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The Effect of Video Information on Preoperative Anxiety Levels in Patients Undergoing Total Knee Replacement

Video ile Bilgi Verilmesinin Total Diz Protezi Operasyonu Hastalarında Preoperatif Anksiyete Düzeyine Etkisi

Onur Baran, Cengiz Mordeniz, Makbule Cavidan Arar, Mustafa Günkaya

Tekirdağ Namık Kemal University Faculty of Medicine, Department of Anesthesiology and Reanimation, Tekirdağ, Turkey

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ABSTRACT

Objective: The preoperative anxiety rate in patients waiting for elective surgery varies between 60% and 80%. We aimed to reduce preoperative anxiety in patients undergoing total knee replacement using a video demonstration of combined spinal-epidural anesthesia on a tablet computer.

Methods: Fifty adult patients, scheduled to undergo total knee replacement, were enrolled in a randomized controlled study. Anxiety levels were assessed using the State-trait Anxiety Inventory (STAI) and the Amsterdam Preoperative Anxiety and Information scale. The assessment was based on questionnaires completed by the patients. Patients were randomly divided into two groups: video and control groups. In the video group, a video demonstration of combined spinal-epidural anesthesia was provided, along with verbal information about the procedure. On the day of surgery, the same questionnaires were again completed for the assessment of anxiety levels.

Results: There were no significant differences between groups regarding age, sex, occupation, education, and previous history of anesthesia and surgery. The STAI scale scores were found to be significantly lower in the video group than in the control group ($p=0.000$; $p<0.005$). The Amsterdam Preoperative Anxiety and Information scale scores were found to be significantly lower in the video group compared to the control group ($p=0.000$; $p<0.05$).

Conclusion: New devices and technologies may be used in daily anesthetic practice to offer patient information more efficiently. This may help reduce preoperative anxiety levels among patients undergoing elective surgery.

Keywords: Anxiety, preoperative period, video recording, technology

ÖZ

Amaç: Elektif ameliyat için bekleyen hastalarda preoperatif anksiyete oranı %60 ile %80 arasında değişmektedir. Çalışmamızda hastalara bir tablet bilgisayar ile daha önceden gerçekleştirilmiş bir kombine spinal epidural anestezi işlemi videosu izleterek hastaların preoperatif anksiyetelerini azaltmayı amaçladık.

Yöntemler: Kombine spinal epidural anestezi ile total diz protezi ameliyatı olacak 50 hasta çalışmamıza dahil edildi. Hastalar randomize olarak video ve kontrol olarak iki gruba ayrıldı. Video grubunda hastalara daha önceden hazırlanmış olan kombine spinal epidural anestezi işlemi videosu işlem hakkında sözel bilgi verilirken izletildi. Kontrol grubunda ise anket formaları doldurulduktan sonra vizit sona erdi. Ameliyat günü Durumluk-sürekli Anksiyete ölçeği (STAI) ve Amsterdam Preoperatif Anksiyete ve Bilgi ölçeği formları cerrahiden bir önceki gibi dolduruldu.

Bulgular: Kontrol grubunda STAI skorları artmış bulunurken video grubunda azalmış bulundu ve bu azalma istatistiksel olarak anlamlıydı ($p=0,000$; $p<0,005$). Amsterdam Preoperatif Anksiyete ve Bilgi ölçeği kontrol grubunda artmış bulunurken video grubunda istatistiksel olarak anlamı olarak azalmış bulundu ($p=0,000$; $p<0,005$).

Sonuç: Yeni cihazlar ve teknolojilerin kullanımı günlük anestezi uygulamalarımızda bizlere kolaylık sağlayabilir ve hastaların preoperatif dönemdeki anksiyetelerini gidermek amacıyla daha verimli bilgilendirmekte kullanılabilir.

Anahtar kelimeler: Anksiyete, preoperatif dönem, video kaydı, teknoloji

ORCID IDs of the authors: O.B. 0000-0003-0007-6315; C.M. 0000-0001-9427-777X; M.C.A.0000-0003-1952-427X; M.G. 0000-0002-6763-2999.

Corresponding Author/Sorumlu Yazar: Onur Baran,
E-mail: dronurbaran@hotmail.com

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INTRODUCTION

The incidence of preoperative anxiety among patients scheduled for elective surgery varies between 60% to 80% (1,2). Preoperative anxiety may necessitate a higher dose of anesthetic agents for the induction of anesthesia (3). The use of premedication before anesthesia and surgery aims to reduce patient anxiety (4).

Benzodiazepines are commonly used as anxiolytic agents. However, adequate preoperative counseling and positive reinforcement by hospital staff may reduce preoperative anxiety and the need for anxiolytic medication (5).

Total knee replacement results in severe postoperative pain and requires specialized care in the postoperative period (6). There are several advantages of regional compared to general anesthesia for total knee replacement (7,8). Combined spinal-epidural anesthesia, originally described by Soresi (9), is still considered one of the preferred techniques for lower extremity arthroplasty (7,8).

Significant comorbidities are common among this patient population. Hence, it is important to choose an anesthetic technique that offers effective analgesia with relatively few side effects such as sedation, hypotension, and postoperative nausea and vomiting. In our clinic, when there is no contraindication, we prefer the combined spinal-epidural-anesthesia technique for total knee replacement to provide adequate analgesia in the postoperative period.

We aimed to reduce patient anxiety by a video demonstration of the planned anesthetic procedure along with verbal information on the night before surgery.

METHODS

The study was approved by the Namık Kemal University Observational Research Ethics Committee (approval number: 2014/92/12/06). Informed consent was obtained by the staff of the department of anesthesiology and reanimation from patients over 18 years of age, with American Society of Anesthesiologist-physical status (ASA-PS) I-II, who were scheduled to undergo total knee replacement at the clinic of orthopedics and traumatology.

Patients with ASA-PS III and above, mental disorders, altered conscious level, psychiatric illness on treatment, and those who were unable to cooperate for the study were excluded. We also excluded patients with contraindications for regional anesthesia, known history of allergy to local anesthetics, those who had previously participated in this study, and those who previously had a total knee replacement at our clinic of orthopedics and traumatology.

A preoperative evaluation was carried out in the anesthesia polyclinic. On the night before the surgery, the study was explained in detail to the patients, and written informed consent was obtained. Patients who refused to participate in the study were excluded.

Demographic information was collected from enrolled patients including age, sex, education level, and occupation. Information was collected on any previous history of surgery under anesthesia. Patients who had a history of regional anesthesia were considered to have undergone "regional anesthesia", even if they had been subjected to general anesthesia previously. Patients who had been subjected only to general anesthesia were considered to have undergone "general anesthesia", and those who had previously had local anesthesia alone were considered to have undergone "local anesthesia". Patient preferences regarding the choice of anesthetic technique were noted. All enrolled patients completed the State-Trait Anxiety Inventory (STAI) and the Amsterdam Preoperative Anxiety and Information scale (APAIS) questionnaires.

The STAI questionnaire includes has two sections; STAI-I, the State Anxiety Inventory, and STAI-II, the Trait Anxiety Inventory. There are 20 questions in each section. In the STAI-I section, possible responses to the current level of anxiety are: 1) not at all; 2) somewhat; 3) moderately so; 4) very much so. In the STAI-II section, the response to the frequency of feelings "in general" are: 1) almost never; 2) sometimes; 3) often; 4) almost always. In the STAI-I section, there are ten "reverse answers", numbered 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20. In the STAI-II section, there are seven "reverse answers", numbered 21, 26, 27, 30, 33, 36, and 39. After reverse scoring of responses as 1 to 4 and 4 to 1, the total STAI-I and STAI-II scores are calculated.

The APAIS form consists of six questions, including 1) I am worried about the anesthetic; 2) the anesthetic is on my mind continually; 3) I would like to know as much as possible about the anesthetic; 4) I am worried about the procedure; 5) the procedure is on my mind continually; 6) I would like to know as much as possible about the procedure. The patient is asked to answer each question using one of the following options: 1) not at all; 2) a little bit; 3) somewhat; 4) a lot; 5) extremely. The APAIS-A score reflects the anxiety level and is calculated by summing up the answers to questions 1, 2, 4, and 5. The APAIS-B score assesses the desire for information and is calculated by summing up the answers to questions 3 and 6. The final APAIS score is calculated by summing up the answers to all questions.

Patients were randomly divided into the "video" and "control" groups through computer-generated randomization. In the video group, a pre-recorded video clipping of the combined spinal-epidural anesthetic technique was demonstrated. In the control group, only the questionnaires were filled. We also provided verbal information regarding the anesthetic technique for the planned surgery to all the patients.

Patients were re-evaluated on the morning of the day of surgery. The STAI and APAIS questionnaires were completed once again and answers noted. Following this, patient preferences regarding the anesthetic technique were noted. Queries raised by patients were also addressed during this visit. All the visits and informing were done by the same anesthesiologist.

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Statistical Analysis

We calculated a sample size of 14 subjects for the desired effect size with 80% power at a significance level of 5%.

Descriptive statistics are presented as mean with standard deviation, median with range, frequency, and ratio. The distribution of the variables was assessed using the Kolmogorov-Smirnov test. The Mann-Whitney U test was used for the analysis of quantitative independent data. The Wilcoxon test was used for analyzing dependent quantitative data. The chi-square test or Fisher's exact test was used to analyze qualitative independent data. A p-value of <0.05 was considered to indicate statistical significance. SPSS version 22.0 was used for all statistical analyses.

RESULTS

We initially included 52 patients in the study; however, two patients refused to participate later. Hence, 50 patients were enrolled (25 in each group). The mean age of patients was 63 years in the control group, compared to 66.28 years in the video group. There was no significant difference between groups in age, sex, occupation, education, and previous history of surgery under anesthesia. The preferred anesthetic technique was different between the video and the control groups. The response "I prefer the specialist's choice" was significantly higher than the "I prefer regional anesthesia" and "I prefer general anesthesia" responses in the video group compared to the control group (χ^2=0.005). Five patients in the video group preferred general anesthesia initially; however, they changed their minds and wished to undergo regional anesthesia after watching the video (Table 1).

The STAI-I scores on the night before surgery were not significantly different between the control (31.2±6.2) and the video groups (29.5±10); suggesting that patients in both groups had similar anxiety levels (p=0.120; p>0.05). In the video group, the STAI-I score on the morning of surgery (24.7±7.4) was significantly lower than in the control group (34.4±6.7) (p=0.000; p<0.05). The STAI-I score in the video group was significantly lower on the morning of surgery compared to the night before (29.5±10) (p=0.000; p<0.05). In the control group, the STAI-I score on the morning of surgery (34.4±6.7) was significantly higher than on the night before (31.2±6.2) (p=0.000; p<0.05), suggesting an increased level

Table 1. Demographic information of patients

		Control group			Video group			p	
		Mean ± SD		Median	Mean ± SD		Median		
Age		63.0±9.9		62.0	66.3±8.0		67.0	0.109	m
Sex	**Male**	5	20.0%	-	1	4.0%	-	0.082	χ^2
	Female	20	80.0%	-	24	96.0%	-		
Occupation									
Housewife		18	72.0%	-	20	80.0%	-	0.415	χ^2
Retired		2	8.0%	-	3	12.0%	-		
Farmer		3	12.0%	-	2	8.0%	-		
Worker		2	8.0%	-	0	0.0%	-		
Education									
Illiterate		2	8.0%	-	5	20.0%	-	0.117	χ^2
Literate		2	8.0%	-	3	12.0%	-		
Primary school		17	68.0%	-	17	68.0%	-		
Secondary school		2	8.0%	-	0	0.0%	-		
High school		1	4.0%	-	0	0.0%	-		
University		1	4.0%	-	0	0.0%	-		
Operation history	**No**	4	16.0%	-	6	24.0%	-	0.480	χ^2
	Yes	21	84.0%	-	19	76.0%	-		
Type of anesthesia history									
General anesthesia		10	40.0%	-	7	28.0%	-	0.653	χ^2
Regional anesthesia		8	32.0%	-	10	40.0%	-		
Local anesthesia		3	12.0%	-	2	8.0%	-		
Anesthesia request									
Specialist's choice		7	28.0%	-	18	72.0%	-	**0.005**	χ^2
Regional anesthesia		9	36.0%	-	2	8.0%	-		
General anesthesia		9	36.0%	-	5	20.0%	-		

mMann-Whitney U test, χ^2Chi-square test, SD: Standard deviation

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of anxiety on the morning of surgery. The STAI-I scores changed significantly between the night before and the morning of surgery in both groups (p=0.001; p<0.05). While the scores reduced in the video group, (-4.8±10.1) they increased in the control group (3.2±6) (Table 2).

Similar to the STAI-I score, the STAI-II score on the night before surgery was not significantly different between the control and the video groups (40.2±5.9 vs 39.3±8.6, p=0.899; p>0.05). In the video group, the STAI-II score on the morning of surgery (37.7±8) was significantly lower than in the control group (42.8±5.4); (p=0.029; p<0.05). The STAI-II score was also significantly lower on the morning of surgery compared to the night before in the video group (39.3±8.6); (p=0.000; p<0.05). In the control group, the STAI-II score on the morning of surgery (42.8±5.4) was significantly higher than on the night before (40.2±5.9); (p=0.000; p<0.05). The STAI-II scores changed significantly on the morning of surgery compared to the night before in both groups; (p=0.036; p<0.05). The scores reduced in the video group (-1.6±3.8) while they increased in the control group (2.6±7.5) (Table 2).

In the video group, the APAIS-A score on the night before surgery (12.8±4.7) was significantly higher than in the control group (7.6±4); (p=0.000; p<0.05). There was no significant difference in APAIS-A scores on the morning of surgery between the control (8.2±4.3) and the video groups (6.8±3.5) (p=0.287; p>0.05). The APAIS-A score on the morning of surgery (6.8±3.5) was significantly lower than on the night before (12.8±4.7) in the video group (p=0.000; p<0.05). In the control group, the APAIS-A score on the morning of surgery (8.2±4.3) was significantly higher than on the night before (7.6±4) (p=0.000; p<0.05). In both groups, the APAIS-A scores changed significantly between the night before and the morning of surgery (p=0.000; p<0.05). The scores reduced in the video group (-6.1±4.2) while they increased in the control group (0.5±3.5) (Table 2).

The APAIS-B score on the night before surgery was not significantly different between the control (5.9±1.9) and the

Table 2. The mean and median values of the STAI and the APAIS scores of patients

	Control group				Video group				p	
	Mean ± SD			Median	Mean ± SD			Median		
STAI-I										
Night	31.2	±	6.2	30.0	29.5	±	10.0	27.0	0.120	m
Morning	34.4	±	6.7	32.0	24.7	±	7.4	21.0	**0.000**	m
Night - morning change	3.2	±	6.0	2.0	-4.8	±	10.1	-6.0	**0.001**	m
Change within the group (p)	**0.000**			w	**0.000**			w		
STAI-II										
Night	40.2	±	5.9	40.0	39.3	±	8.6	40.0	0.899	m
Morning	42.8	±	5.4	43.0	37.7	±	8.0	38.0	**0.029**	m
Night - morning change	2.6	±	7.5	1.0	-1.6	±	3.8	0.0	**0.036**	m
Change within the group (p)	**0.000**			w	**0.000**			w		
APAIS-A										
Night	7.6	±	4.0	6.0	12.8	±	4.7	13.0	**0.000**	m
Morning	8.2	±	4.3	7.0	6.8	±	3.5	5.0	0.287	m
Night - morning change	0.5	±	3.5	0.0	-6.1	±	4.2	-4.0	**0.000**	m
Change within the group (p)	**0.000**			w	**0.000**			w		
APAIS-B										
Night	5.9	±	1.9	6.0	6.4	±	2.1	6.0	0.373	m
Morning	5.7	±	1.8	6.0	3.5	±	2.1	3.0	**0.000**	m
Night - morning change	−0.2	±	0.9	0.0	-2.9	±	3.4	-3.0	**0.000**	m
Change within the group (p)	**0.000**			w	**0.000**			w		
APAIS										
Night	13.0	±	4.7	12.0	19.2	±	5.5	20.0	**0.000**	m
Morning	13.9	±	5.4	11.0	10.2	±	4.1	8.0	**0.007**	m
Night - morning change	0.8	±	3.9	0.0	-9.0	±	5.7	-8.0	**0.000**	m
Change within the group (p)	**0.000**			w	**0.000**			w		

[m]Mann-Whitney U test, [w]Wilcoxon Test
STAI-I: The stait anxiety and information scale, STAI-II: The trait anxiety and information scale, APAIS: The Amsterdam preoperative anxiety and information scale, APAIS-A: The Amsterdam preoperative anxiety scale, APAIS-B: The Amsterdam preoperative information scale, SD: Standard deviation

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video groups (6.4±2.1) (p=0.373; p>0.05). In the video group, the APAIS-B score on the morning of surgery (3.5±2.1) was significantly lower than in the control group (5.7±1.8) (p=0.000; p<0.05). The APAIS-B score was significantly lower on the morning of surgery compared to the night before (6.4±2.1) (p=0.000; p<0.05). The APAIS-B score on the morning of surgery (5.7±1.8) was significantly lower than on the night before (5.9±1.9) in the control group (p=0.000; p<0.05); however, the change in scores between the night before and the morning of surgery was significantly different between groups (p=0.000; p<0.05). The scores reduced more in the video group (-2.9±3.4) compared to the control group (-0.2±0.9) (Table 2).

The APAIS score on the night before was significantly higher in the video group (19.2±5.5) compared to the control group (13.0±4.7) (p=0.000; p<0.05). In the video group, the APAIS score on the morning of surgery (10.2±4.1) was significantly lower than in the control group (13.9±5.4) (p=0.007; p<0.05). In the video group, the APAIS score was lower on the morning of surgery compared to the night before (19.2±5.5) (p=0.000; p<0.05). In the control group, the APAIS score on the morning of surgery (13.9±5.4) was significantly higher than on the night before (13.0±4.7) (p=0.000; p<0.05). In both groups, APAIS scores changed significantly between the night before and the morning of surgery (p=0.000; p<0.05). The scores reduced in the video group (-9.0±5.7) while they increased in the control group (0.8±3.9) (Table 2).

DISCUSSION

The incidence of preoperative anxiety among the patients prior to elective surgery ranges between 60%-80% (1,2). Total knee replacement results in severe postoperative pain and requires special care in the postoperative period (6).

In our study, there were 88% and 12% of female and male patients, respectively. In the study by Kim et al. (10), including 47,961 patients who had total knee replacement between 2002 and 2005 in Korea, 91% were male patients compared to 9% of female patients. In the Souza et al. (11) study, 20.9% of 81 patients were men compared to 79.1% women. Sarban et al. (12) found that 35% of 34 patients who underwent total knee replacement were men compared to 65% of women. The sex distribution in our study was similar to previous studies.

Our study included housewives (76%), farmers (10%), and workers (4%). Retirees made up 10% of subjects. Franklin et al. (13) conducted a study that aimed to investigate the correlation between occupation and knee or hip replacement surgery in 1,408 patients. They found that 13% of 400 patients who had a history of knee replacement were housewives, while 23.7% were farmers, similar to our study.

In our study, 68% of the patients had completed primary school. Sağır et al. (14) aimed to assess the impact of patient information on preoperative anxiety levels in patients scheduled for surgery for inguinal hernia, anal fissure, hemorrhoids, and pilonidal sinus excision under spinal anesthesia. In this study, 42% of 210 patients had completed primary school, while 33% had completed high school.

In our study, 20% of patients had no previous history of surgery under anesthesia. Among the 40 patients who had undergone surgery under anesthesia, 42.5% had undergone general anesthesia, while 45% had undergone regional anesthesia. Shevde and Panagopoulos (15) found in their study of 800 patients regarding knowledge, attitude, and concerns regarding anesthesia that 31.7% of the patients had never experienced anesthesia or undergone surgery. Jlala et al. (16) assessed anxiety levels after patient information and found that 22.4% of patients had never been anesthetized previously.

In a previous study by Sağır et al. (14), basal anxiety levels were assessed using the STAI-I test preoperatively in the anesthesia polyclinic. Patients were divided into the visual and control groups. In the visual group, patients were given a colored visual catalog while in the control group, only written information was provided. Patients were asked to complete the STAI-I form before premedication and at 8 hours postoperatively. No significant difference in the STAI-I scores was observed at baseline and 8 hours postoperatively between groups. However, there was a significant decrease in postoperative compared to the basal anxiety scores in both groups. In the preoperative period, there was an increase in scores in the control group compared to the baseline; no change was seen in the visual group.

In our study, there was a significant decrease in the STAI-I and STAI-II scores on the morning of surgery in the video group compared to the control group. We believe that the video demonstration was effective in reducing anxiety levels on the morning of surgery compared to the night before.

Jlala et al. (16) assessed patients 2 weeks before elective surgery. After measuring the basal anxiety score levels, patients in the intervention arm were shown a video recording of a peripheral neural block or subarachnoid block. Patients in the control group received routine care. On the day of surgery, all patients completed the STAI and Visual Analog scale (VAS) questionnaires 2-3 hours before surgery. The questionnaires were again completed 2 to 8 hours postoperatively. No difference was noted in the STAI scores between groups on the first assessment, 2 weeks before surgery. There was an increase in anxiety levels by the STAI-I scores in the control group immediately before surgery; however, patients who had watched the video demonstration were found to be less anxious. Postoperatively, there was a significant decrease in anxiety levels in both the groups compared to the basal scores. On postoperative assessment, patients who had watched the video demonstration were found to be less anxious compared to the control group. The findings of the present study are similar.

Taşdemir et al. (17) studied the impact of preoperative information on patient anxiety levels in 107 American Society of Anesthesiology class I-II patients between 18 and 70 years, scheduled to undergo ear, nose, and throat surgery. In the preoperative period, patients

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completed the STAI-I form before preoperative counseling and information regarding general anesthesia. The forms were completed again 4 and 6 hours postoperatively. Anxiety scores were significantly less in the postoperative period. In our study, we did not assess postoperative anxiety.

Salzwedel et al. (18) studied 209 patients who were scheduled to undergo general, urological, orthopedic, and trauma surgery. They categorized patients into three groups. An educational video was shown to one group of patients before the pre-anesthetic evaluation, while another group was shown the video after the pre-anesthetic evaluation. The control group did not receive video demonstration. Patients completed the STAI and VAS forms before and after the pre-anesthetic evaluation and the educational video; no significant changes were observed between groups.

We studied a homogenous group of patients who were scheduled to undergo total knee replacement by the orthopedics and traumatology department. The patients had no contraindication to combined spinal-epidural anesthesia. We believe that a more homogenous group of patients, who were provided with more specific information, resulted in reduced anxiety levels.

In a randomized controlled study by Oliphant et al. (19), patients scheduled to undergo surgery for prolapse or incontinence were shown a preoperative video regarding clean intermittent catheterization. STAI forms were completed before and after the video. A decrease in anxiety scores was observed in the video group compared to the control group.

Bondy et al. (20) contacted patients by telephone preoperatively and sent an information CD regarding general and regional anesthesia along with STAI and demographic information. Patients who watched the CD and completed the forms were asked to complete the STAI forms again preoperatively. When compared to written information, visual information was found to be much more effective in decreasing preoperative anxiety, establishing the importance of visual information in a video format, corroborating the findings of our study.

Study Limitations

STAI forms have 40 questions in total. Thus, the patients might have had difficulties while filling the forms.

CONCLUSION

Patients scheduled to undergo elective surgery may experience severe anxiety in the preoperative period. Preoperative anxiety is a serious problem that needs to be addressed adequately. We included patients scheduled to undergo total knee replacement which often leads to severe postoperative pain. We aimed to measure and to decrease anxiety levels by providing detailed information through a video and audio demonstration. We observed that the anxiety levels decreased significantly following detailed information offered in a multimedia format.

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