

Psychological symptoms in anophthalmic patients wearing ocular prosthesis and related factors

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Abstract

Anophthalmic patients not only cause obvious functional deficits and facial deformities, but lead to poor psychological outcomes, although prosthesis wearing can offer improvements in psychological well-being to some extent. The study aimed to comprehensively evaluate the psychological symptoms and analyze related factors in anophthalmic patients wearing ocular prosthesis.

Total of 150 anophthalmic patients and 120 control subjects were included in this cross-sectional study. Baseline characteristics survey and the symptom checklist-90 scale were completed by all participants to assess the psychological symptoms and analyze their related factors by multivariate analysis.

The anophthalmic patients exhibited the increased levels of somatization, depression, anxiety, and hostility compared with control subjects. The most prominent symptom was hostility with the median score of 1.20. Female patients presented with higher somatization, depression, anxiety, and hostility. Marital status single was positively associated with depression, anxiety, and hostility symptoms. Lower education and cause of enucleation were related to higher levels of hostility.

Anophthalmic patients wearing ocular prosthesis presented with more prominent hostility and somatization besides its higher depression and anxiety symptoms. The findings suggest that for female single anophthalmic patients with low education, especially caused by trauma, timely psychological assessment and intervention should be provided to avoid undesirable consequences.

Abbreviation: SCL-90 = symptom checklist-90.

Keywords: hostility, ocular prosthesis, psychological assessment, somatization

1. Introduction

Eye enucleation is the surgical removal of the eyeball, involving the separation of all connections between the globe and orbit.^[1] It is considered to be the primary cure for patients with ocular end-stage diseases, including severe ocular trauma, intraocular malignancy, painful blind eye and phthisis bulbi etc. The causes

for eye enucleations and its associated demographic and clinical factors have been widely investigated. Trauma or tumors is reported to be the most prevalent cause of enucleation, while the most prevalent indication of eye enucleation in children was retinoblastoma.^[2–6] Orbital implant insertion and prosthesis wear after enucleation are usually performed to maintain cosmetic symmetry with the fellow eye, with high levels of patient satisfaction.^[7]

It is well known that eyes play an important role in both physiological functions and maintenance of appearance. Eye enucleation may not only cause obvious functional deficits and facial deformities, but also lead to poor psychological outcomes, especially in cases of losing eyes due to unexpected trauma or malignancy.^[1] Previous studies had emphasized the importance of psychological outcomes after eye enucleation. It was reported that some anophthalmic patients experienced visual hallucinations after enucleation, often in the immediate postoperative period.^[8] Quality of life was found to be obviously affected in anophthalmic patients, which was related to high levels of anxiety and depression.^[9] Wang et al also reported that the levels of anxiety, depression, and quality of life were significantly poorer than population norms, but orbital implant insertion and prosthesis wearing offered significant improvements in psychological and physical functioning for patients with anophthalmia.^[10] Nevertheless, the anophthalmic patients wearing ocular prosthesis with clinical anxiety and depression still remained a high level so far, and more anxiety and depression were associated with poorer vision-related quality of life and greater levels of appearance concerns.^[11] Interestingly, other investigators found that levels of anxiety and depression in patients wearing ocular prosthesis were within the normal range.^[12] The different findings may be partly explained by

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differences in sociodemographic characteristics and different cultural backgrounds. However, it was worth mentioning that only 2 psychological symptoms including anxiety and depression were most frequently concerned and widely investigated in previous studies. Other less evaluated psychological symptoms may be even more important for assessing the psychological status in anophthalmic patients wearing ocular prosthesis, which could be another possible reason for disparities in symptom reported among different studies. It is therefore necessary to further comprehensively evaluate the psychological symptomatology of these patients.

The symptom checklist-90 (SCL-90) questionnaire reflects a broad range of concomitant clinical psychological symptoms and widely used in various fields of medicine.^[13–15] The aim of this study was to comprehensively evaluate psychological status by SCL-90 and analyze their related factors in 150 anophthalmic patients and 120 healthy control subjects. These evaluations would contribute a better understanding of psychological health status in patients wearing ocular prosthesis and provide a potential therapeutic opportunity through psychological interventions.

2. Materials and methods

2.1. Subjects

This study was designed as a cross-sectional study, approved by the Ethics Board of Beijing Tongren Hospital and performed in accordance with the Declaration of Helsinki. All patients provided written informed consent prior to enrollment in the study. Patients aged over 20 years and were living with an ocular prosthesis after eye enucleation at Beijing Tongren Hospital, Capital Medical University from January to December 2019 were recruited in the study. Total of 165 participants were enrolled into this study 1 month after wearing ocular prosthesis and completed questionnaires were received from 150 (90.9%) participants. The healthy control group was chosen from Medical Examination Center in Beijing Tongren Hospital matched for age, sex, and education. Before study participation, the procedures, potential benefits, and risks of the study were explained to all participants to reduce the potential sources of bias as much as possible.

2.2. Survey instruments

Each participant completed 2 questionnaires and could ask for help from professional staff if they had problems in understanding any of the questions. In the first questionnaire, participants answered general questions about gender, age, marital status, education, residence, enucleated eye, and cause of enucleation. The second questionnaire was the symptom checklist-90 (SCL-90),^[16] a 90-item self-report clinical rating scale that evaluated a broad range of psychological problems in the last week. It consists of nine primary symptom scales: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The items are scored on a five-point Likert scale ranging from 0 (none) to 4 (extreme) in this questionnaire. Lower scores indicate a better mental health status.^[17]

2.3. Statistical analysis

Statistical analysis was performed using SPSS 25 (IBM, Chicago, IL, USA). Quantitative variables were non-normally distributed assessed using Kolmogorov-Smirnow test, and reported as

median values with quartiles. The sample size was calculated by a power analysis using G*Power 3.1.9.2, which suggested a sample size of 90 with $\alpha=0.05$ and statistical power $(1-\beta)=0.9$.^[18] Continuous variables were tested by the Mann-Whitney test, while categorical variables were analyzed using the χ^2 test. General linear mixed models were used to estimate the effect of independent variables (gender, age, marital status, education, residence, enucleated eye, and cause of enucleation) on main psychological symptoms. Two-sided P value <0.05 was considered statistically significant for all analyses. Bonferroni correction was applied for multiple comparisons dividing the significance level by the number of comparisons.

3. Result

3.1. Baseline characteristics

A total of 150 patients and 120 controls were included in this study. Table 1 showed the baseline characteristics of 2 groups. The mean age of the patients was 34.0 years (30, 39). The causes for enucleation were as follows: 71 (47.3%) trauma; 36 (24.0%) tumor; 27 (18.0%) phthisis bulbi; 16 (10.7%) infection. Trauma was the main cause of enucleation. There were no significant differences between anophthalmic patients and control subjects in age, gender, marital status, and level of education.

3.2. Psychological symptoms

Comparison of 9 scales of SCL-90 between anophthalmic patients and control subjects was shown in Table 2. The score for somatization, depression, anxiety, and hostility was significantly higher in anophthalmic patients than in control subjects.

Table 1

Baseline characteristics in anophthalmic patients and control subjects.

	Patient (N=150) n (%)	Control (N=120) n (%)	Z	P
Gender			0.54	.46
Male	72 (48.0)	63 (52.5)		
Female	78 (52.0)	57 (47.5)		
Age			3.70	.16
20–39	53 (35.3)	43 (35.8)		
40–59	45 (30.0)	47 (39.2)		
>60	52 (34.7)	30 (25.0)		
Marital status			0.62	.43
Married	129 (86.0)	99 (82.5)		
Single	21 (14.0)	21 (17.5)		
Level of education			0.99	.61
High school	58 (38.7)	40 (33.3)		
University	77 (51.3)	65 (54.2)		
Graduate	15 (10.0)	15 (12.5)		
Enucleated eye				
Right	65 (43.3)			
Left	85 (56.7)			
Residence				
Urban area	83 (55.3)			
Rural area	67 (44.7)			
Cause				
Trauma	71 (47.3)			
Tumor	36 (24.0)			
Phthisis bulbi	27 (18.0)			
Infection	16 (10.7)			

Table 2
SCL-90 subscale scores in anophthalmic patients and control subjects.

	Patient (N=150) Median (quartiles)	Control (N=120) Median (quartiles)	Z	P
Somatization	0.5 (0.4, 0.8)	0.33 (0.10, 0.50)	-6.56	.00
Obsession-compulsion	1.0 (0.6, 1.3)	0.80 (0.40, 1.28)	-1.56	.12
Interpersonal sensitivity	0.67 (0.4, 1.0)	0.67 (0.22, 1.00)	-1.47	.14
Depression	0.9 (0.69, 1.4)	0.62 (0.23, 0.90)	-6.62	.00
Anxiety	0.9 (0.5, 1.2)	0.5 (0.2, 0.8)	-6.87	.00
Hostility	1.2 (0.7, 1.7)	0.5 (0.17, 0.83)	-8.01	.00
Phobic anxiety	0.3 (0.14, 0.70)	0.29 (0.14, 0.43)	-1.59	.11
Paranoid ideation	0.50 (0.33, 0.83)	0.5 (0.3, 0.83)	-1.72	.09
Psychoticism	0.50 (0.30, 0.80)	0.4 (0.2, 0.8)	-1.51	.13

The most prominent symptom in anophthalmic patients was hostility with the median score of 1.20 (0.7, 1.7). There were no statistical differences between the 2 groups in terms of interpersonal sensitivity, phobic anxiety, paranoid ideation, and psychoticism.

3.3. Correlations between main psychological symptoms and baseline characteristics in anophthalmic patients

We next investigated the correlations between main psychological symptoms and baseline characteristics in anophthalmic patients by multivariate analysis using the linear mixed model (Table 3). The somatization scores were significantly associated with gender but not others in the multivariate analysis model with adjustment for age, marital status, level of education, enucleated

eye, residence, and cause of enucleation. There was a statistically significant correlation between depression and gender, age, marital status adjusted for education, enucleated eye, residence and causes. The depression scores were significantly higher in female and single patients than in their male and married counterparts, respectively ($P < .05$). The patients between 40 and 59 years of age had significantly lower depression level than the other 2 groups ($P < .05/2$). There was a statistically significant correlation between anxiety and gender, age, marital status and cause of enucleation adjusted for education, enucleated eye, and residence. Marital status single and female gender were positively associated with anxiety symptom ($P < .05$). The patients between 40 and 59 years of age had significantly lower anxiety level than the other 2 groups ($P < .05/2$). The cause of trauma was significantly associated with higher anxiety ($P < .05/3$). For hostility, we found that the hostility scores were significantly associated with gender, marital status, level of education, and cause of enucleation with adjustment for age, enucleated eye and residence. Marital status single and female gender were positively associated with hostility ($P < .05$). There was a statistically significant correlation between hostility and low level of education ($P < .05/2$), as well as between hostility and the cause of enucleation, especially for trauma and tumor ($P < .05/3$).

4. Discussion

In this study, we assessed the psychological symptoms in anophthalmic patients wearing ocular prosthesis and then analyzed the related factors. The anophthalmic patients exhibited the increased levels of somatization, depression, anxiety, and hostility as compared with the control subjects. Of these, the most

Table 3
Multivariate analysis of the correlation between main psychological symptoms and baseline characteristics in anophthalmic patients.

	Somatization			Depression			Anxiety			Hostility		
	β	<i>t</i>	<i>P</i>	β	<i>t</i>	<i>P</i>	β	<i>t</i>	<i>P</i>	β	<i>t</i>	<i>P</i>
Gender*												
Female	0.14	2.06	.04	0.16	1.82	.07	0.19	2.42	.02	0.36	5.11	.00
Male												
Age**												
20–39	0.05	0.60	.55	-0.11	-1.11	.27	-0.08	-0.95	.35	0.08	1.08	.28
40–59	-0.06	-0.73	.46	-0.28	-2.73	.007	-0.22	-2.32	.02	-0.01	-0.09	.93
>60												
Marital status*												
Single	0.15	1.58	.12	0.29	2.23	.03	0.28	2.40	.018	0.76	7.59	.00
Married												
Level of education**												
High school	-0.09	-0.52	.61	0.29	1.26	.21	-0.06	-0.31	.76	0.51	2.87	.005
University	0.09	0.80	.43	0.14	1.03	.31	0.16	1.22	.22	0.18	1.58	.12
Graduate												
Enucleated eye												
Right	-0.01	-0.20	.84	-0.01	-0.11	.92	-0.01	-0.17	.86	-0.04	-0.59	.55
Left												
Residence												
Urban area	-0.18	-1.33	.19	0.00	0.14	.98	-0.14	-0.92	.36	0.00	0.36	.97
Rural area												
Cause***												
Trauma	0.24	2.08	.04	0.28	1.83	.07	0.38	2.86	.005	0.42	3.57	.000
Tumor	0.18	1.56	.12	0.25	1.64	.10	0.30	2.22	.02	0.32	2.71	.008
Phthisis bulbi	0.04	0.34	.74	0.12	0.78	.44	0.20	1.43	.16	0.22	1.73	.09
Infection												

The Bonferroni-corrected significance level was used for multiple comparisons, with the significance level was set at * $P < .05$, ** $P < .025$, or *** $P < .017$.

prominent symptom was hostility with the median score of 1.20. The severity of psychological symptoms in patients was associated with gender, age, marital status, level of education, and cause of enucleation. Supporting interventions should be provided to relieve the main psychological symptoms in order to improve their mental health.

The eyes are known to be crucial for inter-personal communication and physical appearance. The effect of eye enucleation on patients' psychology should be great and far-reaching during their lifetime. Ocular prosthesis wearing could reduce the anxious and depressive symptoms and improve the appearance-related social avoidance.^[19] However, the vision-related quality of life and appearance concerns were still associated with anxiety and depression after eye enucleation, and anxiety and depression were mostly prevalent in anophthalmic patients wearing ocular prosthesis.^[11,20] The psychological assessment in previous studies was mainly based on questionnaires evaluating anxiety and depression symptoms. Other psychological symptoms should also be considered. In this study, we found that a higher global level of psychological distress in the patients than in the control subjects. It was of interest to note, however, that the difference was not generalized across all subscales of the questionnaire used, but was restricted to specific domains: anxiety, depression, somatization, and hostility. While elevation of the first 2 subscales (depression and anxiety) was also comparable with the findings of previous studies,^[9–11] the last 2 subscales (hostility and somatization) were more prominent in patients compared to controls, and addressed more to the psychological distress experienced.

Eye enucleation and prosthesis wearing was a more complex condition. The patients should not only make decisions on the treatment, but suffer heavy physical and mental burdens. In this study, symptoms of depression, anxiety, hostility, and somatization were statistically associated with anophthalmic state, which probably reflected the objectively and subjectively challenging monocular-vision environment. Among these symptoms, hostility was most prominent in anophthalmic patients according to the SCL-90 scale. Hostility was understandable psychological reactions to frustrating stresses, stemming from the unpredictable concerns about the eyeball and vision lost, physical appearance, financial and emotional burdens, and work-related changes, particularly for anophthalmic patients caused by the unexpected trauma. Somatization score in SCL-90 scale was notably higher in patients, suggesting that the physical symptoms might be the consequence of abnormal psychological status, such as headache, anorexia or sleeplessness. This might be due to the fact that the Chinese prefer to express certain psychological problems through somatic symptoms.^[21] Therefore, hostility and somatization scores may be of clinical importance in assessing mental health in patients wearing ocular prosthesis.

In this study, the correlations between main psychological symptoms and baseline characteristics in anophthalmic patients were assessed by the linear mixed model. We found that women with ocular prostheses differed significantly from men in all of its positive dimensions. Specifically, female patients presented with higher somatization, depression, anxiety, and hostility. Other studies also reported that women had higher stress sensitivity and a higher risk for depression and anxiety compared to men with ocular prostheses.^[9,22,23] Moreover, gender was the only factor significantly associated with somatization scores in this study, suggesting female patients appeared to somatic more. The reason

may lie in that women patients are less likely to accept their current condition and responded negatively to their overall situations, thus leading to somatic complaints. We also found that marital status single was positively associated with depression, anxiety, and hostility symptoms, which highlighted the importance of family support. However, one study from Korea showed that marriage was associated with a lower quality of life, and they explained the result may have been due to the extra responsibilities and labors imposed as a consequence of the patient's disability.^[9] Similar to the previous studies,^[11] lower levels of education were found to be related to higher levels of hostility. More importantly, there was a statistically significant correlation between hostility and the cause of enucleation, especially for trauma. Severe trauma usually comes with the re-experiencing spontaneous memories of the traumatic event, recurrent dreams related to the trauma, flashbacks, or other prolonged psychological distress.^[24] These changes were reflected as increased related symptoms in negative alterations in mood and cognitions. It was reported that high cognitive function was linearly associated with low hostility level.^[25] Therefore, strengthen cognitive function by encouraging healthier lifestyles and higher education or professional achievements is of great importance to improve the mental health of anophthalmic patients.

Some limitations of this study are worth noting. Firstly, this study is exploratory and cross-sectional, which precludes an examination of how the patients change over time. A longitudinal study is preferred for future investigations. Secondly, given that the present sample consisted of patients one month after prosthesis wearing, they may still have been in the process of adapting. Studies using more structural interviews and more disease-specific instruments will contribute to understand the patients better. Thirdly, although some baseline factors have been found to be significantly associated with main psychological symptoms, other clinical factors, including visual function in the remaining eye, appearance concerns, comfort of the prosthesis, etc, might influence them. For future studies, it would be interesting to explore the role of combined related factors on the psychological health status.

In conclusion, we found that the psychological symptoms of anophthalmic patients wearing ocular prosthesis exhibited high levels of somatization, depression, anxiety, and hostility. Of these, the hostility was the most prominent psychological symptom in anophthalmic patients, which was related to gender, marital status, level of education, and cause of enucleation. The findings suggest that for female single anophthalmic patients with low education, especially caused by trauma, timely psychological assessment and intervention should be provided to avoid undesirable consequences.

Author contributions

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