Evaluation of Anxiety Levels in Patients Undergoing Intravitreal Injection for Diabetic Macular Edema

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Abstract

Aim: In this study, we aimed to analyze the anxiety levels of patients regarding intravitreal injection (IVI) using the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and to evaluate the effect of repeated injections on anxiety levels.

Methods: Between September 01, 2023 and January 10, 2024, 85 patients who underwent intravitreal anti-vascular endothelial growth factor injection for diabetic macular edema in our clinic were included in this study.

Results: According to APAIS scores, mean anesthesia anxiety was 5.4±2.6, surgical anxiety was 5.1±2.6 and total anxiety score was 10.5±3.7. Anesthesia information need was 2.7±0.95, surgical information need was 2.6±1.14 and total information need score was 5.3±1.50. There was no significant difference between genders in terms of total and subgroup scores (p>0.05, all). No significant correlation was found in the correlation analysis between age and number of injections and APAIS scores (subdimensions and total) (p>0.05, all).

Conclusions: In conclusion, the potential anxiety of patients before and during intravitreal injection should be considered. In addition, since IVI often involves repeated treatments, it is of great importance to identify modifiable factors that may reduce anxiety. Given the importance of compliance, premedication may be considered to reduce anxiety, especially in high-risk (high preoperative anxiety) patients. Comprehensive explanations about treatment and well-structured processes are crucial for long-term adherence to anti-VEGF therapy.

Keywords: anti-VEGF; anxiety; diabetic retinopathy; intravitreal

1. Introduction

Diabetic retinopathy (DR) is one of the most common microvascular complications of diabetes. For the treatment of DR, triamcinolone acetate, dexamethasone or anti-VEGF (vascular endothelial growth factor) containing solutions are given by intravitreal injection (IVI). Inhibition of VEGF leads to regression of neovascularization and prevents the development of neovascularization. In addition, it improves lipid and exudate leakage from existing vessels[1].

Due to the global aging population and increasing life expectancy, the number of intravitreal injections is increasing day by day. Anxiety disorders are common during the procedures. It is very important to determine the patient's level of anxiety and the causes of anxiety in determining appropriate interventions to relieve anxiety in the pre-procedure period. In this study, we aimed to analyze patients' anxiety levels about intravitreal injection using the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and to evaluate the effect of repeated injections on anxiety levels.

2. Materials and methods

Written informed consent was obtained from all participants. The necessary permissions were obtained from the Toros University Scientific Research and Publication Ethics Committee (2023/155-21/12/2023). The study was conducted in accordance with the Declaration of Helsinki.

All patients who underwent IVI anti-VEGF for diabetic macular edema between September 01, 2023 and January 10, 2024 in our clinic were included in the study. The study population was between 30 and 85 years of age, communicable, literate, and not using any sedative and/or antidepressant medication. Age and gender data of all patients were noted. The number of previous intravitreal injections, if any, and the number of injected eyes were also recorded.

Patients participating in the study were given verbal information about the procedure and the study by the ophthalmologist before the procedure. Participation in the study was voluntary. The Amsterdam Preoperative Anxiety and Information Scale was completed by the investigators (psychiatrists) at the bedside.

Amsterdam Preoperative Anxiety and Information Scale (APAIS) In 1996, the Moermann group in the Netherlands developed the Amsterdam Preoperative Anxiety and Information Scale. It is one of the tests used to assess anxiety in the preoperative period. The source of anxiety is divided into three in this test: anxiety about surgery, anxiety about anesthesia or anxiety about lack of information. It includes 6 statements for these three sources to assess anxiety. To objectify the questionnaire, each statement is given a numerical value based on a 5-point Likert scale according to severity. These severity values range from one to five; 1=none, 2=mild, 3=moderate, 4=severe, 5=extreme. Anesthesia anxiety is calculated with the scores given to questions 1 and 2, surgical anxiety is calculated with the scores given to questions 4 and 5, and the total anxiety score is calculated by summing both. The statements expressing the desire to obtain information about anesthesia and surgery are questions 3 and 6. The lowest score is 6 and the highest score is 302. The validity and reliability study in our country was conducted by Çetinkaya et al.[3]

Statistical analysis of the study data was performed with the SPSS 29.0.1 package program (IBM Corp, Armonk, NY, USA). Categorical variables were expressed as number (n) and percentage (%) and continuous variables were expressed as mean ± standard deviation. The normal distribution of continuous variables was checked by Shapiro-Wilk test. Student's t test was used to compare the means of the groups. The relationship between categorical variables was investigated by chi-square analysis. Statistical significance level was taken as $p < 0.05$ for all comparisons.

3. Results

The mean age of the patients was 53.7±15.2 years. Forty-three (50.6%) of the patients were female. Fifty-two (61.2%) patients received injections in both eyes. The mean number of injections was 9.2±5.2. The mean age and number of injections did not differ between genders (p=0.154 and p=0.346 respectively) (Table 1).

Table 1

Demographic data, injection data and APAIS scores of the patients

	N	Overall 85	Gender Female 43	Male 42	p
Age (years)		53.7±15.2	52.0±13.4	55.4±16.8	0.154
Laterality	Right (n,%)	18 (21.2)	10 (23.3)	8 (19.1)	
	Left (n,%)	15 (17.6)	6 (13.9)	9 (21.4)	0.642
	Bilateral (n,%)	52 (61.2)	27 (62.8)	25 (59.5)	
IVI number (n)		9.2±5.2	8.9±4.8	9.4±5.6	0.346
Anxiety	Anesthesia	5.4±2.6	5.7±2.6	5.1±2.5	0.112
	Surgery	5.1±2.6	4.8±2.5	5.5±2.6	0.096
	Total	10.5±3.7	10.5±3.7	10.6±3.8	0.471
Need for information	Anesthesia	2.7±0.95	2.7±1.00	2.7±0.90	0.398
	Surgery	2.6±1.14	2.5±1.20	2.7±1.07	0.208
	Total	5.3±1.50	5.23±1.56	5.38±1.45	0.325

IVI: intravitreal injection

According to APAIS scores, anesthesia anxiety was 5.4±2.6, surgical anxiety was 5.1±2.6 and total anxiety score was 10.5±3.7. Anesthesia information need was 2.7±0.95, surgical information need

was 2.6±1.14 and total information need score was 5.3±1.50. There was no significant difference between genders in terms of total and subgroup scores (p>0.05, all) (Table 1).

No significant correlation was found in the correlation analysis between age and number of injections and APAIS scores (subgroup and total) (p>0.05, all) (Table 2).

Table 2

Correlation analysis between APAIS scores and age and number of injections

		Anxiety			Need for information		
		A	S	Total	A	S	Total
Age (years)	r	-0.031	0.164	0.092	0.040	-0.152	-0.090
	p	0.781	0.134	0.402	0.717	0.166	0.413
IVI number (n)	r	0.110	0.012	0.083	0.067	-0.048	0.006
	p	0.319	0.915	0.452	0.544	0.666	0.956

A: Anesthesia, S: Surgery

4. Discussion

Patients with long-term or poorly controlled diabetes have a higher risk of developing DR, which can lead to vision-threatening complications[4]. Currently, anti-VEGFs are widely used in the treatment of retinal disorders with exudation. Intravitreal injection of anti-VEGFs is a lengthy process involving regular follow-up in an ophthalmology clinic and frequent follow-up examinations. The decision to IVI and the uncertainties of the injection process may lead to increased anxiety in patients.

Thetford et al. showed that anxiety is most often present at the start of treatment, whereas another study found that anxiety was not related to the time since the start of treatment[5,6]. Anxiety is encountered before and during invasive procedures. Anti-VEGF injection therapies are a continuous process. Therefore, consecutive treatments may cause patient anxiety. This may affect the success of treatment. Anxiety may lead to complications related to sudden eye or head movement such as endophthalmitis, iatrogenic cataract and corneal abrasion[7].

Chaudhary et al. included 48 eyes of 48 patients with a mean age of 68.4 years. 62.5% of the patients were male. Severe anxiety and pain were seen in 10.4% and 12.5%, respectively. In addition, there was a significant correlation between visual analog scale scores for anxiety and pain (r=0.430, p=0.002) and no other pre-procedure parameter showed a significant relationship with VAS score[8].

In another study, high anxiety level in the pre-procedure period was found to be associated with higher pain sensation during the procedure[9]. Berger et al. included 201 patients (92 females and 109 males) with a mean age of 68 years in their study. The results showed that advanced age and high anxiety were associated with increased systolic blood pressure[10].

In a study of 300 patients undergoing IVI, 56% of patients reported anxiety related to anti-VEGF therapy and 17% of patients showed clinically significant anxiety. The main causes of anxiety included fear of blindness due to intravitreal injections and concerns about the efficacy of the treatment rather than pain. Anxiety levels were significantly higher in patients who received one or two injections compared to those who received three or more injections. However, no significant correlation was found between anxiety lev-

els and the number of injections[11].

In our study, no significant correlation was observed between age and number of injections and anxiety levels. However, patients need anesthesia and surgical information. When this finding and literature data are considered together, pre-procedure patient information should be detailed, explanatory and understandable. This may increase the comfort of patients at the time of the procedure and prevent unwanted iatrogenic trauma.

Many methods have been tried to reduce anxiety and increase patient comfort and compliance with the procedure. Wasser et al. included a total of 108 patients in their study and used two different techniques during IVI. As a result of the study, patients who were injected with the technique without a lid speculum had less anxiety and pain than those who used a lid speculum[12]. According to a study by Chen et al., playing classical music to patients before and during intravitreal injection decreases patient anxiety[13].

Anxiety was found to decrease in patients who received intravitreal injections after the respiratory relaxation session and 80% of the patients wanted the relaxation session to be repeated before the next injections[14]. According to the results of a study by Shaughnessy et al., 98% of the patients found it useful to hold hands during the injection and shown that hand holding provided a statistically significant decrease in patient anxiety[15].

In our study, all patients were informed about the injection and the study before the procedure. This may explain our lower anxiety rates compared to literature data. In addition, the relatively low average age of our patients may have led to lower anxiety related to anesthesia and surgery. Studies with large participation are needed to observe the effects and to evaluate them clearly.

5. Conclusion

In conclusion, the potential anxiety of patients before and during IVI should be considered. In addition, since IVI often involves repeated treatments, it is of great importance to identify modifiable factors that may reduce anxiety. Given the importance of compliance, premedication may be considered to reduce anxiety, especially in high-risk (high pre-procedure anxiety) patients. Comprehensive explanations about treatment and well-structured processes are crucial for long-term adherence to anti-VEGF therapy.

Statement of ethics

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by Toros University Scientific Research and Publication Ethics Committee (2023/155-21/12/2023).

Conflict of interest statement

The authors declare that they have no financial conflict of interest with regard to the content of this report.

Funding source

The authors received no financial support for the research, authorship, and/or publication of this article.

Author Contributions

All authors read and approved the final version of the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Originality Assertion

The authors have not submitted this article to another journal previously.

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