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RESEARCH ARTICLE

INVESTIGATION OF THE EFFECT OF AMBULATION TIME ON PATIENT OUTCOMES, ANXIETY AND DEPRESSION

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ABSTRACT

Background: As with any surgical intervention, undesirable complications may occur in patients after abdominal surgery. Early ambulation is an effective nursing intervention applied to accelerate recovery.

Aim: The aim of the study was to investigation of the effects of ambulation time on patient outcomes, anxiety and depression.

Method: This is a descriptive cross-sectional study conducted with 157 patients in the general surgery clinic of a training and research hospital in western Turkey. The data were collected using a Descriptive Form, Patient Outcomes Follow-up Form, Brief Pain Inventory, Hospital Anxiety and Depression Scale (HADS) and analyzed by number, percentage, Mann–Whitney U test, Spearman correlation method using the Statistical Package for Social Science software version 24.

Results: The mean time to ambulation of the patients was 12.45±9.07 hours. It was found that the time to ambulation of the patients with nausea, constipation, nasogastric catheter, urinary catheter and drain was increased ($p < .05$). In addition, a weak and positive correlation was found between the patients' ambulation time and age, duration of anesthesia, length of hospital stay and mean depression score ($p < .05$).

Conclusions: It was determined that the ambulation time of the patients with nausea, constipation, drain and catheter were delayed. It was found that the time to ambulation was increased as the patients' age, duration of anaesthesia and depression scores increased. In addition, it was determined that the duration of hospitalization increased with the increase in the time to ambulation of patients. It is suggested to remove the drains and catheters as early as possible, planning to keep the anesthesia period as short as possible, follow-up of patients in terms of depression symptoms, prevention of nausea and vomiting and establish standards for ambulation to ensure early ambulation in patients undergoing surgery.

Keywords: pain, ambulation, anxiety, depression, patient outcome

INTRODUCTION

It is reported that abdominal surgeries constitute approximately 70% of surgical interventions (1). The high number of patients undergoing elective major abdominal surgery indicates the importance of the issue (2). As in many surgical intervention, patients may experience undesirable results such as pulmonary complications, pain, bleeding, arrhythmia, nausea and vomiting, paralytic ileus, abdominal distension, constipation, urinary retention, venous thromboembolism, wound dehiscence and surgical site infection after abdominal surgery (3,4). In addition, the presence of anxiety and depression in the pre-operative period leads to higher anaesthetics

use during surgery, increased post-operative pain and the consequent increased need for analgesics as well as a higher number of complications (such as nausea, vomiting, fatigue, tachycardia and respiratory system problems). Therefore, it extends the duration of hospitalization, thereby negatively affecting patient recovery, patient satisfaction and quality of life (5,6). In order for the patients to go through the surgical process without complications, in addition to a successful surgical intervention, patient care should be provided by considering the risk factors before and after the surgery. In particular, the early post-operative period (the first post-operative 72 hours) is the period when the risk of developing complications is high (3,7,8). During this period, effective pain management, minimising nausea and vomiting, minimize the use of catheters and drains, detecting and effectively managing anxiety and depression and promoting early ambulation of patients are among the important practices to accelerate the healing process (3,9-11). Early ambulation is an effective nursing intervention applied to prevent complications (pulmonary complications, decreased skeletal muscle strength, thromboembolic complications and insulin resistance) related to immobility and to accelerate recovery, and it is a fundamental part of nursing care practices (12-15). In addition, early ambulation is an important component of Enhanced Recovery After Surgery (ERAS) protocols which are aimed to accelerate post-operative healing (12,13,15). However, patients who have undergone surgery may be reluctant to move, especially in the early post-operative period, due to fear of increased pain and damage to the incision site (12,16). Furthermore, factors such as parenteral fluid therapy, the presence of a drain or chest tube, prolonged indwelling urinary catheter may lead to post-operative difficulties in ambulation (14,15,17). Studies have reported that prolonged bed rest due to difficulties in ambulation increases the risk of complications. (8,18-20). Although various studies have been carried out on ambulation, there has been no study investigate the effects of ambulation time on some patient outcomes, anxiety and depression.

Purpose

The aim of the study was to investigate of the effects of ambulation time on patient outcomes, anxiety and depression.

METHODS

Design

The study was designed as a descriptive cross-sectional study.

Settings

The study was conducted from February 1 to November 29, 2019, in the general surgery clinic of a training and research hospital in the Aegean Region of Turkey. The sample of the study consisted of 157 patients who underwent open abdominal surgery. We calculated the sample size to be 140 based on the number of patients who underwent open abdominal surgery (n: 350) in the same period during the previous year with 80% power, 95% confidence interval and 0.05 margin of error.

The inclusion criteria for the 157 patients in the study sample were as follows: ≥18 years of age, ability to communicate verbally, post-operative hospitalization for at least 24 hours, compliance with the American Society of Anesthesiologists (ASA) I-II-III classification criteria, no diagnosis of a musculoskeletal and neurological disease that will affect ambulation (such as stroke, hemiplegia, cerebrovascular event, multiple sclerosis) and volunteering to participate in the study. Total 101 patients (11 patients who refused to participate in the study, 5 patients who were classified as ASA IV, 85 patients who underwent laparoscopic abdominal surgery) were excluded.

Data collection tools

The data were collected using four tools: the Descriptive Form, Patient Outcomes Follow-up Form, Brief Pain Inventory (BPI) and Hospital Anxiety Depression Scale (HADS).

Descriptive Form: This form was prepared by the researchers with reference to the relevant literature. It consists of 17 questions about the sociodemographic characteristics and medical history of the patients [age, gender, marital status, educational status, profession, medical diagnosis, presence of chronic disease, body mass index (BMI), smoking status, previous hospitalization history, previous surgical intervention, the type of current surgical intervention, duration of anaesthesia, ASA score, duration of hospitalization, postoperative ambulation pattern and time] (9,10,21).

Table 1. Distribution of Individuals by Sociodemographic and Clinical Characteristics

Variables	$\overline{X} \pm SD$	Min–Max
Age (years)	49.50±18.10	18-87
BMI (kg/m²)	27.00±5.10	18-46
Duration of anaesthesia (min)	93.50±50.00	20-270
Pre-operative duration of hospitalization (days)	0.72±1.14	0-1
Post-operative duration of hospitalization (days)	2.24±1.24	1-5
Duration of hospitalization (days)	2.95±2.00	1-11
Time to ambulation (hours)	12.45±9.07	3-48
Saturation	94.10±2.30	90-98
	n	**%**
Gender		
Female	70	44.6
Male	87	55.4
Educational status		
Illiterate	11	7.0
Literate	5	3.2
Primary school	77	49.0
Secondary school	23	14.6
High school	24	15.3
University	17	10.8
Marital status		
Single	37	23.6
Married	120	76.4
Profession		
Civil servant	4	2.5
Unemployed	16	10.2
Self-employment	17	10.8
Worker	18	11.5
Retired	42	26.8
Housewife	60	38.2
Smoking Status		
Smoker	43	27.4
Non-smoker	114	72.6
Chronic illness		
Yes	42	26.8
No	115	73.2
ASA score		
1	37	23.6
2	99	63.1
3	21	13.4
First ambulation type		
1–2 steps in the room	14	8.9
Walking in the room	104	66.2
Walking in the service corridor	39	24.8
Total	**157**	**100.0**

ASA: American Society of Anesthesiologists, BMI: body mass index, SD: standard deviation

Patient Outcomes Follow-up Form: In this form, patient outcomes (urinary retention, abdomial distension, nausea, vomiting, constipation and oxygen saturation) are recorded within 72 hours postoperatively.

Brief Pain Inventory: It was developed by Cleeland et al. (22). The validity and reliability study of the Turkish version of the scale was performed by Dicle, Karayurt and Dirimeşe (23). BPI consists of four questions about pain intensity and seven questions about the effect of pain on functions (general activity, mood, walking, communication with people, sleep, enjoying life). Each dimension is scored between 0 and 10 (23). In the study by Dicle et al. (23), the Cronbach alpha coefficient was 0.79 for pain intensity and 0.80 for the effect of pain on functions. In our study, the Cronbach alpha coefficient for BPI was 0.89 for the part that included questions 3–6 related to pain intensity in the scale and 0.85 for the part of question 9 related to pain interaction, which included sub-questions A, B, C, D, E, F and G.

Hospital Anxiety Depression Scale: This scale was developed by Zigmond and Snaith and includes anxiety and depression sub-scales (24). The first validity and reliability evaluation of Turkish version of the scale was performed by Aydemir et al. (25). The scale consists of 14 items, 7 of which investigate depression and 7 investigate anxiety symptoms. The purpose of the scale is not to establish a diagnosis, but to determine the risk group by screening anxiety and depression in a short time. In addition, the scale can be used to evaluate the changes in patients' emotional state. Answers are evaluated in a four-point Likert format and are scored between 0 and 3. The lowest score that patients can receive in both subscales is 0, and the highest score is 21. As a result of the receiver operating curve analysis, the cut-off point of the Turkish form of HADS was 10 for the anxiety subscale (HADS-A) and 7 for the depression subscale (HADS-D). Accordingly, people who score above these scores are considered as the risk group (25). The Cronbach alpha values of HADS-A and HADS-D were 0.852 and 0.778, respectively (25). In our study, it was determined that the Cronbach alpha values of the general HADS scale, HADS-A and HADS-D were 0.790, 0.700 and 0.739 respectively.

Table 2. Mean Post-operative Pain, Anxiety and Depression Scores of the Patients

Scales	Scale Sub-dimensions	$\bar{X} \pm SD$	Min – Max
BPI	Mean pain status over the past 24 hours	3.7±1.7	0-8
	Current pain status	2.1±2.0	0-8
	Percentage of pain relief with pain treatment in the last 24 hours	82.7±16.0	30-100
	General activity	3.5±2.3	0-10
	Emotional state	2.6±2.6	0-10
	Ability to walk	4.0±2.5	0-10
	Deep breathing and coughing exercise	5.8±2.7	0-10
	Relationships with other people	1.6±2.0	0-8
	Sleep	2.8±3.3	0-10
	Enjoying life	1.8±2.3	0-10
HADS	Anxiety	4.0±2.6	0-12
	Depression	4.4±3.0	0-14

BPI: Brief Pain Inventory, HADS: Hospital Anxiety Depression Scale, SD: standard deviation

Data collection

The data were collected by the investigators through face-to-face interviews with patients in the 72-hour postoperative period and from patient records (protocol number, diagnosis, surgical intervention, ASA score and duration of anaesthesia). The oxygen saturation levels of the patients were measured and recorded using a Medwelt finger-type pulse oximeter during data collection period. Data were collected in approximately 15–20 minutes for each patient.

Statistical analysis

The data were analysed using the Statistical Package for Social Sciences (SPSS) 24 software. Shapiro–Wilk tests were used to determine whether the data obtained were normally distributed. Information on patients were presented as number, percentage and mean. Mann–Whitney U test and Spearman correlation analysis were used for the variables without normal distribution. The level of significance was set at $p \leq 0.05$ for all the tests performed.

Ethical consideration

To conduct this study, permission was obtained from the local Non-Invasive Clinical Research Assessment Commission (Date/Number 2019/04) and the institution,and written and verbal consent was obtained from patients who agreed to participate in the research.

RESULTS

Sociodemographic and clinical characteristics of the individuals are listed in Table 1. Postoperative pain, anxiety and depression scores of the individuals are given in Table 2. Table 3 presents the comparison of the mean time to ambulation of the patients based on post-operative symptoms and presence of catheter. Accordingly, it was found that the mean time to ambulation of the patients with nausea, constipation, nasogastric catheter, urinary catheter and drain was increased ($p< .05$). There was no significant difference between vomiting and time to ambulation; however, it was found that the mean time to ambulation of the patients with vomiting was higher ($p > .05$). Accordingly, it was determined that the time to ambulation of the patients with symptoms and catheter use was increased.

Examination of the correlation between time to ambulation and pain, anxiety, depression, age, duration of anaesthesia and duration of hospitalization of the patients is presented in Table 4. There was a weak positive relationship between time to ambulation of the patients and depression ($r_s = 0.190$; $p = .017$), age ($r_s = 0.275$; $p < .001$), duration of anaesthesia ($r_s = 0.306$; $p < .001$) and duration of hospitalization ($r_s = 0.350$; $p < .001$); these results were statistically significant ($p < .05$).

DISCUSSION

In the post-operative period, there is no established standard for determining the time for ambulation of patients. However, if the patient does not have anaemia and has a stable haemodynamic condition, ambulation is recommended within 8 hours post-operatively (2). According to ERAS protocol, patients should be mobilised out of bed for two hours on the day of surgery and at least six hours on the following days (9,15). In addition, it is recommended that even patients in intensive care who have undergone radical surgery should be ambulated within the first 24 hours, provided that their vital signs are stable (8,19). In our study, it was determined that the mean post-operative time to ambulation was 12.45±9.07 hours. Arı and Yılmaz (26), reported that the mean of post-operative time to ambulation of the patients was 7.1±3.1 hours in their study. In the study by Mahmudova and Candan Dönmez (21), it was reported that the time to ambulation of the patients after surgery was

Table 3. Comparison of Patients' Post-operative Symptoms and Presence of Catheter with Mean Time to Ambulation

Variables	n	%	x̄ ± SD	Test statistics
Nausea				
Yes	113	72.0	13.9±9.8	U=1565.0*
No	44	28.0	8.8±5.6	**p=0.0001**
Vomiting				
Yes	16	10.0	13.9±12.3	U=1082.5*
No	141	89.8	12.3±8.7	**p=0.790**
Constipation				
Yes	30	19.1	15.4±9.0	U=1334.0*
No	127	80.9	11.7±9.0	**p=0.010**
Nasogastric catheter				
Yes	27	17.2	16.7±10.9	U=1205.0*
No	130	82.8	11.6±8.4	**p=0.010**
Urinary catheter				
Yes	31	20.0	19.5±11.7	U=885.0*
No	124	80.0	10.8±7.4	**p=0.0001**
Drain				
Yes	106	67.5	13.7±9.7	U=1960.0*
No	51	32.5	9.8±7.1	**p=0.005**

***** Mann–Whitney U test, SD: standard deviation

8.94±3.24 hours. The reasons for the delay in ambulation of the patients in the post-operative period reported in previous studies include disagreements about the time of ambulation, insufficient number of nurses and high workload, lack of team cooperation and lack of time (8,27,28). It is even reported that ambulation is the most unmet and missed nursing care practice, with a rate of 84% (27). It is believed that the differences between ambulation times in studies may be due to the lack of a standard regarding ambulation times.

In our study, it was found that the time to ambulation was increased as the duration of anaesthesia and age increased. Yolcu et al. (17) reported that in the post-operative period, patients' difficulties with ambulation increased in parallel with increased age, whereas Adogwa et al. (29) reported that there was no significant difference between age and ambulation group (early ambulators-late ambulators). Increase in age and duration of anaesthesia are factors that may pose a risk for the development of post-operative complications. It is reported that patients are at risk of developing complications after surgical interventions longer than four hours (11). In addition, it is known that there are difficulties in patients' ability to move as age increases. All these factors are also believed to delay ambulation times of the patients.

Patients who have surgery may be reluctant to move, especially in the early post-operative period, due to potential pain due to movement and fear of damage to the incision site (12,16). In our study, the mean pain level of the patients was 3.7, which was low, and there was no significant relationship between pain and time to ambulation. However, it was determined that the time to ambulation of patients with nausea and vomiting was delayed, and there was a significant difference in terms of nausea. Further, studies have reported that nausea and vomiting lead to reluctance to stand up in patients and thus, delay ambulation (30). Additionally, a reluctance to consume food may develop in patients with nausea. Therefore, nutrition and fluid intake may be adversely affected due to nausea and vomiting (31). Consequently, it is believed that potential fatigue developed due to this may delay ambulation time for patients. In addition, our study found that patients with delayed ambulation time were constipated. Several previous studies have also reported that delayed ambulation time of patients result in constipation (3,26,32). It is important to restore the gastrointestinal functions to normal by ensuring early ambulation of patients.

It has been reported that the presence of drains and catheters in patients also lead to delay in ambulation (14,17). Based on the results of the study by Ahmed et al. (33), it was found that the duration of ambulation and hospitalization are related to the time of removal of the urinary catheter. In the study by de Lima et al. (34) it was reported that the walking distance of patients with chest tubes increased significantly after removal of the chest tubes. In our study, the time to ambulation of patients with drain, urinary catheter and

Table 4. Examination of the Correlation between Time to Ambulation and Pain, Anxiety, Depression, Age, Duration of Anaesthesia and Duration of Hospitalization

		Pain	HADS-A score	HADS-D score	Age	Duration of anaesthesia	Duration of hospitalization
Time to Ambulation (hour)	r_s	.048	.078	.190	.275	.306	.350
	p	.553	.330	**.017**	**.0001**	**.0001**	**.0001**

r_s: correlation coefficient, $p < .05$

HADS-A: Hospital Anxiety Depression Scale-Anxiety, HADS-D: Hospital Anxiety Depression Scale-Depression

nasogastric catheter was significantly increased, consistent with the results of other studies. It is believed that this may be due to the patients' fear that they will experience pain due to the proximity of the drains to the surgical incision site or their worries that the catheter/drain may be dislocated during ambulation. In addition, the absence of the need to go to the toilet due to the presence of a urinary catheter may cause a delay in ambulation.

It was found that the patients who participated in our study had no anxiety and depression tendency (HADS-A 4.0±2.6, HADS-D 4.4±3.0). Among other studies that examined the anxiety and depression levels in patients undergoing surgery, the mean scores reported by Okanlı et al. (35) were 8.1±5.0 (HADS-A) and 7.74±4.9 (HADS-D) and those reported by Gök ve Kabu Hergül (36) were 7.96±4.27 (HADS-A) and 7.95±4.4 (HADS-D). It is believed that the higher mean scores in these studies may be due to the inclusion of different types of surgical interventions in the study. On the other hand, it was determined in our study that as the mean score of depression increased, the time to ambulation was increased. However, there was no significant relationship between time to ambulation and mean anxiety scores. There are no studies that investigate the relationship of ambulation times of patients with anxiety and depression. However, it is reported that the presence of pre-operative anxiety and depression in patients leads to an increase in the use of anaesthetic agents during surgery, increased post-operative pain and consequently increased analgesic need, as well as a higher number of complications (such as nausea, vomiting, fatigue, tachycardia, respiratory system problems), poorer quality of life and prolonged hospitalization (5,37). This suggests that the negative effects of these problems on the post-operative recovery of patients may lead to a delay in the time of ambulation.

In our study, it was determined that the duration of hospitalization increased as the time to ambulation of the patients was increased. Studies have reported that the duration of hospitalization was significantly shorter in patients who were ambulated early after surgery, and that the physical, social and psychological well-being of the patients were better (16,38,39). In the study by Öndeş Bayar et al. (40), patients who underwent liver resection were divided into two groups (accelerated surgery group and conventional surgery group). Patients in the accelerated surgery group were ambulated early in the first 24 hours after surgery and allowed to spend two hours out of bed on the day of surgery and six hours on the following days until they were discharged. The duration of hospitalization in this group was 5.5±1.4 days, whereas that of the conventional surgery group was 11.4±2.84 days (40). Another study stated that the duration of hospitalization was 5.7 days in patients who were ambulated early and 12.9 days in those who were not ambulated early (41). Early ambulation reportedly reduced the risk of developing complications in patients (12-15). Therefore, this effect has been reported to decrease the duration of hospitalization and even reduce hospital infections, cost, morbidity and mortality rates (14,20).

CONCLUSIONS

In conclusion, it was found that the time to ambulation was increased as the patients' age, duration of anaesthesia and depression scores increased. However, time to ambulation had no relationship with mean scores of pain and anxiety. In addition, it was determined that the time to ambulation of patients with post-operative nausea, vomiting, constipation, nasogastric catheter, urinary catheter and drain was increased. Moreover, it was found that the duration of hospitalization increased with the increase in the time to ambulation of patients.

Therefore, it is suggested to remove the drains and catheters as early as possible, planning to keep the anesthesia period as short as possible, follow-up of patients in terms of depression symptoms and planning the necessary interventions in their presence nausea and vomiting and establish standards for ambulation to ensure early ambulation in patients undergoing surgery.

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