Original Article

The Relationship of Patient's Mobility Levels who Had Laparoscopic Cholecystectomy with Pain and Hemodynamic Parameters

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Abstract

Background: Early mobilization is very important in the recovery process of surgery patients. Patients should be mobilized as soon as possible, but pain levels and hemodynamic parameters should be closely monitored during and after mobilization.
Aim: The aim of the study is to examine the relationship between pain and hemodynamic parameters of postoperative mobility levels of patients who underwent laparoscopic cholecystectomy.
Method: The study, which had a pretest-posttest single-group non-randomized quasi-experimental design, was conducted with 68 patients. 'Survey Form', Barthel Activities of Daily Living (ADL) Index', 'Visual Comparison Scale', 'Observer Mobility Scale (OMS)' were used to collect data.
Results: The mean age of the patients was 55.96±13.30 years, 34.7% were male and 65.3% were female. The hemodynamic parameter values and pain scores of the patients after movement were significantly higher than before the movement and there was a strong correlation ($p<0.001$; $r>0.70$). A significant correlation was found between some demographic and health-related data of the patients and their pre- and post-mobilization OMS scores and Barthel ADL Index values ($p<0.05$; $r>0.70$). In addition, a statistically significant correlation was found between the mean scores of the patients' first mobilization OMS and the mean postoperative Barthel ADL Index scores ($r=-0.762$; $p<0.001$).
Conclusions: Mobilization is recommended in the early postoperative period in patients who have undergone laparoscopic cholecystectomy. However, since the patients' mobility levels affect pain and hemodynamic parameters, it is important to follow the patients closely during and after mobilization in terms of possible complications.

Keywords: early mobilization, hemodynamic parameter, laparoscopic cholecystectomy, postoperative pain, surgery patient

Introduction

Cholelithiasis is defined as one of the most common gallbladder diseases in the world. It is reported that approximately 10-20% of the total population in Europe and 5-25% of the western population are diagnosed with cholelithiasis (Pak & Lindseth, 2016). However, it is known that cholelithiasis is quite common in our country (Aykas & Karasu, 2018). The definitive treatment of the disease is cholecystectomy.

With the reflection of advances in technology in the field of health, laparoscopic surgery, which is accepted as the gold standard in the treatment of gallbladder diseases, is used (Wang, Wang, & Ji, 2012). Laparoscopic cholecystectomy; It has become one of the most common surgical procedures applied today for reasons such as shortening the hospital stay, returning the patient to his daily life faster, having fewer post-operative

complications and being cosmetically advantageous (Wang, Wang, & Ji, 2012; Tan et al., 2018).

Background

Although it is a less painful method compared to open surgery, postoperative pain occurs in patients due to surgical manipulation, increased intra-abdominal pressure during the operation, irritation of intraperitoneal carbon dioxide, bile leaks during the operation, and incisions arising from the entry points of the trocars into the abdominal wall (Acar & Aygin, 2007). Abdominal pain is among the most common complications after laparoscopic cholecystectomy (Mentes et al., 2009). In the post-operative period, inadequate pain control pushes patients to avoid activities that may cause trauma to the surgical site and to rest for a long time (Dos Santos et al., 2017). However, it is noted in the literature that as the duration of bed rest increases, insulin resistance increases, and muscle weakness and muscle mass loss may occur. And also; It can cause many complications such as deep vein thrombosis, atelectasis, pulmonary embolism and anxiety (Mentes et al., 2009; İzveren and Dal, 2011). Early mobilization of the patient is important in minimizing these complications. Therefore, early mobilization has an important place in the rapid recovery protocols developed today (Kato, Miyata, & Kamei, 2015). Although there are differences in the literature, according to the ERAS protocol; It was stated that patients should stay out of bed for 2 hours on the first postoperative day and 6 hours a day on the following days (Pedziwiatr et al., 2018).

Activity planning of patients; It is performed by considering the post-operative sensory and mental state and physical and functional performance level. Patients should be stood up as early as possible, provided that their vital signs (such as blood pressure, pulse, respiration) are stable (Yolcu, Akın, & Durna, 2016; Najjar et al., 2021). Considering these situations, individualized nursing care and follow-up have a very important place in patient mobilization. The first mobilization should be done under the control of a nurse. In the preoperative period, training should be given on the technique of moving, and patients should be supported and encouraged in mobilization in the postoperative period. Applied activity planning reduces the complications associated with the surgery, accelerates the postoperative recovery and increases the quality of life (Dos Santos et al., 2017; Najjar et al., 2021).

In this context, research; The aim of this study was to determine the effect of mobility levels on pain and hemodynamic parameters (blood pressure, pulse, respiratory rate, blood oxygen saturation (SPO_2) in the postoperative period of patients who underwent laparoscopic cholecystectomy.

The main research questions of this study:

- What is the mobility level of the patients who underwent laparoscopic cholecystectomy in the postoperative period?
- How do the mobility levels of patients who have undergone laparoscopic cholecystectomy surgery affect their pain status in the postoperative period?
- How does the postoperative mobility level of patients undergoing laparoscopic cholecystectomy affect their hemodynamic parameters?

Methods

Study Design: This research is a pretest-posttest single-group non-randomized quasi-experimental study.

Sample: The population of the study consisted of patients who were treated and cared for in the general surgery clinic of a state hospital due to laparoscopic cholecystectomy. The sample of the study was calculated using the G-Power 3.1.9.7 program. In line with the literature, the sample size was determined as 68 when the effect size was 0.36, the alpha was 0.05, and the power was 90% (Aydin Sayilan et al., 2021). The study was completed with 75 patients who met the sampling criteria. Sampling criteria; having undergone laparoscopic cholecystectomy, being older than 18 years of age, being suitable for the interview in terms of general condition, and volunteering to participate in the research.

Data Collection Tools: Data; It was collected using the 'Survey Form', 'Barthel Activities of Daily Living Index', 'Visual Comparison

Scale', 'Observer Mobility Scale' and data recording form.

Questionnaire Form: In line with the literature review, it was composed of two sections, including sociodemographic characteristics and health history, and 13 questions (Mentes et al., 2009; Izveren & Dal, 2011; Kato, Miyata, & Kamei, 2015; Acar & Aygin, 2016; Yolcu, Akin, & Durna, 2016; Dos Santos et al., 2017; Tan et al., 2018).

Barthel Activities of Daily Living Index (Barthel ADL Index): It is a scale used to determine the level of addiction of patients in daily living activities. There are 10 dimensions in Barthel ADL Index and patients are evaluated based on the total scores they get from these dimensions. These; food, bathroom, toilet, clothing, bowel control, bladder control, toilet use, walking and climbing stairs. Items are classified as to whether individuals can perform activities independently, with some help, or whether they are dependent (with 20, 15, 10, 5 or 0 points). Items are determined by the level of nursing care required. A total of 100 points is obtained from Barthel ADL Index, and the higher the score, the higher the degree of functional independence. The index was developed by Mahoney and Barthel in 1965, and its sensitivity was increased by Shah et al. in 1989 (Mahoney & Barthel, 1965; Shah, Vanclay & Cooper, 1989). The Turkish validity and reliability was established by Kucukdeveci et al. in 2000 (Kucukdeveci et al., 2000). In the validity and reliability study, the Cronbach alpha internal consistency coefficient of Barthel ADL Index was found to be 0.77. In this study, the Cronbach alpha internal consistency coefficient of Barthel ADL Index was calculated as 0.72.

Visual Comparison Scale (V CS): It allows the patient to indicate the pain most clearly by scoring it. The lowest score is 0 and the highest score is 10. 0 is defined as no pain, 2 as a little pain, 4 as a little more, 6 as more, 8 as quite a lot, and 10 as the most severe pain. The patient is asked to mark the score closest to him.

Observer Mobility Scale (OMS): Dependency independence status/degree is scored between 1 and 5 during the performance of 4 activities after surgery. As a scale score of 1, he independently performed the relevant activity without verbal stimulation or physical assistance; The number 5 indicates that the patient is unable to perform the relevant activity despite verbal warning or physical assistance. Turning, sitting, standing and walking scores are summed and the average score value is calculated. The Global Observer Mobility score is obtained by summing the scores of the four activities in the scale. The lowest and highest score that can be obtained from the scale is between 1-5, and the total score is between 4-20. An increase in the score indicates that the mobility skills of the patients are insufficient, and the decrease in the score indicates that their ability to move after surgery is good/sufficient (Heye et al., 2002; Ayoglu, 2011). In the validity-reliability study, the OMS Cronbach alpha internal consistency coefficient was found to be 0.73 (Ayoglu, 2011). In this study, the OMS Cronbach alpha internal consistency coefficient was calculated as 0.70.

Data Collection: First of all, a questionnaire form was applied to the patients admitted to the clinic by face-to-face interview technique. The blood pressure, pulse, respiratory rate and SPO_2 of the patients were measured and recorded in the data recording form. Barthel ADL Index was applied to determine the mobility levels of the patient before the surgery. Postoperatively, the patient was asked to evaluate the pain with a visual comparison scale 5 minutes after the bedside mobilization was performed, and vital signs were obtained. If there was no condition for which mobilization was contraindicated (hypotension, hypertension, orthostatic hypotension, tachycardia, bradycardia, severe pain, confusion and bleeding at the surgery site), the patient was aroused. The patient was taken back to bed after walking 10 steps in the room. After 5 minutes in a sitting position, vital signs were checked again and pain was evaluated with a visual comparison scale. After the mobilization was completed, the OMS was filled in by the researcher in accordance with the instructions. In order to determine the change in the level of addiction, VCS was filled in again by the researcher. In order to determine the change in the patient's mobility level, Barthel ADL Index was applied again after the operation (Figure 1). This study performed Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) Statement as a guide

(Supplementary file-1) (Des Jarlais, Lyles, & Crepaz et al., 2004).

Ethical Considerations: Ethics committee approval was obtained from the Clinical Research Ethics Committee of a university, with protocol number 2018-82-14/03, in order to carry out the research. Permission numbered 39330677-799 was obtained from the chief physician of the institution where the research was conducted and from the Provincial Health Directorate. Informed consent was obtained from the patients for the study.

Data Analysis: The data obtained in the study were analyzed using the SPSS 17.0 program. While evaluating the research data, descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum) were used. The conformity of the quantitative data to the normal distribution was tested with Kolmogorov-Smirnov. Independent t test and paired t test were used for comparison of quantitative variables between groups. Relationships between quantitative variables were tested with Pearson correlation analysis. Statistical significance was accepted as $p<0.05$.

Results

Table 1 includes data on the sociodemographic and health status of the patients. 34.7% of the patients were male, 65.3% were female, the majority (88%) were married and lived with their families (94.7%), 54.7% had primary education, 54%, It was determined that 7 of them had a surgical experience and chronic disease, the majority of them did not smoke (72%) and did not use alcohol (92%), 58.7% did not use local analgesic drugs after surgery, and 53.3% did not have a drain. The mean age of the patients was 55.96±13.30 years, and the mean duration of the surgical procedure was 47.86±16.46 years.

The systolic blood pressure, diastolic blood pressure, pulse, respiratory rate, oxygen saturation values and pain scores of the patients were higher after the exercise than before the exercise ($p<0.001$). In addition, a strong correlation was found between the patients' systolic blood pressure, diastolic blood pressure, pulse values and pain status before and after movement ($r>0.70$) (Table 2). It was determined that all vital parameters increased after the movement.

The patients' mean preoperative Barthel ADL Index scores were 98.80±3.66, post-operative Barthel ADL Index mean scores were 87.20±9.55, first mobilization OMS mean scores were 9.90±2.45, and second mobilization OMS mean scores were 5.45±1.74 (Table 3).

The comparison of the patients' mean OMS and Barthel ADL Index scores according to the individual characteristics of the patients is given in Table 4. The OMS scores of female patients were found to be higher in both after the first mobilization and after the second mobilization compared to the male patients ($p<0.05$). It was determined that the postoperative Barthel ADL Index scores of male patients were statistically significantly higher than those of female patients ($p<0.05$). While the OMS scores measured in the first mobilization and second mobilization of the patients with chronic disease were statistically significantly higher ($p<0.001$), it was observed that the Barthel ADL Index scores were higher in those without chronic disease. However, this difference was not statistically significant ($p>0.05$). It was found that the presence of a drain in the patients also affected the OMS and Barthel ADL Index scores in a statistically significant way. While the OMS scores at the second mobilization were significantly higher in patients with a drain, they were significantly higher in patients without a drain after the Barthel ADL Index scores ($p<0.05$). While a significant difference was found between the surgical time spent in the operating room and the postoperative Barthel ADL Index score, there was a weak negative correlation between them ($r= -0.23$, $p<0.05$).

In addition, statistically significant differences were found between the mean age of the patients and their OMS and Barthel ADL Index scores. While there was a moderate positive correlation between the mean age of the patients and the first mobilization and second mobilization GCS scores ($r=0.46$, $p<0.001$; $r=0.39$, $p<0.001$), there was a moderate correlation between the mean age of the patients and the mean Barthel ADL Index scores. A negative correlation was determined ($r=-0.32$, $p<0.05$; $r=-0.36$,

p<0.001). No statistically significant correlation was found between the other sociodemographic and health-related data of the patients and the mean OMS and Barthel ADL Index scores.

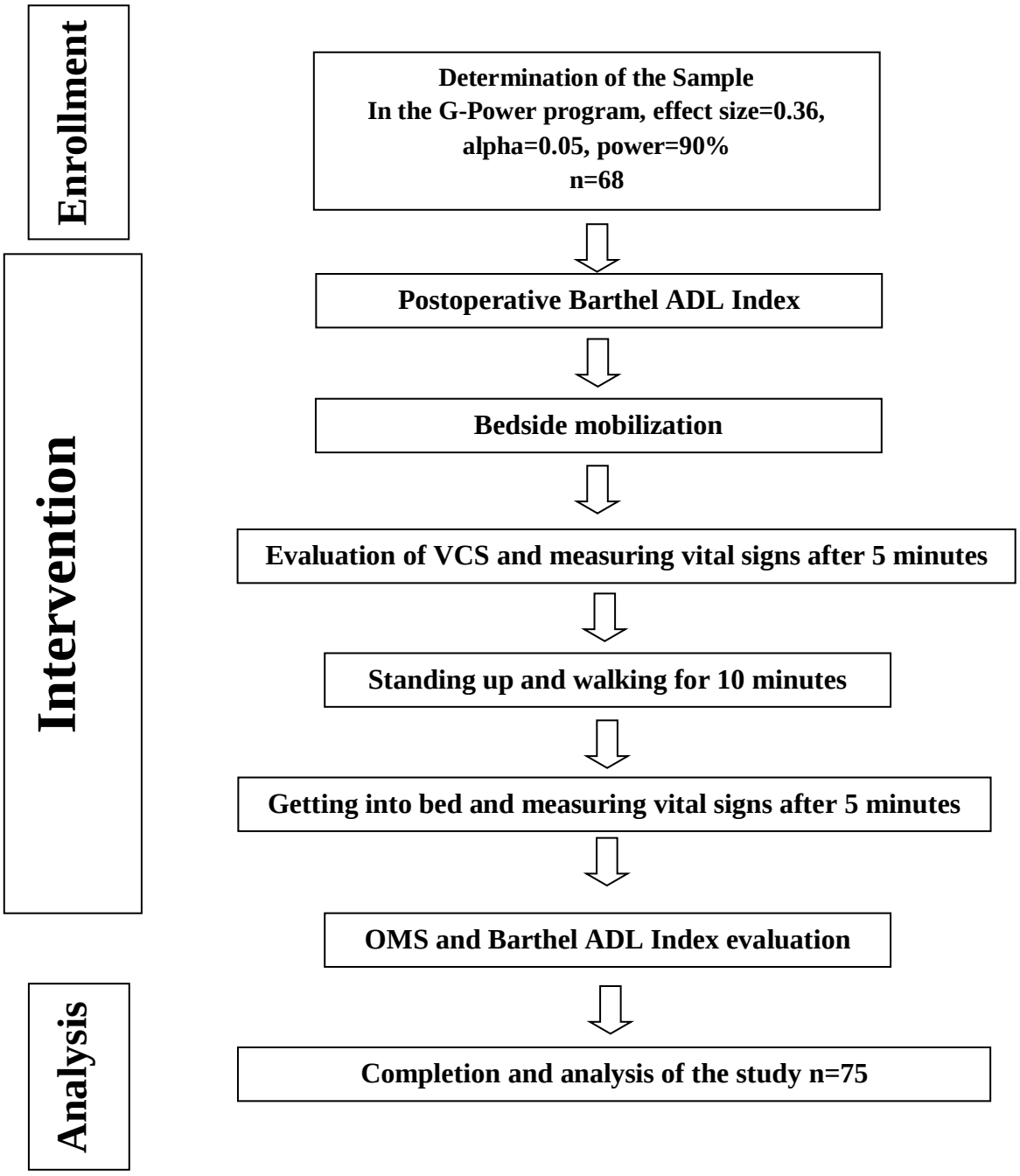

Figure 1: Data Collection Process

The relationship between the mean OMS scores of the patients and the Barthel ADL Index mean scores is given in Table 5. There was a statistically significant correlation between the patients' first mobilization and second mobilization mean OMS scores and their preoperative and postoperative Barthel ADL Index scores (p<0.05 and p<0.001). Since there was a strong negative correlation between the first mobilization of OMS and the

mean post-operative scores of Barthel ADL Index, it was determined that the level of addiction increased as the movement skills of the patients decreased (r= -0.762, p<0.001). There was a weak statistically significant negative relationship in other variables.

Table 1. Data on Sociodemographic and Health Status of the Patients

Variables	n	%
Gender		
Male	26	34.7
Female	49	65.3
Marital status		
Single	9	12
Married	66	88
Educational status		
Literate	8	10.7
Primary education	41	54.7
High school	19	25.3
Licence	7	9.3
Cohabitation status		
Alone	4	5.3
Family	71	94.7
Surgical experience		
No	34	45.3
Yes	41	54.7
Chronic disease status		
No	34	45.3
Yes	41	54.7
Smoking		
No	54	72
Yes	21	28
Alcohol use		
No	69	92
Yes	6	8
Use of local analgesic drugs after surgery		
No	44	58.7
Yes	31	41.3
Presence of drain		
No	40	53.3

Yes	35	46.7	
	Min.	**Max.**	**Mean±SD**
Age	18	78	55.96±13.30
Surgical procedure time (min)	30	95	47.86±16.46

Table 2. Comparison of Vital Parameters of Patients Before and After Movement

Vital parameters	**Before mobilization Mean±SD**	**After mobilization Mean±SD**	**t***	**p**
Systolic blood pressure (mm/Hg)	117.87±14.91	124.00±15.15	-6.75	**0.000**
r**		**0.860**		
Diastolic blood pressure (mm/Hg)	71.20±9.29	74.00±10.00	-3.25	**0.001**
r**		**0.747**		
Heart rate/min	77.66±9.07	82.38±9.28	-11.64	**0.000**
r**		**0.920**		
Breaths/min	19.33±2.16	20.04±1.89	-3.56	**0.001**
r**		**0.654**		
SpO_2 (%)	94.94±1.50	96.88±1.38	-12.69	**0.000**
r**		**0.582**		
Pain score	4.10±1.94	4.76±2.31	-5.62	**0.000**
r**		**0.908**		

**Paired t test **Pearson correlation analysis SD: Standard Deviation*

Table 3: Mean OMS and Barthel ADL Index Scores of the Patients

Scales	**Min.**	**Max.**	**Mean±SD**
Barthel ADL Index total score			
Before surgery	80	100	98.80±3.66
After surgery	60	100	87.20±9.55
OMS score			
First mobilization	4	16	9.90±2.45
Second mobilization	4	10	5.45±1.74

SD: Standard Deviation

Table 4. Comparison of the Mean Scores of OMS and Barthel ADL Index according to the Individual Characteristics of the Patients

Variable	n	%	OMS After The First Mobilization Mean±SD	OMS After The Second Mobilization Mean±SD	Barthel ADL Index Before Surgery Mean±SD	Barthel ADL Index Before Surgery Mean±SD
Gender						
Male	26	34.7	8.65±2.05	4.69±1.15	99.42±1.62	91.34±8.19
Female	49	65.3	10.57±2.40	5.85±1.88	98.46±4.35	85.00±9.57
Test Statistics (t*)			t=0.708	t=14.604	t=5.207	t=1.005
			p=0.001	**p=0.005**	p=0.286	**p=0.005**
Chronic disease						
No	34	45.3	8.94±2.41	4.67±1.22	98.82±3.70	89.55±9.48
Yes	41	54.7	10.70±2.21	6.09±1.86	98.78±3.67	85.24±9.28
Test Statistics (t*)			t=0.445	t=12.007	t=0.000	t=0.024
			p=0.001	**p=0.000**	p=0.961	p=0.510
Drain						
No	40	53.3	9.45±2.31	5.05±1.66	99.62±1.74	89.25±8.05
Yes	35	46.7	10.42±2.53	5.91±1.75	97.85±4.89	84.85±10.67
Test Statistics (t*)			t=0.005	t=0.877	t=17.270	t=1.187
			p=0.852	**p=0.030**	**p=0.030**	**p=0.040**
Surgical time	47.86±16.46		9.90±2.45	5.45±1.74	98.80±3.66	87.20±9.55
Test Statıstıcs (r)**			r= 0.176	r= 0.087	r= -0.125	r= -0.237
			p=0.142	p=0.491	p=0.273	**p=0.040**
Age	55.96±13.30		9.90±2.45	5.45±1.74	98.80±3.66	87.20±9.55
Test Statıstıcs (r)**			r= 0.467	r= 0.395	r= -0.327	r= -0.364
			p=0.000	**p=0.001**	**p=0.004**	**p=0.001**

**Independent t test **Pearson correlation test SD: Standard Deviation*

Table 5. Comparison of the Patients' Mean OMS and Barthel ADL Index Scores

Varıables	Barthel ADL Index Before surgery Mean±SD	Barthel ADL Index After surgery Mean±SD
	98.80±3.66	87.20±9.55
OMS First mobilization Mean±SD 9.90±2.45	r= -0.246 **p=0.010**	r= -0.762 **p=0.000**
OMS Second mobilization Mean±SD 5.45±1.74	r= -0.273 **p=0.010**	r= -0.343 **p=0.000**

SD: Standard Deviation

Discussion

Comparison of Patients' Preoperative and Postoperative Barthel ADL Index Levels

In the study, it was determined that while the patients were mildly dependent (98.80±3.66) in the preoperative period in their daily living activities, their dependence levels increased and they became moderately dependent (87.20±9.55) in the postoperative period. Considering that daily life activities such as getting out of bed require trunk strength, coordination and balance, the trauma caused by the movement in the surgical area limits the mobilization of patients. It is thought that this may be the main reason for the increase in the addiction level of the patients. The results of two studies conducted in orthopedics and cardiovascular surgery clinics are in parallel with our study, and it has been shown that patients are mildly to moderately dependent after surgery (Yolcu, Akın, & Durna, 2016; Najjar et al., 2021).

Guner and Cilingir (2021), in their study on neurosurgery patients, the postoperative Barthel ADL Index score of the patients was found to be 34.8±31.8, and it was shown that they were highly dependent. In this study, it is thought that the reason for the low mean score of Barthel ADL Index compared to our results may be due to the presence of many complications such as hearing loss, dysphagia, memory loss, paralysis, blindness, speech disorders, mental confusion and loss of sensation in patients after neurosurgery (Guner & Cilingir, 2021). In a study evaluating the effect of ERAS protocols on recovery in patients who underwent minimally invasive transforaminal lumbar interbody fusion surgery, the Barthel ADL Index scores of the patients in the control group decreased temporarily within the first three days after the surgery. However, it showed a statistical increase within one month after surgery compared to preoperative values (Yang et al., 2020). In a meta-analysis study, although it was reported that there was no statistically significant difference between early mobilization and non-early mobilization, it was reported that early mobilization increased the Barthel Index score and shortened the length of hospital stay (Li et al., 2018). In our study, it was determined that the dependence levels increased with the decrease in the postoperative mobility of the patients, and it seems to be in line with the literature in this direction.

Comparison of OMS Scores Related to Mobilization of Patients

In the study, the dependence of the patients on the nurse during their first mobilization was moderate, and their dependence level

decreased in the second mobilization. The physical and psychological changes caused by the surgical process in the patient may cause difficulties during mobilization (Katogi, 2020). When we look at a few studies conducted in our country, it has been shown that the level of addiction of patients decreased between mobilization and second mobilization, and the findings support our research (Yolcu, Akın, & Durna, 2016; Iskender, Bektas, & Eren, 2020). There are also international studies reporting that activities such as getting out of bed early, transferring, standing and walking shorten the length of stay and increase the mobility of patients (Guerra, Singh, & Taylor, 2015; The AVERT Trial Collaboration group, 2015; Herisson et al., 2016). For this reason, it is thought that support of mobilization by nurses, especially after surgical procedures that restrict patients' mobility, may have a positive effect on many parameters such as length of hospital stay, cost of care, and risk of complications.

The Relationship Between Demographic and Health Status and Mobilization Status of the Patients

In the study, it was found that female patients were more dependent on postoperative mobilization than male patients. It is thought that this may be related to the fact that female patients are more dependent on daily living activities in the preoperative period than male patients. In a group of studies, it has been shown that there is no significant difference between gender and mobilization (Yolcu, Akın, & Durna, 2016; Iskender, Bektas & Eren, 2020). Up-to-date research is needed in this regard.

In the study, it was shown that as age increases, the dependency ratio of patients to nurses during mobilization also increases. It is thought that the comorbidities brought about by advanced age have a direct effect on the level of mobilization and may cause an increase in addiction levels. The data of the research conducted by Yolcu et al. (2016) support the current research results. In the study conducted by İskender et al. (2020), it was shown that, unlike the current study, there was no significant relationship between age and mobilization level. It is thought that this may be due to the high age range of the sample group (min-max: 50-81/ 48-80).

The presence of chronic disease has been shown to have an effect on the movement levels of the patients in the postoperative period, and it has been shown that patients with chronic diseases have higher scores on the observer mobility scale. It is thought that this result may be due to the higher level of addiction in daily living activities of patients with chronic diseases. The data of a study conducted in our country are similar to the results of the current study (Yolcu, Akın & Durna, 2016). In another study, it was reported that the postoperative early mobilization times of patients with preoperative comorbidities were affected. In addition, it is stated in the study that the probability of developing complications increases 1.9 times as the patient's level of movement decreases (Kenyon-Smith et al., 2019). For this reason, early mobilization of patients with preoperative comorbidities gains more importance.

In a study of patients with trochanteric fractures, both preoperative and perioperative factors were found to be significantly associated with the early postoperative Barthel Index score (Tomita et al., 2022). These factors; age, body mass index, dementia, nutritional status, Charlson Comorbidity Index score and hemoglobin value are reported. Similarly, in our study, it was observed that there was a relationship between the patients' mean Barthel ADL Index scores and age, gender, presence of drains, and the duration of surgery, while the mean OMS scores were affected by the factors of age, gender, and presence of chronic disease.

The Relationship Between Patients' Vital Findings and Oxygenation Levels and Mobilization Status

In the study, it was determined that systolic blood pressure, diastolic blood pressure, pulse, respiratory rate and oxygen saturation values increased significantly after mobilization compared to before mobilization. In addition, it is seen that increasing values do not go out of the parameters accepted as normal, and especially the increase in respiratory rate and oxygen saturation shows a change for the benefit of

the patient. These results suggest that mobilization has a positive effect on all vital parameters.

In the study of Kose and Avsar, the difference between the pulse and systolic blood pressure values measured before and after the first mobilization in patients who had open heart surgery was statistically significant ($p<0.05$). In the same study, it is stated that the difference between the mean systolic blood pressure values before the first mobilization and after the third mobilization is statistically significant. However, the measured values did not go out of the normal range after each mobilization (Kose &Avsar, 2021). In a study, data after out-of-bed mobilization and in-bed position change were compared, and a statistically significant ($p<0.05$) clinically insignificant increase was found only in the respiratory rate while standing and sitting on a chair (Ozcelik et al., 2017). This is in line with our research since mobilization causes an increase in respiratory rate but does not go beyond normal limits. In the study of Yolcu et al. (2016) in our country with patients who underwent different surgical procedures, the results of our study support the results of our study, and it has been shown that the vital signs of the patients before and after mobilization are statistically significantly higher. Giacchi et al. (2020) and Moradian et al. (2017), it was reported that there was a significant increase in the pulse and respiratory rates of the patients after mobilization. Cassina et al. (2016), on the other hand, although there is no significant difference in vital signs, its negative effects are not mentioned. With these results, it can be said that mobilization has a positive effect on vital parameters.

In the study of Fagevik et al. (2021), it was shown that mobilized patients had higher SPO_2 levels. It seems to be beneficial to encourage patients to mobilize early in order to prevent pulmonary complications in the postoperative period. The results of the research conducted by Zhou et al. (2021) in patients undergoing lung surgery also showed that mobilization improved pulmonary functions and SPO_2 levels were higher. In a study, it was revealed that postoperative mobilization increased tissue oxygenation and cardiovascular response was preserved in patients undergoing breast surgery (Muller, Nielsen & Kehlet, 2010). Fagevik et al. (2021), the blood gas levels of the patients were also examined, and it was shown that the partial oxygen levels of the patients were higher after mobilization. The results of the studies reviewed and our current study also show the positive effect of mobilization on the oxygenation levels of the patients.

All the data obtained suggest that the support of mobilization by the nurse in the postoperative period will reduce the risk of complications and positively affect the quality of life of the patients.

The Relationship Between Patients' Pain Levels and Mobilization Status

In the study, it was determined that the pain of the patients increased significantly after mobilization. The results of the research conducted by Masashi (2020) show that the pain levels of the patients increase after mobilization. The proximity of the surgical incision to the diaphragm and the dense nerve network in the abdominal region cause an increase in pain after mobilization (Havey, 2013). Studies have also pointed out that more than 50% of patients avoid mobilization due to the fear of post-operative pain (Straatman et al., 2016; Probst et al., 2017). Pain is a parameter that negatively affects patient mobilization and must be taken under control before mobilization.

Study Limitations and Strengths

There were a few limitations during the implementation of the study. One of its limitations is that it was performed only on patients who had undergone laparoscopic cholecystectomy. It is thought that this limitation will be eliminated with studies conducted with patients who have undergone different surgical procedures. In addition, the evaluation of the OMS score by a single observer is among the limitations of the study. In addition, in our study, initial mobilization (bedside mobilization) and after (standing up and walking 10 steps) were evaluated. However, further evaluation of patients' mobility levels and addiction status in the postoperative period may also strengthen research.

One of the strengths of the study is that the patients' movement levels were comparable as they were evaluated both preoperatively and

postoperatively. In previous years, studies evaluating the post-operative movement levels and addiction status together are limited. Studies were generally evaluated with a single scale. Therefore, another strength of our study is the evaluation of the patients' activity levels (OMS) and their addiction status (Barthel ADL Index) together. In addition, the small number of studies in the literature examining the effect of postoperative mobility on vital parameters strengthens our research.

Conclusion: The research showed that post-operative mobilization increased pain levels. However, it was determined that postoperative mobilization had positive effects on vital signs and addiction levels. Therefore, early postoperative mobilization is recommended for patients undergoing laparoscopic cholecystectomy. In addition, it is recommended that future studies be conducted with patients who have undergone different types of surgery and that patients' mobility levels should be evaluated by at least two observers.

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