLUSION

Aflibercept 8 mg may represent a significant advancement in the treatment of retinal diseases. Its high-dose formulation may offer the potential for extended treatment intervals, potentially reducing patient burden and promoting treatment adherence. While currently approved for nAMD, DME, DR, ongoing research explores its efficacy in other conditions like RVO, mCNV and ROP.[9]

Randomized clinical trials have demonstrated the effectiveness of 8 mg aflibercept in improving vision and stabilizing disease progression across the approved indications. Its safety profile seems comparable to that of the standard aflibercept 2 mg version, although further long-term data are needed. Although not devoid of potential challenges, including higher cost and the need for further research in certain areas, aflibercept 8 mg shows promise in the management of retinal diseases.

Continued clinical investigations will refine our understanding of the role of 8 mg aflibercept in treating additional retinal conditions. Optimizing treatment regimens, potentially reducing the injection frequency further, and ensuring wider accessibility remain key priorities.

ETHICAL DECLARATIONS

Reviewer Evaluation Process

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Case Report

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Reverse straatsma syndrome and lamellar cataract: a case report and review of the literature

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ABSTRACT

Myelinated retinal nerve fiber (MRNF) is a developmental anomaly that is often detected during routine ophthalmological examination, but can be an ocular finding in a wide variety of diseases. An important example of this group is the Straatsma Syndrome. Straatsma Syndrome is an entity that presents with the triad of myopia, amblyopia, and MRNF. When this triad is accompanied by hyperopia instead of myopia, it is referred to as the Reverse Straatsma Syndrome. Here, we present a case of Reverse Straatsma Syndrome accompanied by lamellar congenital cataracts.

Keywords: Amblyopia, hypermetropia, myelinated retinal nerve fiber, reverse straatsma syndrome

INTRODUCTION

Myelinated retinal nerve fiber (MRNF) is a developmental anomaly with blurry borders located in the retinal nerve fiber layer and often has a white/gray-white appearance. It was first described by Virchow in 1856.[1,2] Although it is a finding frequently encountered during routine ophthalmological examination, it can also appear as a symptom of a wide variety of diseases (Gorlin syndrome, neurofibromatosis, etc.).[2] Straatsma Syndrome is the name given to the myopia and amblyopia triad accompanying MRNF. There is also a variation called Reverse Straatsma Syndrome, which may present with a hyperopia triad instead of myopia.[3] This article aims to present and discuss a case of unilateral Reverse Straatsma Syndrome accompanied by lamellar cataract.

CASE

A 26-year-old male patient was admitted to our retina unit with a complaint of decreased vision in his left eye, which had been present since childhood. There was no additional systemic disease in the patient's medical history. The patient was diagnosed with amblyopia and mild cataracts in his previous examinations. On visual acuity examination, the best-corrected visual acuity (BCVA) of the right eye was 20/20, and the left eye was counting fingers at 5 meters (with +14 D spherical correction). Intraocular pressure was normotonic bilaterally. The anterior segment examination revealed a normal appearance in the right eye and a lamellar cataract in the left eye. The visual axis was open (Figure 1). Dilated fundus examination revealed that the right eye was normal. In the left eye, there was an MRNF image with blurry borders, feathery, and white, shading the retinal vessels that started from the disc and spread 360°. No foveal involvement was observed (Figure 2). Based on these findings, the patient was diagnosed with Reverse Straatsma Syndrome. The patient's follow-up continued in our retinal unit.

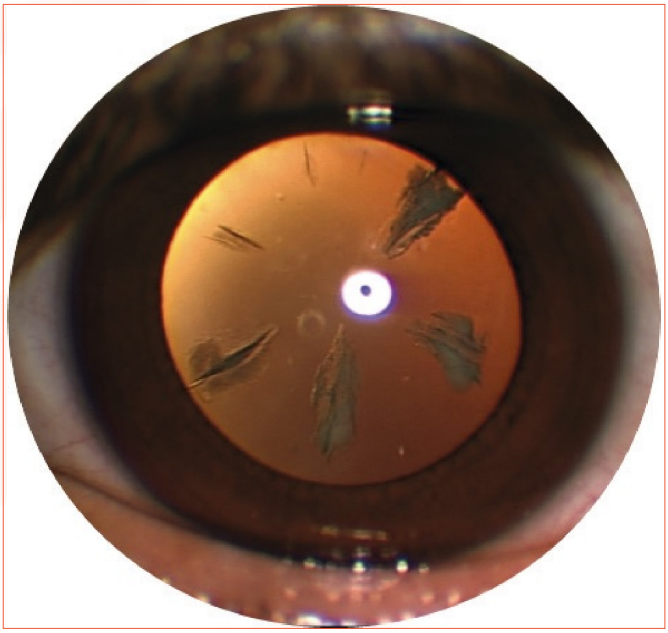

Figure 1. Lamellar cataract appearance observed in the anterior segment photograph of the patient's left eye.

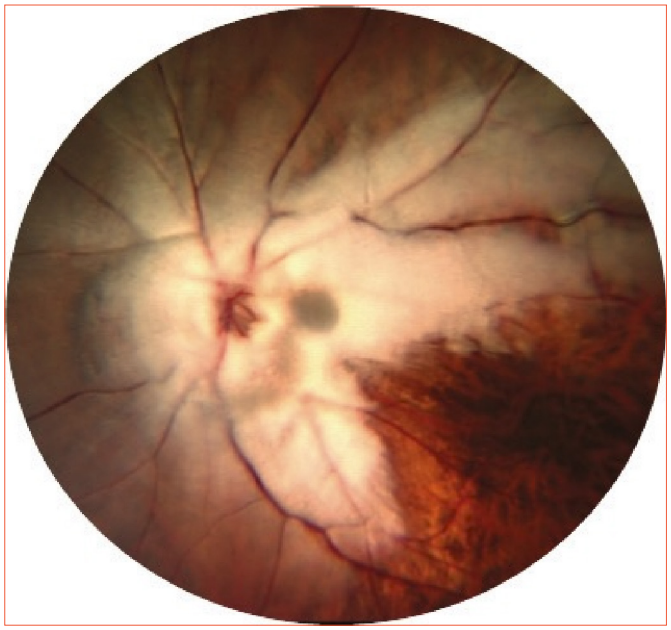

Figure 2. In the colored fundus photograph of the patient's left eye, an image of a feathery myelinated nerve with faint borders spreading 360° from the disc is observed.

DISCUSSION

In an autopsy study by Straatsma et al.[1] who examined 7936 eyes of 3968 patients, they observed that 39 of the patients (0.98%) had MRNF, and three of these patients (7.7%) presented bilaterally. In total, MRNF was detected in 42 eyes (0.54%), and there was no statistically significant difference in terms of sex between patients. The pathogenesis of MRNF is still not fully understood. According to one opinion, the abnormal distribution of oligodendrocytes is held responsible for the development of this condition.[1,4] Another thought is that the blurring of the retinal image during ocular development causes visual stimuli to decrease, resulting in axial elongation of the eye and the development of myopia. During this axial elongation, the development of the lamina cribrosa is disrupted, and it is thought that it cannot function as a sufficiently strong barrier to prevent the migration of oligodendrocytes to the retina.[2] This idea contradicts cases with Reverse Straatsma syndrome, such as in our case, and supports the idea of abnormal distribution of oligodendrocytes as the pathogenesis.[1,4,5]

It has been stated that the presence of wide MRNF may be associated with high myopia and poor visual acuity. In fact, in a study evaluating 12 patients with MRNF, poor visual acuity after treatment was associated with the myelination area around the fovea, and retinal involvement of nine clock dials and more had the worst visual outcome.[6] In the study conducted by Hittner et al.[7] it was determined that the appearance of the macula is an important factor in predicting visual acuity in the presence of MRNF and anisometropia. They also found that eyes that responded poorly to amblyopia treatment had abnormal macula. In the study conducted by Sevik et al.[8] the presence of profound anisometropia, strabismus myelination, and macular involvement were expressed as poor prognostic features and were thought to be associated with poor visual outcomes after treatment. In the case of bilateral Reverse Straatsma Syndrome presented by Alenezi et al.[5] myelinated nerve fibers were located peripapillary in both eyes and the macula was observed naturally. The authors attributed the low visual acuity in this case to ametropia and stated that this situation was more important than the presence of MRNF. We think that the low visual acuity in our case was mostly due to the presence of anisometropia. Although myelinated nerve fibers are located in the macula, the relative preservation of the fovea was an important factor that led us to think that the reason for low visual acuity was anisometropia. A wide variety of ocular findings accompanying the triad of myopia, amblyopia, and MRNF has been described in the literature in cases of Straatsma Syndrome. Examples of these ocular findings include nystagmus, heterochromia iridis, strabismus, and optic nerve hypoplasia.[2,8,9] In addition, a recently published case report stated that this picture may be accompanied by congenital cataracts and that this association may have occurred with common etiopathogenic mechanisms.[10] To our knowledge, this is the first report of a case of congenital cataract accompanying Reverse Straatsma Syndrome. This association between Reverse Straatsma Syndrome and congenital cataract may be related to a common developmental etiopathogenesis, or it may be related to the simultaneous occurrence of two different entities.

CONCLUSION

As a result, Reverse Straatsma Syndrome is a rare entity that can present with varying degrees of visual acuity decrease, depending on the MRNF width and anisometropia depth. These cases may occur simultaneously with congenital cataracts and Reverse Straatsma Syndrome.

ETHICAL DECLARATIONS

Informed Consent

All patients signed and free and informed consent form.

Reviewer Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors declare no potential conflicts of interest.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Case Report

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Miller-Fisher syndrome after COVID-19 pneumonia: case report

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ABSTRACT

Miller-Fisher syndrome is a rare variant of Guillain-Barré syndrome and is a disease with ataxia, areflexia, and ophthalmoplegia. Recent viral diseases are generally blamed for their etiologies. Our aim is to present a case of Miller-Fisher syndrome that developed after COVID-19 pneumonia.

Keywords: Miller-Fisher syndrome, COVID-19, ophthalmoplegia

INTRODUCTION

Miller Fisher syndrome (MFS) is a rare variant of Guillain-Barré syndrome and was first described by Fisher in 1956 and is an acquired neurologic disease characterized by ataxia, areflexia, and ophthalmoplegia.[1,2] Viral diseases such as recent gastroenteritis or acute respiratory tract infections are blamed for their etiology.[3] Although the diagnosis is mainly based on clinical findings, albumino-cytologic dissociation or a non-proportional increase in cerebrospinal fluid (CSF) protein in the absence of inflammation findings support clinical findings. In addition, electromyography (EMG), magnetic resonance imaging (MRI), and nerve biopsy help to confirm the diagnosis.[4,5] MFS has a good prognosis with treatment. In cases of MFS occurring after a viral infection, findings may resolve in 8-10 weeks.[6] Our aim is to present a case of Miller-Fisher syndrome (MFS) that developed after COVID-19 pneumonia.

CASE

A 63-year-old male patient presented to our outpatient clinic with a sudden onset of diplopia. The best corrected visual acuity (BCVA) in the right eye was 0.8 (with -0.50 axis 25) (Snellen), and the BCVA in the left eye was 0.7 (with -0.50 axis 100) (Snellen). Bilateral pupillary light reflex were positive. Anterior segment examination revealed bilateral posterior subcapsular cataracts. Ocular tension was 16 mmHg bilaterally. While the fundus examination of the right eye was normal, retinal collaterals secondary to a previous vein occlusion were present in the left eye. Eye movements were minimally restricted in bilateral outward gaze, and diplopia was present. There was lagophthalmos, which was more prominent on the right (Figure 1). In the anamnesis of the patient, it was learned that he was treated for COVID-19 pneumonia 3 weeks ago. Neurology was consulted. Dysphagia, hyponasal speech, and areflexia in deep tendon reflex (DTR) were observed. COVID-19 test was positive in hospital records. No acute neurological findings were found in brain MRI. Lumbar puncture was performed and CSF protein was detected as 75. A diagnosis of Miller-Fisher syndrome was made, hospitalization was given, and five cycles of plasmapheresis treatment were administered. After the treatment, the patient's DTRs returned to normal, and dysphagia and hyponasal speech improved. The patient's

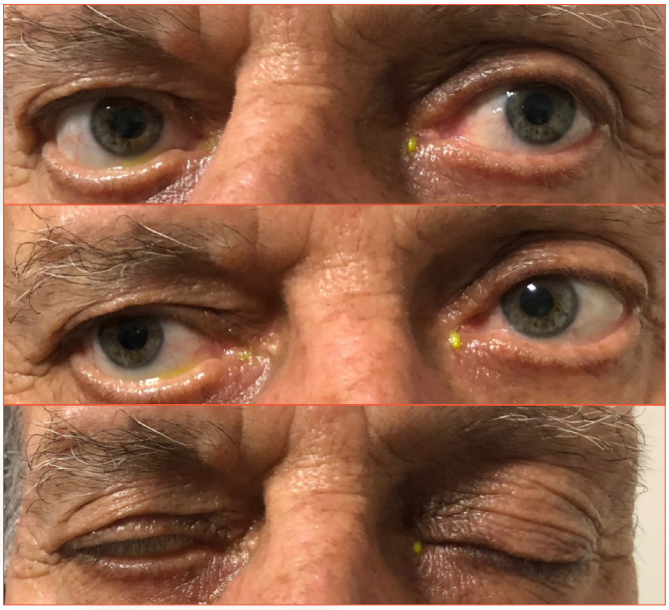

Figure 1. Bilateral gaze limitation and right lagophthalmos

bilateral outward gaze limitation improved in the early period (Figure 2). On examination 6 weeks after discharge, it was observed that eye movements and diplopia improved, but facial paralysis findings still persisted.

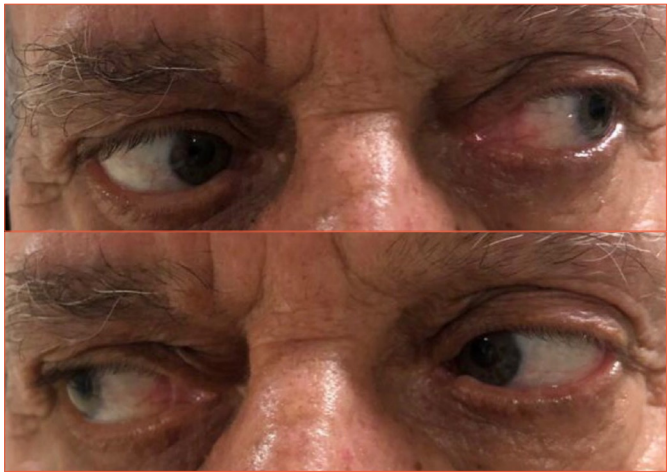

Figure 2. Improvement in gaze at week 6

DISCUSSION

Although the etiology of Miller-Fisher syndrome is not known exactly, the majority of patients have a history of upper respiratory tract infection or gastroenteritis 2 or 3 weeks ago. It is accepted that autoimmunity against glycopeptides in Schwan cells and axons with antigenic stimulation induced by viruses or bacteria is responsible for the pathogenesis of the disease. There are cases reported after mumps, varicella, measles, EBV, influenza, and *C. jejuni* infection.[3] COVID-19 Disease is a disease that causes an epidemic all over the world due to coronavirus infection, starts with upper respiratory tract infection findings, and affects many systems. It is generally known that coronaviruses exhibit neurotropic properties and therefore may cause neurologic conditions.[7] In the literature, a few cases of MFS with COVID-19 disease have been reported.[8,9] Our patient had COVID-19 disease three weeks ago. He was evaluated in our clinic with a complaint of diplopia that developed afterwards. The patient had normal pupillary light reflex and no afferent pupillary defects. The patient had bilateral outward gaze restriction in eye movements with diplopia. He also had lagophthalmos in the right eye. After a detailed evaluation with neurology, the patient was diagnosed with Miller-Fisher syndrome with dysphagia, hyponasal speech, and areflexia in DTRs and was treated with plasmapheresis. MFS generally has a good prognosis, and the symptoms regress in 8-10 weeks with treatment. Immunoglobulin (IVIG) and/or plasmapheresis treatment is given in the treatment of MFS. Ulaş et al.[10] treated a patient with MFS with intravenous immunoglobulin. Likewise, Fernández-Domínguez et al.[8] treated the patient who developed MFS after COVID-19 with intravenous immune globulin. In our patient, 5 cycles of plasmapheresis treatment were administered, and regression was observed in the majority of the findings afterwards. No complications related to plasmapheresis were observed in the early period. At 6 weeks, eye movements had improved. Diplopia was absent. But lagophthalmos was still persisting. Since the patient did not continue follow-up, we do not have longitudinal findings.

CONCLUSION

In our extensive literature review, we did not find a case of MFS developing after COVID-19 disease due to coronavirus in our country. It should be kept in mind that the COVID-19 infection can also cause MFS.

ETHICAL DECLARATIONS

Informed Consent

All patients signed and free and informed consent form.

Reviewer Evaluation Process

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Conflict of Interest Statement

The authors declare no potential conflicts of interest.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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