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Risk Factors for Perioperative Anxiety in Laparoscopic Surgery

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ABSTRACT

Background and Objectives: Our aim is to investigate the anxiety status of the patient before elective cholecystectomy and to analyze the relation between the level of anxiety for a given operation type (laparoscopic and open cholecystectomy) and the corresponding demographic and social data.

Methods: A total of 333 patients undergoing cholecystectomy due to cholelithiasis were included in the study; 218 patients (66.1%) received laparoscopic cholecystectomy and 115 patients (33.9%) were treated with open cholecystectomy. The Beck Anxiety Inventory was given to all patients to be completed. We evaluated levels of anxiety in 3 groups as follows: 0 to 15, low to mild anxiety; 16 to 25, moderate anxiety; 26 to 63, severe anxiety. The following patient information remained confidential and was recorded: age and sex, associated disease, civil status, educational status, having open/laparoscopic cholecystectomy, previous knowledge of the operation, job status, economic status, health insurance, and having a child in need of care.

Results: The following criteria were determined: the most determinant factors in differentiating between the score groups were having a low level of education, being of the female sex, being single, and having laparoscopic operation; the factors of being a homemaker and over the age of 25 years were determined to have significant effects.

Conclusions: When analyzing the results that may appear during the intraoperative and postoperative period, understanding preoperative anxiety, analyzing the risk factors in depth, and taking the necessary precautions are all considerations that need to be the primary objectives of operators who are involved with laparoscopic, endoscopic, and robotic surgery.

Key Words: Laparoscopic surgery, Preoperative anxiety, Public health.

INTRODUCTION

Preoperative anxiety, a common phenomenon in preoperative patient evaluation, is a process that starts from the date of planning a given operation and progressively intensifies up to the moment of the operation itself. It can be generally described as a highly disturbing condition for patients. The symptoms of preoperative anxiety are stress and discomfort and the sympathetic, parasympathetic, and endocrine systems are known to play a role.[1] Because preoperative anxiety causes a decrease in patient comfort and quality of life, difficulties in making rational preferences between treatment choices, a decrease in various cognitive functions, and even difficulties in handling postoperative pain during the postoperative period, it is important to thoroughly analyze the possible risk factors associated with preoperative anxiety and to take the relevant precautions.[2] In this study, we investigated the anxiety status of the patient before elective cholecystectomy and analyzed the relation between the level of anxiety for a given operation type (laparoscopic and open cholecystectomy) and the corresponding demographic and social data.

PATIENTS AND METHODS

Patients

A total of 333 patients undergoing cholecystectomy due to cholelithiasis (gallstone disease) between May 2005 and April 2011 were included in the study. A total of 218 patients (66.1%) received laparoscopic cholecystectomy, and 115 patients (33.9%) were treated with open cholecystectomy. The same team performed both procedures. All patients who underwent surgery due to cholecystec-

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tomy in this period were included in the study. However, to get reliable results from the study, the psychiatric histories of all patients were questioned in detail. Whether associated with anxiety disorder or not in the past, the patients with any psychiatric diagnosis, the patients who have been using drugs for any reason, or the patients who had used drugs but stopped, especially in patients with disease associated with anxiety disorders, were excluded from the study.

Additionally, some other systemic diseases that can cause a defect on cognitive functions, such as hypertension, diabetes mellitus, atherosclerotic cardiovascular disease; patients presenting with chronic diseases that necessitate continuous drug use; and those having had a surgical operation prior to the present intervention were not included into the study.

All patients underwent preoperative systematic physical examination, complete blood cell count, and routine biochemical examination. Moreover, following consultation with the department of anesthesia, only patients who were classified as being in the American Society of Anesthesiologists' categories I and II were included in the study. Furthermore, all patients were informed about the possible risks and complications associated with anesthesia by the anesthetist, and an informed consent form was signed by the patient's relatives.

In terms of standardization, patients were hospitalized 1 day prior to the operation, and their vital signs were monitored once every 6 hours. Patients presenting with abnormal fever, pulse, or tension values were excluded from the study. All patients were informed in detail about the operation and the study by the same operator. Informed consent forms for the operation and consent forms for the study were signed by all patients. Our study was conducted in accordance with the World Medical Association Declaration of Helsinki and received approval by the institutional ethics committee.

Beck Anxiety Inventory

All patients were given the Beck Anxiety Inventory[3] to complete. The Beck Anxiety Inventory measures the strength of the anxiety indications that an individual experiences. The inventory consists of 21 items and has a Likert-type self-evaluation scale pointing between 0 and 3; the high total point indicates the high level of anxiety that an individual experiences. There is no breakpoint in the Beck Anxiety Inventory. However, according to the points scored in the Beck Anxiety Inventory, the level of anxiety of the patient is classified as follows: 0 to 7, minimal level of anxiety; 8 to 15, mild anxiety; 16 to 25, moderate anxiety; and 26 to 63, severe anxiety. In this study, we evaluated levels of anxiety in 3 groups as follows: 0 to 15, low to mild anxiety; 16 to 25, moderate anxiety; 26 to 63, severe anxiety. For illiterate patients, the Beck Anxiety Inventory form was completed by their chosen relatives, by reading and simultaneously completing the inventory in accordance with the answers provided by the patients.

Evaluated Parameters

Demographical data and applied surgical procedures from all patients were recorded into the work file database. The following patient information remained confidential and was recorded: age and sex (female [F] or male [M]); associated disease: have/do not have; civil status: (1) single, (2) married, or (3) divorced; educational status: (1) illiterate, (2) primary education, or (3) high school and university; Beck Anxiety Inventory score; having open/laparoscopic cholecystectomy; previous knowledge of the operation: (1) health personnel, (2) family doctor and/or house nurse, etc., (3) other, such as friend and/or neighbor, etc., or (4) not informed; job status: (1) unemployed, (2) self-employed, (3) employed, or (4) homemaker; economic status: (1) good, (2) average, or (3) bad; health insurance: have/do not have; and child in need of care: have/do not have.

Data Evaluation

Data analysis was performed with SPSS for Windows 11.5 package software (SPSS Inc, Chicago, Illinois). Diagnostic statistics were shown as number of features and (percentage). Categorical variables were evaluated with Pearson or Fisher exact chi-square tests. Multinomial logistic regression analysis was used to identify the factors that affect distinguishing the group with a 0 to 15 score in Beck Anxiety Inventory from the groups with 16 to 25 and 26 to 53 scores. Every variable's odds ratio, 95% confidence interval, and Wald statistics were calculated. The results were accepted as statistically significant for $P < .05$.

RESULTS

A total of 333 patients, 300 (90.1%) of whom were women and 33 (9.9%) of whom were men, were included in our study. Laparoscopic cholecystectomy (LAP) was performed on 220 patients (66.1%) and open cholecystectomy (OPEN) was performed on 113 patients (33.9%).

Systematic evaluation of the patient demographical data within LAP and OPEN groups determined the following:

There was a significant difference between LAP and OPEN groups in terms of age distribution: the 25- to 50-year age-group was predominant in the LAP group, and the 50- to 89-year age-group was predominant in the OPEN group ($P < .001$). Regarding sex distribution, women were more predominant in the LAP group than they were in the OPEN group ($P < .001$). The frequency of associated disease was significantly higher in the LAP group than in the OPEN group ($P < .001$). Regarding civil status, the frequency of single or divorced patients was significantly higher in the LAP group than in the OPEN group ($P < .001$ and $P = .003$ for single and divorced patients, respectively), whereas the frequency of married patients was significantly lower in the LAP group than in the OPEN group ($P < .001$). Regarding educational status, the frequency of illiterate patients was statistically higher in the OPEN group than in the LAP group ($P < .001$). The frequency of primary school graduates was significantly lower in the OPEN group than in the LAP group ($P < .001$). Regarding job status, the frequency of unemployed patients was similar between the 2 groups ($P = .101$); by contrast, the frequencies of self-employed patients and housewife patients were significantly higher in the OPEN group than they were in the LAP group ($P < .001$ and $P = .005$, respectively), and the frequency of employed patients was significantly higher in the LAP group than in the OPEN group ($P < .001$). Regarding economic status, the frequency of patients with good economic status was similar between the 2 groups ($P = .606$), and while patients with average economic status were predominant in the OPEN group, patients with weak economic status were predominant in the LAP group ($P < .001$). The frequencies of patients without health insurance and having children were significantly higher in the LAP group and the OPEN group, respectively ($P = .024$ and $P < .001$). The frequencies of patients informed about the operation prior to applying to the hospital by health personnel or by others was significantly higher in the LAP group than in the OPEN group ($P < .001$ and $P = .002$, respectively), whereas the frequency of patients not informed about the operation was significantly higher in OPEN group ($P < .001$) **(Table 1)**.

When the 2 groups were evaluated according to their Beck Anxiety Inventory scores, it was determined that the frequency of patients having 0 to 15 scores was statistically similar between the groups ($P = .538$), the frequency of patients having 16 to 25 scores was significantly lower ($P < .001$), and the frequency of patients having 26 to 53 scores was significantly higher ($P < .001$) in the LAP group than in the OPEN group **(Table 2)**. Further inves-

Table 1.
Distribution of the Demographical and Clinical Features of the Patients According to Surgical Groups[a]

	LAP (n = 218)	Open (n = 115)	*P*
Age, y			
18–25	19 (8.7)	5 (4.3)	.143
25–50	177 (81.2)	57 (49.6)	<.001
50–89	22 (10.1)	53 (46.1)	<.001
Sex			<.001
Male	11 (5.0)	24 (20.9)	
Female	207 (95.0)	91 (79.1)	
Associated disease	51 (23.4)	6 (5.2)	<.001
Civil status			
Single	40 (18.3)	3 (2.6)	<.001
Married	133 (61.0)	99 (86.1)	<.001
Divorced	45 (20.6)	13 (11.3)	.033
Educational status			
Illiterate	—	22 (19.1)	<.001
Primary education	125 (57.3)	44 (38.3)	<.001
High school or university	93 (42.7)	49 (42.6)	.993
Beck's Anxiety Inventory score			
0–15	42 (19.3)	19 (16.5)	.538
16–25	63 (28.9)	62 (53.9)	<.001
26–53	113 (51.8)	34 (29.6)	<.001
Informed about the operation by			
Health personnel	44 (20.2)	5 (4.3)	<.001
Others	158 (72.5)	64 (55.7)	.002
Not informed	16 (7.3)	46 (40.0)	<.001
Job status			
Unemployed	15 (6.9)	3 (2.6)	.101
Self-employed	—	10 (8.7)	<.001
Employed	72 (33.0)	15 (13.0)	<.001
Homemaker	131 (60.1)	87 (75.7)	.005
Economic status			
Good	44 (20.2)	26 (22.6)	.606
Average	101 (46.3)	75 (65.2)	<.001
Bad	73 (33.5)	14 (12.2)	<.001
Health insurance	184 (84.4)	107 (93.0)	.024
Child in need of care	172 (78.9)	107 (93.0)	<.001

LAP, laparoscopic cholecystectomy.

[a]Data are n (%). Dashes indicate that data were not available.

Table 2.
Distribution of the Demographical and Clinical Features of the Patients According to Their Scores in the Beck Anxiety Inventory[a]

	0–15 (n = 61)	16–25 (n = 125)	26–53 (n = 147)	*P*
Age, y				<.001
18–25	9 (14.8)[b,e]	7 (5.6)[b]	8 (5.4)[e]	
25–50	47 (77.0)[c,f]	50 (40.0)[c,h]	137 (93.2)[f,h]	
50–89	5 (8.2)[c,e]	68 (54.4)[c,h]	2 (1.4)[e,h]	
Sex				<.001
Male	22 (36.1)[c,g]	11 (8.8)[c,i]	2 (1.4)[g,i]	
Female	39 (63.9)[c,g]	114 (91.2)[c,i]	145 (98.6)[g,i]	
Associated disease	0 (0)[d,g]	13 (10.4)[d,h]	44 (29.9)[g,h]	<.001
Civil status				<.001
Single	4 (6.6)[e]	12 (9.6)[j]	27 (18.4)[e,j]	
Married	56 (91.8)[c]	56 (44.8)[c,h]	120 (81.6)[h]	
Divorced	1 (1.6)[c]	57 (45.6)[c,h]	0 (0)[h]	
Educational level				<.001
Illiterate	0 (0)[c]	20 (16.0)[c,h]	2 (1.4)[h]	
Primary education	16 (26.2)[b,g]	16 (12.8)[b,h]	137 (93.2)[g,h]	
High school-University	45 (73.8)[g]	89 (71.2)[h]	8 (5.4)[g,h]	
Operation type				<.001
OPEN	19 (31.1)[b]	62 (49.6)[b,h]	34 (23.1)[h]	
LAP	42 (68.9)[b]	63 (50.4)[b,h]	113 (76.9)[h]	
Informed about the operation by				<.001
Health personnel	17 (27.9)[c]	0 (0)[c,h]	32 (21.8)[h]	
Others	44 (72.1)[d]	64 (51.2)[d,h]	114 (77.6)[h]	
Not informed	0 (0)[c]	61 (48.8)[c,h]	1 (0.7)[h]	
Job status				<.001
Unemployed	2 (3.3)	8 (6.4)	8 (5.4)	
Self-employed	9 (14.8)[c,g]	0 (0)[c]	1 (0.7)[g]	
Employed	24 (39.3)[c]	9 (7.2)[c,h]	54 (36.7)[h]	
Housewife	26 (42.6)[c]	108 (86.4)[c,h]	84 (57.1)[h]	
Economic status				<.001
Good	6 (9.8)[c,h]	0 (0)[c,h]	64 (43.5)[g,h]	
Average	47 (77.0)[c,g]	118 (94.4)[c,h]	11 (7.5)[g,h]	
Bad	8 (13.1)[g]	7 (5.6)[h]	72 (49.0)[g,h]	
Health insurance	59 (96.7)[g]	122 (97.6)[h]	110 (74.8)[g,h]	<.001
Child in need of care	54 (88.5)	108 (86.4)	117 (79.6)	.170

[a]Data are n (%).
[b]The difference between the 0 to 15 and 16 to 25 score groups is statistically significant ($P < .05$).
[c]The difference between the 0 to 15 and 16 to 25 score groups is statistically significant ($P < .001$).
[d]The difference between the 0 to 15 and 16 to 25 score groups is statistically significant ($P < .01$).
[e]The difference between the 0 to 15 and 26 to 53 score groups is statistically significant ($P < .05$).
[f]The difference between the 0 to 15 and 26 to 53 score groups is statistically significant ($P < .01$).
[g]The difference between the 0 to 15 and 26 to 53 score groups is statistically significant ($P < .001$).
[h]The difference between the 16 to 25 and 26 to 53 score groups is statistically significant ($P < .001$).
[i]The difference between the 16 to 25 and 26 to 53 score group is statistically significant ($P < .01$).
[j]The difference between the 16 to 25 and 26 to 53 score groups is statistically significant ($P < .05$).

tigation was conducted to assess the determinant factors in differentiating between patients having 0 to 15 scores and those having 16 to 25 or 26 to 53 scores. According to the results of this investigation, the following criteria were determined: the most determinant factors in differentiating between the score groups were having a low level of education, being of the female sex, being single, and having laparoscopic operation; the factors of being a homemaker and over the age of 25 years were determined to have significant effects. Finally, no significant effect was determined in terms of being in a bad economic status **(Table 3)**.

DISCUSSION

Anxiety is a mood disorder emerging by a trigger or an acute situation and manifesting itself with autonomic nervous system components, such as stress, discomfort, nervosity and anxiety, and individuals having this disorder are mostly nervous, more reactive, and alert to all kinds of stimuli.[2,4–6] In this study, we investigated patients who had preoperative state anxiety, which is characterized by the fear of obscurity, the feeling of being in a strange situation, and the feeling of loss of control. When patients are asked what the causes of their anxiety are so that health personnel can perceive the different components of preoperative anxiety, many different answers are provided. For instance, most patients expressed that remaining separated from their family, and most importantly from their children, causes them anxiety. Other patients expressed that waiting for an operation causes them anxiety; contrary to expectations, being awake during the operation is not a common reason for anxiety. According to Jawaid et al[1] the most common reasons for anxiety are postoperative pain, waiting a very long time for the operation, nausea and vomiting, inability to wake from anesthesia, and fear of injection. Moreover, other studies demonstrate that patients develop anxiety because of the environment they are in. The most common reasons that patients give for anxiety due to the surrounding environment are feeling uncomfortable about the environment, having difficulty in reaching for personal belongings, sleeping in a foreign bed, and interrupted lifestyle. Nowadays, patients to be hospitalized for an operation are advised by most health care organizations to bring their own belongings (such as a pillow) with them.[7] A common conclusion drawn by most studies conducted to understand the reasons for preoperative anxiety is that the anxiety of the patient is such a complex process that it is not only relevant to surgery or anesthesia, but it is also relevant to the postoperative phase and to being separated from the family.[8]

Even in this complex and multifactorial process, there are some predictable risk factors. For example, a recent study (8) revealed that the preoperative anxiety risk of patients having future anxiety is relatively high; therefore, patients having a known psychiatric disease were excluded from our study. Furthermore, females constitute another high-risk group for preoperative anxiety, and the results of our study support this finding.[8] When being a housewife is considered as an anxiety-promoting factor, it can be suggested that being a female and having a low level of education are the 2 factors affecting this parameter; accordingly, the level of education is considered to be a risk factor from various aspects in previous studies.[8,9] In our study, a low level of education is determined to be one of the predominant and most effective factors responsible for increasing preoperative anxiety. It is considered that this situation is especially relevant to having difficulty in reaching accurate information because of the level of education, the lack of self-confidence in understanding what is being told and making the right decision after

Table 3.
Determining the Factors Playing a Role in Distinguishing Between the 0 to 15 Score Group and, Respectively, the 16 to 25 and 26 to 53 Score Groups With Multinomial Logistic Regression Analysis

Back Anxiety Inventory Score	Variables	*P*
16–25	>25 y of age[a]	.007
	Female	.422
	Single	<.001
	Low educational level[b]	.782
	LAP	<.001
	Homemaker	.003
	Bad economic status	.258
26–53	>25 y of age[a]	.287
	Female	<.001
	Single	.005
	Low educational status[b]	<.001
	LAP	.553
	Homemaker	.011
	Bad economic status	.084

LAP, laparoscopic cholecystectomy.

[a]The 25 to 50 years and 50 to 89 years age groups are combined.

[b]Illiterate or having primary education.

evaluating the information. Another factor influencing preoperative anxiety is recent operation history. Recent operation history can lessen the feeling of obscurity, and there are arguments that the preoperative anxiety level increases or decreases in accordance with the quality of the former operation.[2] Patients who had an operation before the present intervention were excluded from our study in terms of standardization. In this context, some studies claim that religious belief is another factor. In the study of Jawaid et al,[1] the investigators indicate, as an interesting note, that a patient presenting with a low anxiety score attributes this to "believing and trusting in Allah."

From the results of our study, it appears that the most unpredictable risk factor for anxiety is laparoscopic operation. This finding begs the question to what extent we, as doctors, can be successful in optimizing the patient's adaptation, despite the rapid and excellent technical developments in endoscopic and laparoscopic surgeries. We think that it should be discussed whether we should take into account the emotional and psychological state of the patient in its entirety while we are making efforts to be up to date and to apply surgical techniques that are constantly being developed and improved. Although the clinic in which this study was conducted reaches out to a wide population, has been performing laparoscopic operations for many years, and closely tracks the developments in the field, only 14.7% of patients were informed by health personnel about the laparoscopic operation, 66.6% of patients had speculative information by their relatives or neighbors who underwent the operation before, and 18.6% of patients were never informed about it, and especially the last 2 patient groups were informed about the technique of the surgery by the operator just prior to surgery in the clinic. From bilateral discussions, we concluded that the laparoscopic technique is perceived as new and untested. The following quotation demonstrates this concept from one patient's perspective: "An operation cannot be properly done through two holes; I want to have an open surgery so that you see clearly what you do." In this situation, the problem to deal with is the preoperative anxiety of a patient who is going to have an operation with a technique that the patient does not have confidence in. When analyzing the results that may appear during the intraoperative and postoperative periods, to understand preoperative anxiety, to analyze the risk factors in depth, and to take the necessary precautions are all considerations that need to be the primary objectives of the surgeons who are involved with laparoscopic, endoscopic, and robotic surgeries. Preoperative anxiety requires a higher dosage of agent for induction of anesthesia during the intraoperative period, and the studies of Carr et al[9] demonstrated that the patients who have preoperative anxiety are more likely to show nausea and vomiting in the postoperative period, need a higher dosage of agent for pain alleviation, and stay for a longer period at the hospital in the postoperative period. Some publications even assert that preoperative anxiety causes symptoms such as delirium, cognitive disorders, and some behavioral pathologies in the postoperative period.[2,9,10] Furthermore, preoperative anxiety is seen as a factor that decreases the patient's reassurance in terms of the surgery itself.[2] For all of these reasons, preoperative anxiety needs to be identified at the right time to take the necessary precautions. Although there are various tests to diagnose and assess preoperative anxiety, talking to the patient during the preoperative period is a good first step in ensuring fruitful results.[8,11–13]

Prior duty in coping with preoperative anxiety belongs to the health personnel, doctors or other relevant health personnel who perform field studies on public health shall thoroughly analyze the symptoms and findings, shall have information about the medical applications that the patient may encounter especially in next phases, and shall adequately inform the patient about these applications. Then, the operator who plans the operation shall inform the patient about the operation in accordance with the sociocultural level of the patient, shall listen to the anxiety reasons and answer his/her questions, and shall maintain a reassuring attitude in order to relieve the anxiety of the patient. Lastly, we believe in the importance of informing the patient with a patient visit by the anesthetist, ideally 1 day before the operation, thereby attempting to minimize the preoperative anxiety of the patient with a gradual informing strategy processing from simple to complicated. For training and research hospitals, both the surgical and anesthesia assistants shall have the responsibility of keeping in touch with the patient in accordance with the operators and specialists. The greatest responsibilities of the surgeon are to allocate sufficient time for the questions of the patients and to give responses to them by encouraging them to ask questions and to enable illumination on the issue for the patient to a satisfactory extent. However, to ensure effective communication between the patient and the anesthesia department, the health care staff should observe the patient and, if anxiety symptoms are noticed, refer the patient to any relevant branches. At this stage, the observations of the clinic nurses are also important. After all these observations, if the patient is perceived to present with anxiety symptoms, it is recommended to

apply the necessary tests and to ask for a consultation with the psychiatric clinic, and to take steps in accordance with the recommendations of the psychiatric clinic to avoid intra- and postoperative results.[8,11,14,15]

CONCLUSIONS

For the reasons explained in our study, it is highly important in today's surgical practice to observe patients carefully and to take the necessary precautions to avoid the bothersome intra- and postoperative results of preoperative anxiety.

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