Original Article

DOI: 10.4274/haseki.galenos.2023.9005
Med Bull Haseki 2023;61:167-171

Effect of Preoperative Anxiety Level on Postoperative Analgesia Requirement in Patients Undergoing Laparoscopic Cholecystectomy

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Abstract

Aim: The preoperative anxiety levels of the patients create negative effects in the postoperative period. In this study, we aimed to reveal the relationship between postoperative analgesia needs and preoperative anxiety levels in patients undergoing laparoscopic cholecystectomy.

Methods: This study was organized as a cross-sectional study. The Preoperative Trait And State Anxiety Scales (STAI-T and STAI-S) were applied to 66 patients undergoing elective laparoscopic cholecystectomy between October 2020 and October 2021, and they were divided into two groups of high and low anxiety according to their STAI-S scores. Postoperative anxiety level was considered 0th hour when the patient was able to respond to verbal stimuli and was re-evaluated with the STAI-S scale within the first 4 h. Postoperative pain scores of the patients were recorded with the visual analogue scale at 2nd, 6th, 12th, and 24th hours. Patients who needed additional analgesia doses were recorded.

Results: Sociodemographic characteristics were compared between groups, and no significant difference was found. Although the pain of our patients decreased over time, there was no significant relationship between anxiety levels and postoperative pain scores of the groups.

Conclusion: This study showed that there was no relationship between the preoperative anxiety level and the postoperative analgesia score of the patients.

Keywords: Analgesia, anesthesia, anxiety

Introduction

Undergoing surgery due to health issues is a psychologically challenging situation for individuals. Patients awaiting surgery experience increased anxiety and fears throughout the operation period, considering this period a crisis phase. The evaluation of patients' physical and psychological condition, medications used, previous surgeries, and laboratory results plays a crucial role in determining the anesthesia risk before surgery. Therefore, alleviating anxiety during the pre-operative preparation process holds significant importance. Typically, hospitalized patients exhibit anxiety rates ranging from 10% to 30% (1). Anxiety can have adverse effects on surgical procedures, anesthesia management, and postoperative recovery (2). Various factors contribute to preoperative anxiety, such as separation from loved ones, disruption of daily activities, fear of death, limb or organ loss, dependency on care, fear of job loss, fear of waking up during surgery or not waking up after surgery, and concerns about experiencing pain (3). Providing detailed information to patients based on preoperative assessments can reduce anxiety.

Postoperative pain can negatively impact the patient's quality of life and increase mortality and morbidity rates due to its effects on the respiratory, endocrine, cardiovascular, immune, and gastrointestinal systems (4). While numerous drugs and methods are used for postoperative pain management, no consensus on the gold standard approach has yet been reached. Moreover,

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Received: 05.01.2023 **Accepted:** 15.06.2023

the side effects of these methods can further deteriorate the already compromised quality of life for patients. In some cases, managing pain during the postoperative period remains challenging. Particularly, pain following laparoscopic procedures poses significant issues during the early stages.

The aim of this study was to evaluate the relationship between preoperative anxiety levels and postoperative analgesia requirements in patients undergoing laparoscopic cholecystectomy. We hope that our findings, along with current and future studies, will contribute to the resolution of this problem.

Methods

Compliance with Ethical Standards

Ethical permission for the study was obtained from Clinical Research Ethics Committee of University of Health Sciences Turkey, Istanbul Haseki Traning and Research Hospital (approval number: 2020/190, date: 21.10.2020). The participants were informed that the data would only be used for scientific purposes. Informed consent was obtained from all participants.

Study Design

This study included American Society of Anesthesiologist I-II patients aged between 18 and 60 years who were eligible for elective cholecystectomy and who had the mental state to fill in the scales and questionnaires for evaluation, all of whom were volunteers. Our research was designed as a cross-sectional study. Sociodemographic information about the patients was recorded at the pre-operative anesthesia visit. The Preoperative Trait and State Anxiety Inventory (STAI-T and STAI-S) was applied to 66 patients, and they were divided into two groups based on their STAI-S scores: high and low anxiety. Those with a preoperative STAI-S score of 40 points or less were included in Group L (low), and those above 40 points were included in Group H (high). No sedative medication was administered to the patients in the service on the day of surgery. After premedication with 0.04 mg/kg midazolam, 1-2 mcg/kg fentanyl, 2-3 mg/kg propofol, and 0.6 mg/kg rocuronium were administered for anesthesia induction, the patients were intubated orotracheally.

Anesthesia Procedure

Laparoscopic surgery was performed under inhalation anesthesia with a concentration of sevoflurane of 1-2% in a 40-60% oxygen-air mixture for the maintenance of anesthesia. During the laparoscopic procedure, pneumoperitoneum was created at pressures of 10-12 mmHg. 15 mg/kg acetaminophen and 1-2 mg/kg tramadol were administered to the patients 30 minutes before the end of the surgery. Patients who were taken to the service after the follow-up in the recovery room were administered intravenous 1 g acetaminophen every 8 h and intravenous non-steroidal anti-inflammatory (20 mg tenoxicam) drugs every 12 h, in accordance with the general surgery clinic postoperative analgesia protocol, if there were no contraindications. Patients who needed additional analgesia were recorded. The time when the patients were able to respond to verbal stimuli was accepted as the 0^{th} hour postoperatively, and the pain scores of the patients were recorded at the $2n^{d}$, 6^{th}, 12^{th}, and 24^{th} hours. The STAI-S questionnaire was repeated to measure the state anxiety level in the first 4 hours postoperatively. The preoperative STAI-S scores, postoperative visual analogue scale (VAS) scores, and postoperative analgesic drug needs of the groups were compared.

Statistical Analysis

The Statistical Package for the Social Sciences version 25 (SPSS, IBM Corp., Armonk, NY, USA) program was used. The normal distribution of the variables was checked by the Shapiro-Wilk test and Q-Q plots. The Mann-Whitney U test was used to compare continuous data. Categorical variables were grouped and compared using the χ^2 test or Fisher's exact test. The repeated measurement test was used for the analysis of repeated measurements. The data were analyzed at a 95% confidence level.

Results

The mean age of the 66 patients included in the study was 46.09±11.27 years. While 30 patients (45.5%) had no surgical experience; 36 patients (54.5%) had previous experience with one or more operations (Table 1). The mean preoperative STAI-T score of the participants was 42.2±13.8, the maximum score was 70, the minimum score was 21, and the median was 39; the mean preoperative STAI-S score was 46.4±13, the maximum score was 72, the minimum score was 26, and the median was 42.5; the mean postoperative STAI-S score was 39.7±9.8, the maximum score was 69, the minimum score was 25, and the median was 38.5 (Table 2).

It was determined that the rate of participants with a preoperative STAI-T value of ≤40 was 62.1%, the rate of participants with a preoperative STAI-S value of ≤40 was 39.4%, and the rate of participants with a postoperative STAI-S value of ≤40 was 71.2% (Table 3).

When the demographic characteristics of the groups were examined, the mean age of the group with low preoperative anxiety (Group L) was 44.5±9.5 years, 65.4% were female, 80.8% were married, 38.5% were primary school graduates, and 42.3% had a history of surgery. The mean age of the group with high preoperative anxiety (Group H) was 47.1±12.2 years, 67.5% were female; 80%

were married; 32.5% were primary school graduates; and 62.5% had a history of surgery. No statistically significant difference was found in the comparison of the two groups according to their demographic data (Table 4).

No statistically significant difference was found in the comparison of the additional analgesic dose needs of the groups (Table 5). In the comparison of the VAS values of the groups, it was determined that VAS values decreased statistically significantly over time, but there was no statistically significant correlation between preoperative STAI-S and VAS values (Table 6).

Table 1. Demographic data of patients

Mean age*	**46.09±11.27**
Gender, n (%)	
Male	22 (33.3%)
Female	44 (66.7%)
Marital status, n (%)	
Single	13 (19.7%)
Married	53 (80.3%)
Educational status, n (%)	
Illiterate	2 (3.0%)
Literate	7 (10.6%)
Primary school	23 (34.8%)
Secondary school	12 (18.2%)
High school	14 (21.2%)
University	7 (10.6%)
Graduate of a master' program	1 (1.5%)
Operation history, n (%)	
No	30 (45.5%)
Yes	36 (54.5%)
*Mean ± standard deviation	

Table 2. Maximum, minimum and median distribution of STAI scores

	Preoperative STAI-T score	Preoperative STAI-S score	Postoperative STAI-S score
Maximum	70	72	69
Minimum	21	26	25
Median	39	42.5	38.5

Table 3. STAI score distribution of patients

	n (66)
Preoperative STAI-T, n (%)	
≤40	41 (62.1%)
>40	25 (37.9%)
Preoperative STAI-S, n (%)	
≤40	26 (39.4%)
>40	40 (60.6%)
Postoperative STAI-S, n (%)	
≤40	47 (71.2%)
>40	19 (28.8%)

Discussion

Although many studies have been conducted on the factors affecting the analgesia needs of patients in the postoperative period, postoperative pain remains a problem. We evaluated the preoperative anxiety levels of our patients who participated in our study and examined the relationship between their postoperative VAS scores.

Lichtor et al. (5). evaluated the anxiety levels on the morning of the operation and the day before the

Table 4. Comparison of groups by demographic data

		Preoperative STAI-S score		
	Total	Grup L	Grup H	p-value
Age, mean ± standard deviation		44.5±9.5	47.1±12.2	*0.408
Gender, n (%)				**0.859
Male	22 (33.3%)	9 (34.6%)	13 (32.5%)	
Female	44 (66.7%)	17 (65.4%)	27 (67.5%)	
Martal status, n (%)				**0.939
Single	13 (19.7%)	5 (19.2%)	8 (20.0%)	
Married	53 (80.3%)	21 (80.8%)	32 (80.0%)	
Educational status, n (%)				**0.746
Illiterate	2 (3.0%)	0	2 (5.0%)	
Literate	7 (10.6%)	3 (11.5%)	4 (10.0%)	
Primary school	23 (34.8%)	10 (38.5%)	13 (32.5%)	
Secondary school	12 (18.2%)	5 (19.2%)	7 (17.5%)	
High school	14 (21.2%)	5 (19.2%)	9 (22.5%)	
University	7 (10.6%)	2 (7.7%)	5 (12.5%)	
Graduate of a master' program	1 (1.5%)	1 (3.8%)	0	
Operation history, n (%)				**0.107
No	30 (45.5%)	15 (57.7%)	15 (37.5%)	
Yes	36 (54.5%)	11 (42.3%)	25 (62.5%)	
*Student's t-test, **Chi-square test				

Table 5. Comparison of additional analgesic dose needs of the groups

		Preoperatif STAI-S score		
	Total	**Grup L**	**Grup H**	**p-value**
Analgesic dose need, n (%)				*0.061
No	57 (86.4%)	25 (96.2%)	32 (80.0%)	
Yes	9 (13.6%)	1 (3.8%)	8 (20.0%)	
*Chi-square test				

Table 6. Comparison of VAS values of the groups

Time	Preop STAI-S	VAS (Mean ± SD)	Sphericity	Greenhouse-Geisser (Time-VAS)	Greenhouse-Geisser (VAS-STAI-S)
2nd hour	≤40	5.73±2.49	<0.001	<0.001	0.149
	>40	4.9±2.53			
6th hour	≤40	4.54±1.65			
	>40	4.18±2.07			
12th hour	≤40	4.19±1.96			
	>40	4.08±2.08			
24th hour	≤40	2.88±2			
	>40	3.38±2.65			

VAS: Visual analogue scale, SD: Standard deviation

operation and did not observe any difference between the two time periods (5). We performed a preoperative visit one day before the operation to determine the demographic characteristics of our patients and to measure their preoperative anxiety levels.

The most widely used test for measuring anxiety is the STAI scale, developed by Spielberger et al. (6). In our study, we also used the STAI scale to evaluate the effect of preoperative anxiety on the need for postoperative analgesics. Domar et al. (7) found a mean anxiety score of 45 according to the STAI scale in the pre-operative period in their study. Gönüllü et al. (8) reported a mean anxiety score of 40.76 in their study, which included 83 patients. In our study, we found the preoperative anxiety score of the patients to be 46.4, and we observed that our results were similar to those reported in the literature. Some studies in the literature have observed a relationship between increased anxiety levels and increased education levels, but this relationship has not been observed in some studies (9-11). In our study, we did not find a statistically significant relationship between the education status and preoperative anxiety levels of the patients.

There are studies with different results on the relationship between patient age and preoperative anxiety. Since family responsibility is found to be higher in middle-aged individuals compared to other age groups, higher anxiety levels were obtained in the study conducted by Ossai et al. (12) in this age group. Meyer et al. (13) found the anxiety level to be higher in young individuals due to their level of knowledge. In our study, the mean age of our patients was 46.09 years, and we did not find a significant relationship between age and preoperative anxiety level.

Wagner et al. (9) obtained the result that previous operation experience reduced preoperative anxiety, but Domar et al. (7) concluded that previous operation experience did not affect anxiety. In our study, we did not find a statistically significant difference between the previous surgery of experience and the level of preoperative anxiety in our patients. In their study, Güz et al. (14) evaluated the preoperative anxiety level using the state and trait anxiety scale and found a significant relationship between increased anxiety level and postoperative pain level. In our study, when we compared the preoperative anxiety levels of our patients with their postoperative VAS scores, we observed that the VAS scores decreased over time in both groups, but there was no statistically significant correlation between the anxiety level and postoperative pain scores. In the studies of Caumo et al. (11) and Kashif et al. (15), patients with increased anxiety needed more analgesics due to the increased pain they felt in the postoperative period. In our study, when the preoperative anxiety levels and the need for additional dose analgesia were evaluated, we did not find a significant statistical relationship, and we observed that 3.8% of the patients in the low- and 8% of the patients in the high-anxiety groups needed additional dose analgesia. If we touch on the shortcomings of our study, since we did not record the weight and height of our patients, the effect of body mass index on position-related postoperative pain was not evaluated.

Study Limitations

Our study has some limitations. The first limitation is that the study was conducted at a single center. Additionally, the subjective nature of anxiety assessments may impact the results. Moreover, the patients' body mass indexes were not evaluated, which could influence postoperative pain related to positioning. However, despite these limitations, the study's strengths lie in its prospective design and the examination of a specific group, specifically patients undergoing laparoscopic cholecystectomy.

Conclusion

Although medical and alternative treatment methods are used for treating postoperative pain, there is no consensus on the gold standard treatment. The side effects of the methods used can worsen the already impaired quality of life of patients. We conducted our study to evaluate the relationship between the preoperative anxiety levels of the patients and postoperative pain, and according to the data, we did not observe a relationship between the preoperative anxiety levels of our patients and their pain levels in the postoperative period.

Ethics

Ethics Committee Approval: Ethical permission for the study was obtained from Clinical Research Ethics Committee of University of Health Sciences Turkey, Istanbul Haseki Traning and Research Hospital (approval number: 2020/190, date: 21.10.2020).

Informed Consent: Informed consent was obtained from all participants.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: M.K., Design: O.S., Data Collection or Processing: M.K., N.A., Analysis or Interpretation: N.A., Literature Search: O.S., Writing: M.K., O.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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