

Original Article

## Relations between Patients' Breathing Practices and Mobilisation after Lung Resection Surgery

**Sacide Yildizeli Topcu, BSN, MSc, PhD ,**

Teaching Assistant, Trakya University, Health Science Faculty, Surgical Nursing Department, Edirne, Turkey

**Selda Rızalar, BSN, MSc, PhD**

Assistant Professor, Medipol Trakya University, Health Science Faculty, Nursing Department, Edirne, Turkey

**Fatma Önüt, BSN**

Trakya University, Health Center for Medical Research and Practice (Hospital), Department of Thoracic Surgery, Edirne, Turkey

**Ayşe Gökçe Işıklı, BSN, MSc**

Trakya University, Health Center for Medical Research and Practice (Hospital), Department of Thoracic Surgery, Edirne, Turkey

**Seher Ünver,**

Trakya University, Health Science Faculty, Surgical Nursing Department, Edirne, Turkey

**Correspondence:** Sacide Yildizeli Topcu, Teaching Assistant, Trakya University, Health Science Faculty, Surgical Nursing Department E-mail: [sacideyildizeli@yahoo.com](mailto:sacideyildizeli@yahoo.com)

### Abstract

**Background:** Mobilisation and pulmonary physiotherapy is used together for improving lung functions after surgery.

**Aims:** This study was aimed to examine the relation between patients' frequency and duration of mobilization and practices of pulmonary physiotherapy after lung resection surgery.

**Methods:** This cross-sectional, relational study was conducted from 1<sup>st</sup> of May 2013 to 30<sup>th</sup> of April 2014 with 66 patients who have undergone lung resection surgery. Until the time of discharge from morning of 1<sup>th</sup> day after surgery, patients' frequency and duration of mobilisation and frequency of deep breathing and coughing exercises and using spirometry were followed up. Data analysis was performed using SPSS 16.0.

**Results:** It was found out that 69.7% of the patients who participated in the research were men and the average age of the patients was  $57.24 \pm 14.93$ , 65.2% of the patients were applied wedge resection and all of the patients stood up on the 1<sup>st</sup> day after the operation. It was found that there were positive relationships between patients' frequency and duration of mobilization and practices of pulmonary physiotherapy including breathing and coughing exercise and frequency of using spirometry in the postoperatively from first day until fifth day.

**Conclusions:** According to the study results, patients undergone lung resection executed the pulmonary physiotherapy practices easily with effect of mobilisation which provided sensation of wellness. In this respect, it is suggested that nurses should make the patients mobilize more frequently and support them about increasing their duration of mobilization in the postoperative period.

**Key Words:** Lung resection, mobilisation, nursing care, postoperative, pulmonary physiotherapy.

### Introduction

Lung resection is the common surgical procedure performed in various pulmonary pathologies such as lung cancer, bronchiectasis and lung abscesses (Sivakumar & Maiya, 2008). After the lung

surgery, pulmonary functions may be affected negatively due to limited movement of the chest, impaired coughing reflex and elimination of sputum associated with anaesthesia, pain and stress of surgery. Eventually, various postoperative pulmonary complications such as

atelectasis, sputum retention, respiratory infection and respiratory failure can appear (Reeve, 2008; Sivakumar & Maiya, 2008; Kaneda, Saito, Okamoto, et al., 2007). Also, postoperative pulmonary complications lead to additional health cost and prolonged hospital stay and an increase in morbidity and mortality after major surgery (Samnani, et al., 2014; Haines, Skinner, Berney, 2012).

Systematical and standardized care is essential for improving quality of perioperative care and reducing incidence of complication in the patients undergone lung resection surgery. In this approach of care, assessment of patients preoperatively, perioperative education and pulmonary physiotherapy and mobilisation are important implementations (Schwarzbach, et al., 2010). Positive effect of pulmonary physiotherapy including deep breathing and coughing exercises, using spirometry and mobilisation was indicated in the literature (Haines, Skinner, Berney, 2012; Reeve, 2008; Sivakumar & Maiya, 2008; Kaneda, Saito, Okamoto, et al., 2007). On the other hand, Agostini et al. (2013) stated that pulmonary physiotherapy was not enough for preventing pulmonary complications alone after lung resection surgery. Also, Samnani et al. (2014) recommended that in their study, pulmonary physiotherapy should be supported with mobilisation.

Although, there is information in the literature that mobilisation and pulmonary physiotherapy was used together for improving lung functions after surgery and reducing postoperative pulmonary complications, any relation between frequency and duration of mobilisation and practices of pulmonary physiotherapy is not seen (Samnani, Umer, Mehdi, et al., 2014; Agostini P, Naidu, Cieslik, et al., 2013; Silva, Li, Rickard, 2013; Haines, Skinner, Berney, 2012; Westerdahl & Möller, 2010; Sivakumar & Maiya, 2008). This study was aimed to examine the relation between patients' frequency and duration of mobilization and practices of pulmonary physiotherapy after lung resection surgery.

## Methods

### Participants and Design

This cross-sectional, descriptive study was conducted between 1 May 2013 to 30 April 2014 at Trakya University Health Center for Medical Research and Practice (Hospital) Department of

Thoracic Surgery with 66 patients who were volunteered to participate in research. The study was approved by Trakya University School of Medicine Scientific Research Ethics Committee (File number: TÜTF-GOKAEK-2013/08). The study population consisted of patients undergoing elective lung resection surgery involving lobectomy and wedge resection. Patients were excluded if they had a problem about communication and mobilisation.

### Procedure

In the preoperative period, researchers interviewed the 74 patients undergoing elective lung resection surgery and determined patients who met the inclusion criteria. Informed consent was taken from the patients who were volunteered to participate in research. Pulmonary physiotherapy practices (deep breathing and coughing exercise, use of incentive spirometry) and mobilisation were taught to patients and said that it should be done by the patients in the postoperative period much as they can. In the postoperative period, patients were mobilized by the nurses within 8 hours after surgery. Until the time of discharge from morning of 1<sup>st</sup> day after surgery, patients' frequency and duration of mobilisation and frequency of deep breathing and coughing exercises and using spirometry were followed up by the researcher. Because of the occurring postoperative complications (5) and unwillingness to participate in the study (3) eight patients were not included in this study.

### Data Analysis

Data analysis was performed using SPSS 16.0 (Statistical Package for the Social Sciences Version 16.0. Descriptive statistics (mean, frequency and percentage) and correlation analysis was used to analyse the results. *P* value of  $\leq 0.05$  was considered significant.

### Results

In this study examining the relation between mobilization and practices of pulmonary physiotherapy, it was found that there were relationships between patients' frequency and duration of mobilization and practices of pulmonary physiotherapy postoperatively from first day until fifth day. It was found out that 69.7% of the patients who participated in the research were men and the average age of the patients was  $57.24 \pm 14.93$ , 66.7% of the patients had an operation experience, 65.2% of the patients were applied a wedge resection and all of

the patients stood up on the 1. day after the operation (Table 1).

It was detected that in the post-operative first to five days patients' frequency and duration of mobilisation increased as of the 1. day (respectively;  $7,04 \pm 3,04$  -  $9,89 \pm 4,12$  times/day;  $38,34 \pm 32,79$  min. -  $86,29 \pm 79,78$  min./day). It was detected that as the frequency of patients' mobilisation increases, the frequency of the breathing and coughing exercises application and the frequency of working with spirometry also increase; but duration of mobilisation affects the frequency of post-operative breathing exercises positively on the first five postoperative days; coughing exercises on the first three postoperative days; also the frequency of working with spirometry on the following postoperative two and five days. (Table 2).

## Discussion

Postoperative immobilisation causes various complications including severity pulmonary complications affecting the patients' recovery process negatively. Therefore, patients should be mobilized as soon as possible after the surgery (İzveren & Dal, 2011). In the literature, it was seen that the effects of early mobilisation on postoperative recovery were investigated in patients undergone other surgical procedures more than thoracic surgery (Samnani, Umer, Mehdi, et al., 2014; Silva, Li Rickard, 2013; Haines, Skinner, Berney, 2012; Reeve, 2008; Browning, Denehy, Scholes, 2007; Toraman, Karabulut, Alhan, 2000). In the studies carried out with patients undergone lung resection, the investigations about the effect of postoperative mobilisation on pulmonary functions and postoperative pulmonary complications stand out.

In their study, Sivakumar & Maiya's (2008) investigated the effects of mobilisation on exercise tolerance after lung resection surgery and it was reported that patients' pulmonary functions and exercises tolerances improved in the study group. Kaneda et al. (2007) stated in their study conducted with patients undergone lobectomy that early mobilisation after surgery accelerated the recovery of pulmonary functions according to the conventional mobilisation procedures. Similarly, Toraman et al. (2000) reported that early mobilisation had an important role in preventing postoperative pulmonary complications in the patients undergone open heart surgery. Also, Schwarzbach et al. (2010) reported that the length of hospital stay was

reduced in the patients undergone pulmonary lobectomy with a clinical pathway including early mobilisation. In this study investigated relations between frequency and duration mobilisation and practices of pulmonary physiotherapy was determined that there are positive relations between the frequency of mobilisations and the frequency of pulmonary physiotherapy activities including breathing and coughing exercises and using spirometry at 1th to 5th postoperative days, postoperatively. When looking at the relations between the duration of mobilisation and the frequency of the pulmonary physiotherapy activities, it was detected that there are positive relations between the duration of mobilisation and the frequency of breathing and coughing exercises at the first 3 days after surgery, also the frequency of using spirometry was affected from the duration of mobilisation at 2<sup>nd</sup> and 5<sup>th</sup> days, postoperatively.

In the abdominal surgeries, positive effects of mobilisation on pulmonary functions and the length of stay are discussed. Browning et al. (2007) who studied with patients undergone upper abdominal surgery reported that daily frequency and duration of mobilisation and walking greater than 5 metres on day have a positive effects on reducing the length of stay. Similarly, Silva et al. (2013) stated that mobilisation reduced postoperative pulmonary complications and length of stay in patients undergone elective open upper abdominal surgery. In their study which was conducted with the patients undergone surgery for gastrointestinal cancer, Van der Leeden et al.(2015) reported that occurrence of postoperative pulmonary complications were reduced after implementation of mobilisation. Also, Samnani et al. (2014) and Haines et al. (2012) stated that early postoperative mobilisation following abdominal surgery was an effective implementation in reducing postoperative pulmonary complications after abdominal surgeries. Results of the studies showed that time, frequency and duration of mobilisation had positive effects on pulmonary functions after surgeries. Also, in the literature, it was stated that mobilisation implemented for the purpose of recovering pulmonary functions, supporting to the cardiovascular system, preventing postoperative complications and improving sensation of wellness reduced the length of stay (Silva, Li, Rickard, 2013; Browning, Denehy, Scholes, 2007; Genç, 2007).

**Table 1. Baseline and perioperative patients characteristics (n=60)**

		N	%
Sex	Female	20	30.3
	Male	46	69.7
Type of surgery	Lobectomy	23	34.8
	Wedge Resection	43	65.2
Have a past surgical experience	Yes	44	66.7
	No	22	33.3
Have a information about pulmonary physiotherapy	Yes	63	95.5
	No	3	4.5
Time of getting informed about pulmonary physiotherapy	Preoperative	62	98.4
	Postoperative	1	1.6
Application of pulmonary physiotherapy preoperative period	Yes	62	95.4
	No	3	4.6
	<b>M±SS</b>	<b>Min.</b>	<b>Max.</b>
Age	57.24±14.93	19	86
Pain	5.04±2.25	0	10
Duration of ending drainage (day)	3.86±1.86	1	10
Length of stay (day)	7.22±2.64	3	14

**Table 2. Relation between frequency and duration of mobilisation and frequency of pulmonary physiotherapy practices**

		M±SS	Frequency of breathing exercises	of Frequency coughing exercises	of Frequency of using spirometry
POD 1.	Frequency mobilisation of	7.04±3.04	r= 0.399 <b>p= 0.001</b>	r= 0.625 <b>p= 0.000</b>	r= 0.347 <b>p= 0.004</b>
	Duration mobilisation (min.) of	38.34±32.79	r= 0.549 <b>p= 0.000</b>	r= 0.413 <b>p= 0.001</b>	r= 0.224 p= 0.070
POD 2.	Frequency mobilisation of	9.07±4.00	r= 0.555 <b>p= 0.000</b>	r= 0.682 <b>p= 0.000</b>	r= 0.447 <b>p= 0.000</b>
	Duration mobilisation (min.) of	66.63±54.34	r= 0.492 <b>p= 0.000</b>	r= 0.484 <b>p= 0.000</b>	r= 0.396 <b>p= 0.001</b>
POD 3.	Frequency mobilisation of	8.70±3.97	r= 0.446 <b>p= 0.000</b>	r= 0.645 <b>p= 0.000</b>	r= 0.386 <b>p= 0.002</b>
	Duration mobilisation (min.) of	73.05±53.21	r= 0.292 <b>p= 0.024</b>	r= 0.265 <b>p= 0.041</b>	r= 0.156 p= 0.235
POD 4.	Frequency mobilisation of	9.05±4.28	r= 0.530 <b>p= 0.000</b>	r= 0.614 <b>p= 0.000</b>	r= 0.435 <b>p= 0.001</b>
	Duration mobilisation (min.) of	80.77±64.84	r= 0.353 <b>p= 0.009</b>	r= 0.252 p= 0.067	r= 0.227 p= 0.099
POD 5.	Frequency mobilisation of	9.83±4.12	r= 0.458 <b>p= 0.004</b>	r= 0.429 <b>p= 0.008</b>	r= 0.607 <b>p= 0.000</b>
	Duration mobilisation (min.) of	86.29±79.78	r= 0.413 <b>p= 0.011</b>	r= 0.268 p= 0.108	r= 0.466 <b>p= 0.004</b>

POD: Postoperative day

As a simple method, mobilisation can be implemented by the nurses in order to prevent postoperative complication and improve ability of maintaining daily living activities after surgery (Topçu, Fındık, Üstündağ, et al., 2009). Therefore, in the nursing care of patients undergone lung surgery, mobilisation should be started as soon as possible after surgery.

### Conclusions

Based on the study results, it is said that patients undergone lung resection surgery mobilized quite frequently and performed the pulmonary physiotherapy practices including breathing and coughing exercises and using spirometry with effect of mobilisation provided sensation of wellness. According to these results, nurses should make the patients mobilize more frequently and support them about increasing their duration of mobilization in the postoperative period, with the aim of performing patients' breathing and coughing exercises more easily after lung surgery.

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