

Vision-related quality of life in patients after ocular penetrating injuries

Qualidade de vida relacionada à visão em pacientes após ferimentos oculares penetrantes

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ABSTRACT

Purpose: To measure and investigate visual functioning and health-related quality of life (QOL) in patients after ocular penetrating injuries (OPI).

Methods: Fifty-four adult patients with OPI and 26 healthy control subjects were enrolled in the study. The National Eye Institute Visual Functioning Questionnaire (NEI VFQ-25) and the 36-Item Short Form Health Survey (SF 36) were administered. Sociodemographic and clinical data also were collected. The primary outcome measures were comparisons and multivariate analysis among groups for the NEI VFQ-25 and SF 36 subscale scores.

Results: All NEI VFQ-25 scores, except general health, were significantly lower in the OPI group than those in the control group. All SF 36 scores were significantly lower in the OPI group than in the control group. The NEI VFQ-25 subscale item scores showed no significant differences with respect to age, educational level, or visual acuity in the injured eye. The SF 36 subscale item scores revealed no significant differences according to gender or educational level.

Conclusions: Patients with OPI have increased psychological symptoms and lower levels of QOL than healthy control subjects have. Deteriorations in QOL should be kept in mind when managing patients with OPI.

Keywords: Eye injuries, penetrating; Quality of life; Questionnaires

RESUMO

Objetivo: Medir e investigar a função visual e a qualidade de vida relacionada à saúde (QOL) em pacientes após ferimentos ocular penetrantes (OPI).

Método: Cinquenta e quatro pacientes adultos com OPI e 26 indivíduos saudáveis (controles) foram incluídos no estudo. O questionário de função visual do National Eye Institute (NEI VFQ-25) e a avaliação curta de 36 itens (Short Form Health Survey - SF 36) foram administrados. Dados sociais, demográficos e clínicos também foram coletados. As comparações e análise multivariada entre os grupos para as subescalas do NEI VFQ-25 e do SF 36 foram consideradas como resultados primários.

Resultados: Todos os índices do NEI VFQ-25, exceto saúde geral, foram significativamente menores no grupo OPI do que aqueles no grupo controle. Todos os índices do SF 36 foram significativamente menores no grupo OPI do que no grupo controle. Os índices das subescalas do NEI VFQ-25 não apresentaram diferenças significativas em relação à idade, escolaridade, ou acuidade visual no olho ferido. Os índices das subescalas do SF 36 não revelaram diferenças significativas de acordo com o nível de escolaridade ou sexo.

Conclusões: Pacientes com OPI apresentaram sintomas psicológicos aumentados e níveis mais baixos de qualidade de vida que os indivíduos saudáveis. Deteriorações na qualidade de vida devem ser consideradas ao gerenciar pacientes com OPI.

Descritores: Ferimentos oculares penetrantes; Qualidade de vida; Questionários

INTRODUCTION

Ocular trauma, one of the most common causes of visual loss and impairment, can contribute considerably to a decreased quality of life (QOL). Among the types of ocular trauma, ocular penetrating injuries (OPI) are the leading cause of unilateral vision loss. In the United States, the incidence of OPI was reported to be 3.81 per 100,000 persons. Many of these injuries are preventable⁽¹⁾.

OPI lead to varying degrees of vision loss, depending on the complications, location, and size of the injury. The majority of people who suffer OPI are young individuals⁽²⁾. Therefore, loss of vision and visual prognosis is more important for a longer life expectancy. Ocular pathology in young patients does not only affect visual acuity (VA) but also affects occupational and social functions⁽³⁾. In the practice of ophthalmology, visual function tests, such as visual field analysis, do not provide information about the psychological consequences of decreased vision and QOL^(4,5). To the best of our knowledge, no published study has examined the impact of OPI on QOL.

In our study, we used the National Eye Institute 25-Item Visual Function Questionnaire (NEI VFQ-25) and the 36-Item Short Form Health Survey (SF 36) to better understand the impact of OPI on QOL. In previous studies, decreases in visual acuity affected NEI VFQ-25

and SF 36 scores⁽⁶⁾. NEI VFQ-25 was developed to assess a patient's perception of QOL and visual function, and has been used to assess the quality of vision in retinal vein occlusion⁽⁷⁾, diabetic retinopathy⁽⁸⁾, glaucoma⁽⁹⁾, and after ocular surgery^(4,5). SF 36 evaluates the effect of overall health on QOL⁽¹⁰⁾.

Here, we report vision-related QOL (VR-QOL) and health-related QOL (HR-QOL) in a population of patients with OPI using NEI VFQ-25 and SF 36 questionnaires. To the best of our knowledge, this is the first study to measure VR-QOL and HR-QOL in patients with OPI.

METHODS

Institutional review board approval was obtained through the university ethics committee, and the study was conducted in compliance with the Declaration of Helsinki. Written informed consent was obtained from the participants. This prospective study enrolled 54 patients with OPI who were scheduled for vision care at the Department of Ophthalmology. Patients were enrolled in the study if they were aged ≥18 years, at least 6 months into the clinical course after the injury (to achieve relatively stable results of visual outcomes), and had no other systemic or ocular disease that could affect vision.

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A complete ophthalmological examination, including visual acuity, intraocular pressure measurements, and biomicroscopic evaluation of the anterior segment and fundus was performed for all participants. To correlate visual acuity with subscale responses, the Snellen visual acuity of the affected eye was converted to a logMar equivalent.

Data, including age, gender, and best-corrected visual acuity, of all participants were recorded. All participants completed the SF 36 and VFQ-25 questionnaires to evaluate their HR-QOL and VR-QOL, respectively. The control group consisted of age, gender, and education level matched patients who were admitted to our clinic for examination with no pathology that affected visual function.

MEASUREMENTS OF PSYCHOLOGICAL STATE AND QOL SF 36

SF 36 is the most widely used self-report scale that measures HR-QOL. It successfully measures the HR-QOL of patients with medical or psychological disorders, as well as healthy subjects. The scale can assess the positive and negative aspects of health, and it is considered sensitive to small changes in disability status. It was first developed by Ware and Sherbourne in 1992⁽¹⁰⁾. It provides scores ranging between 0 and 100 that represent QOL in eight dimensions of health (physical functioning, physical role difficulty, bodily pain, general health perception, vitality, social functioning, emotional role difficulty, and mental health). Higher scores reflect a better QOL. The validity and reliability of the Turkish version of the SF 36 was demonstrated by Kocycigit et al. in 1999⁽¹¹⁾.

NEI VFQ-25

NEI VFQ-25 was used to assess VR-QOL in our participants. It is a validated and reliable instrument that assesses the dimensions of self-reported and vision-targeted health status, which are most important for persons with chronic eye disease.

The NEI VFQ-25 has been translated into Turkish, and its reliability and validity have been established. This version, which was used in previous studies, was administered to all subjects⁽¹²⁾. VR-QOL, which measures visual functioning level in 12 dimensions, was assessed using NEI VFQ-25. It generates subscales for the following 12 dimensions of VR-QOL: general health, general vision, ocular pain, near activities, distance activities, vision-specific social functioning, vision-specific mental health, vision-specific role difficulties, vision-specific dependency, driving, color vision, and peripheral vision. Finally, an overall composite score is calculated that serves as an average of all subscales, excluding the general health subscale. Scores range from 0 to 100, with higher scores indicating a better QOL⁽¹³⁾.

STATISTICAL ANALYSIS

Statistical analysis were performed with Statistical Program for Social Science version 15 (SPSS, Chicago, Illinois, USA). Independent sample *t*-tests, one-way analysis of variance (ANOVA), correlational analysis, and linear regression were used in the statistical analysis. The data are presented as the mean \pm standard deviation.

RESULTS

The study participants included 54 patients who had undergone surgery because of OPI occurring at least 6 months before the study began. In addition, we examined 26 healthy control subjects. There were no differences between groups in terms of age, gender, or education level. The demographic characteristics of the patients and the control group are given in table 1.

SF 36 and NEI VFQ-25 scores are presented in table 2. All NEI VFQ-25 scores, except general health, were significantly lower in the OPI group than in the control group. The study participants answered all questions, except driving-related questions. Driving-related questions were answered by only 6 (11%) patients in the OPI group and 13 (50%) subjects in the control group. All SF 36 scores were

significantly lower in the OPI group than in the control group. All patients with OPI had sustained an injury in only one eye. The mean follow-up for patients after surgery was 8.4 ± 3.1 (6-19) months. Male and female patients in the OPI group showed no difference in NEI VFQ-25 and SF 36 scores.

A correlation analysis of the NEI VFQ-25 and SF 36 scores, age, visual acuity, and gender are presented in table 3. A linear regression analysis was performed with the variables that showed a significant correlation. In the regression analysis, the NEI VFQ-25 composite

Table 1. Demographic characteristics of the ocular penetrating injury patients and control subjects

	OPI n (%)	Control n (%)	<i>p</i>
Sex			
Female	12 (22.2)	9 (34.6)	0.238
Male	42 (77.8)	17 (65.4)	
Duration	8.4 \pm 3.1 (6-19) month		
Educational level			
Elementary school	2 (3.7)	2 (7.7)	0.564
Junior high school	9 (16.7)	4 (15.4)	
High school	40 (74.1)	20 (76.9)	
logMar VA	0.76 \pm 0.89	0.0 \pm 0.0	<i>p</i> <0.001
Type of the injury			
Corneal	32 (59.3)		0.158
Corneoscleral	9 (16.7)		
Scleral	13 (24.1)		
Age	30.5 \pm 8.2	33.0 \pm 4.6	

Table 2. Test result of NEI VFQ-25 and SF 36 tests

Subscale	OPI group	Control group	<i>p</i> value
NEI VFQ-25	(mean \pm SD)	(mean \pm SD)	
General health	80.1 \pm 25.4	91.7 \pm 11.7	0.092
General vision	50.4 \pm 18.1	95.4 \pm 8.6	<0.001
Ocular pain	58.7 \pm 13.6	98.1 \pm 6.8	<0.001
Near activity	54.8 \pm 12.3	99.0 \pm 3.4	<0.001
Distance activity	56.5 \pm 15.5	97.1 \pm 7.0	<0.001
Social function	63.0 \pm 19.9	100.0 \pm 0	<0.001
Mental health	53.3 \pm 11.4	100.0 \pm 0	<0.001
Role difficulties	52.5 \pm 12.9	100.0 \pm 0	<0.001
Dependency	66.8 \pm 17.6	100.0 \pm 0	<0.001
Driving (6/13)	56.9 \pm 3.4	93.6 \pm 7.0	<0.001
Color vision	70.8 \pm 17.3	100.0 \pm 0	<0.001
Peripheral vision	58.2 \pm 21.3	100.0 \pm 0	<0.001
Composite score	58.1 \pm 21.3	99.8 \pm 0.7	<0.001
SF 36	(mean \pm SD)	(mean \pm SD)	
Physical functioning	98.2407 \pm 3.2443	100.0000 \pm 0	<0.001
Social functioning	73.3796 \pm 21.3139	94.7115 \pm 7.2224	<0.001
Physical problems	53.3704 \pm 44.1478	97.1154 \pm 8.1453	<0.001
Pain	66.3889 \pm 21.9454	87.8462 \pm 4.6276	<0.001
Emotional problems	55.5557 \pm 46.2426	100.0000 \pm 0	<0.001
Mental health	65.5556 \pm 13.1043	85.2308 \pm 5.7432	<0.001
Energy and vitality	59.0741 \pm 12.4033	83.2692 \pm 5.6466	<0.001
General perception of health	48.5556 \pm 17.8997	89.1923 \pm 8.3331	<0.001

score was affected by the final visual acuity, social function, and emotional status sub-scores of the SF 36 (Table 4). In addition, the final visual acuity was affected by the NEI VFQ-25 composite score and initial visual acuity (Table 5). Gender and education level were not related to the NEI VFQ-25 composite score or the final visual acuity.

DISCUSSION

To our knowledge, the present study is the first to compare the psychological status and QOL of patients with OPI to those of healthy control subjects. The results of the current study demonstrate that OPI patients have increased psychological symptoms and lower levels of QOL than healthy control subjects.

OPI, which are usually observed in young individuals, is the leading cause of unilateral vision loss; men are more often affected than women⁽²⁾. In our study, the male/female ratio was consistent with those reported in the literature. However, there was no significant effect of gender on QOL.

Many studies have found the size and location of the wound are important indicators for the visual prognosis^(2,14). Corneoscleral OPI has a poorer prognosis in terms of visual acuity^(14,15). In our study, there was no relationship between OPI location and NEI VFQ-25 or SF 36

scores. Schareder et al.⁽¹⁶⁾ evaluated patients with open eye injuries and examined how the trauma affected their work life, QOL, and emotional well-being. They reported that QOL was negatively affected in patients with an ocular injury. However, in that study they did not report information about their questionnaire; therefore, it is uncertain if a standard questionnaire was used. In our study, the effect of OPI on QOL was analyzed with standard questionnaires and compared with the QOL of healthy controls.

Patients with vision loss due to ocular trauma not only suffer vision impairments, they also experience deterioration in social functioning that can decrease labor in the workplace. Many patients with vision loss cannot continue their employment and need to change their occupation or obtain disability status⁽¹³⁾. Therefore, QOL of those individuals is seriously affected. In our study, the overall health of patients in the OPI group was affected and the SF 36 scores, which determine the HR-QOL, were significantly lower in the group than in the control group. Rofail et al. compared QOL in patients who underwent primary or secondary enucleation because of OPI⁽¹⁷⁾. They reported that QOL was more affected in patients who underwent primary enucleation than in those who underwent secondary enucleation. They suggested that, if possible, the eyeball should not be removed during the primary repair. However, in that study, QOL was not compared between patients with OPI and control subjects.

The NEI VFQ-25 composite scores observed in the present study were lower than those reported for patients with PDR, SMD, or Behçet's disease in other studies^(8,18,19). Our patients were younger than those in other studies; therefore, young individuals may experience a greater impact on their QOL with permanent vision loss due to trauma than with other diseases. The NEI VFQ-25 scores for a younger patient group with ocular chemical burns reported in a study⁽¹³⁾ were similar to those observed in our study. In that study, patients with bilateral injuries had severely decreased composite scores in NEI VFQ-25⁽¹⁶⁾. No patient had bilateral trauma in our study.

Using NEI VFQ-25, Onal et al. reported that general health was more influenced than general vision in patients with Behçet's disease⁽¹⁸⁾. In contrast, the present study found that OPI affected vision more than general health. We suggest that this difference is based on the systemic involvement of the Behçet's disease, whereas OPI is usually localized to one eye.

Previous reports indicated that QOL is affected by ocular diseases^(18,20,21). In this study, SF 36, a widely known instrument, was used to assess HR-QOL. Using the same questionnaire, QOL changes were reported with central serous chorioretinopathy, age-related macular degeneration, and Behçet's disease^(8,18,20). In our patients' first VA exam, the composite score of NEI VFQ-25 and the mental health score of SF 36 affected the final VA. Level of education, age, and gender had no effect on the final VA. In contrast to Onal et al., who reported that education level and age affected the visual prognosis in Behçet's disease⁽¹⁵⁾; another study found that education, general vision, near vision, and social functioning scores decreased. They suggested that a high level of education increases the patient's awareness and knowledge of their disease.

In this study, we showed that OPI patients showed poorer vision and health-related QOL than healthy subjects. In addition, general vision was more affected than general health in patients with OPI. Furthermore, deterioration in QOL should be considered in patients with OPI. Deterioration in QOL may lead to psychiatric disorders. Patients should be evaluated in this aspect and psychiatric help should be given when necessary.

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Table 3. The correlations between visual acuity, age duration of OPI with the NEI VFQ-25* scores

Test scores	Visual acuity	Age	r	p
	r	p		
General health	-0.507	<0.001	-0.271	0.279
General vision	-0.582	<0.001	-0.311	0.122
Ocular pain	-0.224	0.103	-0.224	0.271
Near activity	-0.386	0.004	-0.200	0.327
Distance activity	-0.496	<0.001	-0.353	0.077
Social function	-0.468	<0.001	-0.433	0.027
Mental health	-0.443	0.001	-0.296	0.141
Role difficulties	-0.437	0.001	-0.240	0.238
Dependency	-0.477	<0.001	-0.171	0.403
Color vision	-0.402	0.430	-0.097	0.637
Peripheral vision	-0.178	0.197	-0.111	0.591
Composite score	-0.574	<0.001	-0.393	0.047

*NEI VFQ-25= National Eye Institute Visual Functioning Questionnaire.

Table 4. Regression analysis of the factors that were found to be effective on composite score of NEI VFQ-25* in a univariate analysis

	Beta	t	p value
Social function	0.850	11.64	0.000
Final visual acuity	0.555	6.09	0.000
Emotional score of SF 36	0.273	2.28	0.027

Dependent variable= composite score of VFQ 25 $r^2=0.81$.

*NEI VFQ-25= The National Eye Institute Visual Functioning Questionnaire.

Table 5. Regression analysis of the factors that were found to be effective on final visual acuity in a univariate analysis

	Beta	t	p value
Composite score of NEI VFQ-25*	-0.810	-9.942	0.000
First visual acuity	0.231	2.404	0.020

Dependent variable is final visual acuity. $r^2=0.66$.

*NEI VFQ-25= The National Eye Institute Visual Functioning Questionnaire.

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