

24 hours prehabilitation for thoracoscopic surgery; is it enough to improve outcome?

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Abstract

Background: VATS is used in both diagnostic and therapeutic pleural, lung and mediastinal surgery.

Objective: assess the patients' knowledge about thoracoscopic surgery and evaluate the effect of 24 hours prehabilitation protocol on patients' length of hospital stay and quality of life.

Patient and method: Quasi experimental research design was used to conduct this study. The sample was consisted of a convenience sixty adult patients undergone thoracoscopic surgery. The following tools were utilized for data collection: "An interview questionnaire sheet for patients" and "World Health Organization Quality of Life".

Result: There was significant difference between study and control groups as regard to hospital stay with no significant difference as regard total quality of life.

Conclusion: 24 hours prehabilitation for thoracoscopic surgery should be tried in centers with no long wait list and can lead to shorter hospital stay.

Introduction

During the last three decades, video-assisted thoracoscopic surgery (VATS) has revolutionized the surgical approach to several thoracic pathologies. Compared to thoracotomy, VATS has demonstrated not only a significant reduction in pain, recovery time and complications but also an improvement in the post-operative quality of life for patients. Therefore, VATS should be considered the conventional approach for almost all common thoracic operations [1].

VATS is principally employed in the management of pulmonary, mediastinal, and pleural pathology. Its main benefit has been the avoidance of a thoracotomy incision, which allows a shorter operating time, less postoperative morbidity, and earlier return to normal activity than can be achieved with thoracotomy [2].

Enhanced recovery after surgery (ERAS) programs has been focused mainly in minimal invasive surgical approach during lung resection and respiratory rehabilitation after surgery. Prehabilitation has demonstrated reduction of morbidity-mortality in other surgeries but in thoracic surgery continues to be under discussion. The implementation of a preoperative respiratory rehabilitation could optimize patient's physical capacity before surgery, improve outcomes and enhance recovery [3].

High-intensity interval training has been assumed as the best alternative option to endurance training, with duration of the intervention from 2 to 6 weeks. It continues a limitation in some countries where patients can be operated in less than 2 weeks, but generally 4 weeks of waiting is the usual and scientific societies support these periods of time [3].

Prehabilitation has an impact on the occurrence and severity of postoperative complications. Prehabilitation is easy to perform and

easily adapted to each patient's functional abilities. Early recovery of physical function is possible after VATS but does not necessarily correlate with early QOL recovery. It is therefore necessary to perform perioperative interventions to quickly restore QOL after surgery [4].

Nowadays, healthcare system is facing numerous challenges due to aging population, medical technique advancement and rise of consumerism. Surgical technique and treatment strategies for thoracic surgical patients continue to evolve. Nurses, as one of the pivotal members of the healthcare teams, need to grow and go forward together as well. Thoracic nursing team works closely together with other healthcare professionals and provides quality care to patients suffering from thoracic diseases. Post-operative nursing interventions including complication monitoring and early mobilization remain the most important and essential care to ensure early and complication-free rehabilitation [5].

High-risk patients can be optimized with preoperative and postoperative cardiopulmonary rehabilitation to reduce their operative risk, frequency of complications and hospital stay and improve postoperative outcomes including postoperative lung function. In addition, preoperative pulmonary rehabilitation may improve preoperative exercise capacity and so operability. The future development and adoption of innovative strategies is required to reduce

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the impact of post-operative complications in an ageing co morbid population [6].

Material and method

This was a prospective randomized case-control pilot clinical trial (clinical trial number: NCT03915093) carried out from January 2018 till December 2018 on patients who met the inclusion criteria. Quasi experimental research design was utilized to conduct this study.

The sample size was 73 patients per year was selected by using the equation according to Steven Thompson [7].

Inclusion criteria:

- Age between 18-65 year.
- All cases undergone video thoracoscopic surgery.
- Patients accept to continue with the researcher until follow up.

Exclusion criteria:

- Converted to thoracotomy.
- Patients refuse to participate.

World Health Organization Quality of Life (WHOQOL)

WHOQOL [8] contains 5 broad domains of QOL within which 18 facets are covered to determine the quality of life. These 5 domains include physical, social, psychological, environmental and perceived QOL.

Distribution of the scores in QOL tool

The scoring of these variables, a 3-point lickert scale on tables was adopted for the answer low QOL=0-3, moderate QOL=4-6, and high QOL =7-9.

Data were collected at the cardiothoracic surgery department at Assiut University Hospital. The tools were filled through interviewing and the purpose of the study was explained to all patients prior to collection of data.

For the control group; after taking the patient oral agreement for voluntary participation in the study, the researcher then fills the patient's structured assessment sheet. After the patient's discharge from the hospital, the researcher calls the patient for follow up in telephone one-month post thoracoscopic surgery for re-evaluating the patient's condition includes quality of life.

For the study group; after filling the patient's structured assessment sheet, the researcher explains to the patient prehabilitation protocol in the following sequence: the prehabilitation protocol was prepared in a simple Arabic language with a simple photo illustrations and contain information about thoracoscopic surgery (pre – post care and follow up instructions). It was administered to the patient in two sessions, the duration of each session was about 45 minutes, including 15 minutes for discussion and feedback, but the time may differ from one patient to another according to educational level and his\ her ability to understand what is being said. Each patient in the study group obtained a copy of the prehabilitation booklet. After the patient's discharge from the hospital, the researcher calls the patient for follow up in telephone one-month post thoracoscopic surgery for re-evaluating the patient's condition include (knowledge and quality of life).

Content validity

The content validity for the booklet in Arabic language was done by 5 expertise (medical staff) from cardiothoracic surgery department & (nursing staff) from the medical-surgical nursing department who reviewed the booklet for clarity, relevance, comprehensiveness, understanding, applicability and easiness.

Results

During the study time frame, the study included 73 patients, 13 of whom were excluded from the study, 3 of them converted to thoracotomy and the other 10 not respond to telephone calls. Finally, 60 patients were completely followed up and analyzed. Two groups were formed: one group with prehabilitation (n=30) and one group without prehabilitation (n=30). Patients were followed from 24th hour preoperatively to the postoperative day 30.

More than half of the study group patients (53.3%) and more than one third of the control patients (33.3%) their age ranged from (18-29 years). About two thirds of both groups (study 63.3% and control 66.7%) were male. As regarding to level of education the highest percentage in study group (36.7%) were highly educated and in control group (33.3%) were not educated.

There was no significant difference between both groups as regarding to type of operation with the highest percentage underwent lung resection surgery in both groups (36.7% and 33.3%) respectively (Table 1).

There was statistical significance difference between study and control group patients as regarding to environmental and general or perceived QOL domains and there was no significance difference between study and control group patients as regarding to physical, psychological and social domains (Table 2).

This study presented that, there was significant difference between study and control groups as regard to hospital stay with means (3.166 ± 2.018 and 5.033 ± 4.649) respectively.

Table 1. Frequency distribution of both groups (study and control) in relation to types of operation (n=60)

Variables	Study		Control		P.V
	N	%	N	%	
Sympathectomy	5	16.7	2	6.7	.714 ns
Lung resection	11	36.7	10	33.3	
Pleural or lymph node biopsy	6	20.0	8	26.7	
Decortication	5	16.7	5	16.7	
Others	3	10.0	5	16.7	

Chi-Square Tests

Ns= Non-significant difference p<0.05

Table 2. Mean total quality of life for studied patients (study and control groups) as regarding to general domains (n=60)

Variables	Total score	Study	Control	P.V
		Means±SD	Means±SD	
Physical	63	37.800±2.524	38.000±2.228	.746 ns
Psychological	36	29.600±1.003	28.900±2.073	.101 ns
Social	27	11.833±11.286	14.166±10.989	.421 ns
Environmental	27	20.733±2.196	19.633±1.973	.046*
Perceived QOL	9	7.733±1.48	6.933±1.172	.024*
Total score QOL	162	107.700±11.614	107.633±10.707	.982 ns

Independent t-test, *=Significant difference, *p≤0.05, Ns= Non-significant difference p<0.05, **= highly significance, p≤0.01

Discussion

Based on the results of the present study; more than half of the study group patients and more than third of the control group patients their age ranged from (18-29 years). Most of both groups were male. As regarding to level of education the highest percentage in study group were highly educated and in control group were not educated.

Schwarzbach *et al.* [9] unlike our study as regard age of patients; they stated that the median age was 66 year in study group and 60 year in control group, but they agree with the study as regard to sex which revealed that the majority of patients were male. They reported that there are no statistically significant differences in sex, age between both groups. This study was in the same line with Hammad and Saad [10] who found that, the mean age of the patients was 27.8 years (range 19-35).

As regarding to diagnosis, it was noticed that the highest percentage of patients had lung, mediastinal or pleural mass with no significant difference between both groups as regarding to type of operation with the highest percentage underwent lung resection surgery in both groups.

These results in the same line with Schwarzbach *et al.* [9] who reported that the majority of patients in both groups underwent VATS for diagnostic or therapeutically pulmonary wedge resection (pulmonary/pleural mass or bullae resection). The most common underlying diagnoses were malignancies in both groups.

The present study revealed that, there was highly statistical significance difference between study group patients pretest and posttest in total knowledge. This result was supported by Brunetti *et al.* [11] who told that preoperative educational program helps to set expectations about surgical and anesthetic procedures and may diminish fear, fatigue and pain and enhance recovery and early discharge. Verbalized education, leaflets and multimedia information containing explanations of the procedure and cognitive interventions may improve pain control, nausea and anxiety after surgery.

Refai *et al.* [12] revealed that, a preoperative personal education may play a key role to reduce stress, fear or anxiety and improve the morbidity of patients, enabling them to achieve functional and psychological compensatory mechanisms more quickly. Preoperative patient counseling performed using verbal, written or multimedia materials to make the patient a potentially active participant and the main character of recovery, able to positively impact self throughout the surgical and healing process.

Sebio Garcia *et al.* [13] reported that education provides beneficial effects with no evidence of harm. Pain control appears better following lung resection. It is recommended that patients should routinely receive dedicated preoperative education and concluded that prehabilitation is beneficial, but, because of study heterogeneity, the exact duration, intensity, structure and patient selection to achieve maximum efficacy is uncertain [13].

Boujibar *et al.* [14] reported that physical activities are method of disease control and treatment for patients. In particular, exercise has positive effects on physical and mental health and is essential for patients who feel their quality of life has deteriorated due to physical, psychological, emotional, and financial hardships [14].

Batchelor *et al.* [15] mentioned that preoperative exercise rehabilitation program can reduce hospital stay and postoperative pulmonary complications. Because of study heterogeneity, no firm

recommendations can be made on the nature of the intervention in terms of exercise modality, delivery and frequency or preoperative duration. Preoperative exercise program should be considered for patients with borderline lung function or exercise capacity.

Refai *et al.* [12] revealed that, the information transfer may be impaired by the patient's intellectual level, language barriers, learning disabilities, and cultural barriers. Considering all these factors, questions and discussions with the surgeon should be encouraged as an additional tool provided to the patients [12].

According to Schwarzbach *et al.* [9] reported that length of hospital stay (LOS) was 9 days for clinical pathway (CP) group and 14 days for pre pathway group. The median length of stay in the hospital was five days shorter in the CP group as compared to the pre pathway group [9]. This was confirmed by the result of the present study which illustrated that the means of hospital stay for study and control groups were (3.166 ± 2.018 and 5.033 ± 4.649) respectively.

This study also, supported by Gao *et al.* [16] who reported a correlation between prehabilitation and length of hospital stay, but disagree with Boujibar *et al.* [14] who found that there was a median difference of two days in LOS between groups, but this was not statistically significant [14].

Valenzuela *et al.* [17] in the same line with the current study who mentioned that shorter hospital stays with lower postoperative complications were found in the preoperative physiotherapy education group, the differences were not significant. There was no significant differences in the types of complications between the groups ($p > 0.05$).

Bertolaccini *et al.* [18] found that, depending on the type of surgical procedure, most patients stay in the hospital one to four days and can return to their normal activity levels within four weeks. VATS results in less pain during weeks and months of recovery; patients have much smaller scars; and patients have a better chance of breathing normally post-surgery.

This study clarified that, there was significance difference between study and control groups' patients as regarding to environmental and general or perceived QOL domains and there was no significance difference between study and control group patients as regarding to physical, psychological and social domains with better improvements in total QOL of study group than control group.

Sanchez-Lorente *et al.* [19] reported that VATS has been shown to deliver a better immune system response, provide a better chance of breathing normally and a better quality of life after surgery.

Anami *et al.* [20] reported that early recovery of physical function is possible after VATS but does not necessarily correlate with early QOL recovery. It is therefore necessary to perform perioperative interventions to promptly restore QOL after surgery. Shi *et al.* [21] found that patients who underwent VATS returned to their baseline activity, mood and enjoyment of life at a significantly faster rate than patients who underwent open lobectomy.

White *et al.* [22] found that, preoperative education programs make patients would no longer arrive at the operating theatre frightened and unaware of what will happen to them. The provision of good quality preoperative information facilitates patient's active involvement in their care and may contribute to an overall increase in satisfaction. Preadmission information intervention helps reduce postoperative pain levels and significantly increases knowledge of self-care and complication management.

Mielck *et al.* [23] found that less than half of the studied sample has low evaluation of the quality of life and which are responsible for poor community health and low satisfied about their health with chronic disease.

Deasy *et al.* [24] revealed that perioperative rehabilitation strategies recommended to prevent postoperative complications include lung expansion interventions, deep breathing exercises, incentive spirometry, and ambulation. Negative automatic thoughts are associated with reduced health behavior and physical activity.

Ronco *et al.* [25] reported that surgical patient outcomes are improved by patient education, and the maladaptive coping style is a risk factor for psychiatric morbidity and decreased survival in cancer patients.

Öz *et al.* [26] revealed that thoracic surgery operations caused substantial dissatisfaction in life comfort especially in the third month postoperatively. The worsening in physical function, physical role, pain and mental health is much more in patients with resection compared with the patients who did not undergo resection.

Möller *et al.* [27] found that the extent of surgery, age, and adjuvant therapy, was predictive of a reduced postoperative QOL 6 months after lung surgery. Other factors, i.e., gender, comorbidity, postoperative complications, and tumor stage, were not associated with a higher risk for impaired postoperative QOL.

Conclusion

The result of the present study concluded that; 24 hours prehabilitation for thoracoscopic surgery should be tried in centers with no long wait list and can lead to shorter hospital stay and improvements in total knowledge and total QOL after prehabilitation protocol implementation.

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