



DIFFERENCES IN THE LONG-TERM QUALITY OF LIFE FOLLOWING DIFFERENT SURGICAL APPROACHES IN THORACIC SURGERY

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Article Received on 09/05/2022

Article Revised on 30/05/2022

Article Accepted on 20/06/2022

ABSTRACT

Objective: To assess the long-term quality of life, more than 6 months after surgery, across different surgical techniques in thoracic surgery. **Methods:** Data was collected on 141 patients retrospectively, each having a thoracic surgery procedure more than 6 months prior to invitation to participate in the study. Patients were divided into three groups based on the surgical approach: open approach; video assisted thorascopic surgery (VATS) and robot assisted thorascopic surgery (RATS). The EQ-5D-5L questionnaire was used to estimate the utility score of quality of life: mobility; self-care; usual activities; pain/discomfort and anxiety/depression. **Results:** Mobility, self-care and usual activities were not significantly different between the three groups. Pain, or discomfort, was significantly higher in the open approach group, with only 36.8% reporting no pain, compared to 51.3% and 62.7% in the RATS and VATS approaches, with a P-value of 0.037. Likewise, self-described anxiety and depression were more common among the open approach group, with a P-value of 0.022. **Conclusion:** Patients who underwent a minimally invasive approach in Thoracic Surgery have better long-term quality of life, with less pain and less feelings of anxiety post-operatively, compared to those who underwent an open approach. Accordingly, a minimally invasive approach should be adopted where possible in Thoracic Surgery.

KEYWORDS: Thoracic surgery, quality of life, minimally invasive, pain.

INTRODUCTION

Thoracic surgery has evolved significantly in recent years. For many years, thoracotomy was the gold standard as a surgical approach in the management of primary and secondary lung cancer as well as benign conditions. However, with the development and adaption of minimally invasive surgery into thoracic surgery, such as video-assisted thorascopic surgery (VATS) and robotic-assisted thorascopic surgery (RATS), there has been a rapid and touchable technological, medical, and surgical revolution in thoracic surgery.^[1,2,3]

These developments were not only in surgical techniques but also improvements in diagnostic methods, treatment modalities, and peri-operative care have all led to the earlier diagnosis and treatment of lung cancer, reducing lung cancer mortality overall. Currently, the average age for diagnosis of lung cancer is 70 years and thus lung cancer can be considered a disease of the elderly. Due to the increasing life expectancy in patients with lung cancer and patients who need thoracic surgery for any reason, it becomes important to give more attention to the quality of life (QoL) after thoracic surgery.^[1,4,5]

Quality of Life assessments reflects different aims to just survival post-operatively, but also to those in the

biopsychosocial model, as well as functional status, and provides further information usually reported as morbidity and mortality with short-term outcomes.^[6,7] In this study, we aim to evaluate the long-term QoL in patients who underwent a variety of thoracic surgery procedures, for different indications, using different surgical approach techniques.

METHODS

A retrospective study was completed, collecting data from 141 patients who underwent different thoracic surgeries more than 6 months prior to data collection for this study. Included patients were divided into three groups based on the surgical approach; open approach (49 patients), VATS (51 patients), and RATS (41 patients).

The EQ-5D-5L questionnaire was used to estimate the utility values of QOL (Mobility, Self-care, Usual activities, Pain/Discomfort, Anxiety/Depression). Each of these have five options as to performance status, with Level 1 indicating there the task can be completed without difficulty or discomfort, reaching up to Level 5, indicating that the patient is unable to complete the task, or feels uncomfortable while completing the task.

In our institution, VATS approach was with 3 or 4 ports technique. RATS approach used 4 port technique with one utility port. A posterolateral thoracotomy approach was used in the open approach. The operations were performed by one of two consultant surgeons, and post-operatively patients were managed on a ward with nursing staff and allied health staff experienced in managing post-operative thoracic surgery patients.

Medical records and institutional lab database were used for data collection to identify physical data, operation details, and lung cancer type and stage. The EQ-5D-5L interview was performed over the phone with patients after permission to participate in the study.

Statistical analysis was performed on nonparametric data with a Chi-square test or Fisher exact depending on the

assumption required for each test. Differences in continuous variables were tested with a Student t-test. A significance criterion of P-value ≤ 0.05 was used in the analysis. All analyses were performed using SPSS.

RESULTS

141 patients were included in this study, divided into three groups based on the surgical approach of their procedure. The median age in the open group was 64.3 years of age, in the VATS group was 68 years of age, and in the RATS group was 57 years of age, respectively, with a significant p-value. Data was collected based on smoking status and history of underlying chronic lung disease, however there was no difference between the groups in either of these risk factors. Tab. 1

Tab. 1: patients characteristics.

	RATS (n=41 patients) M±SD	VATS (n=51 patient) M±SD	Open (n=49 patients) M±SD	P-value
Age	57± 14.18	68 ± 12.96	64.3 ± 13.14	0.000
DM:				
Yes	00 (0.0%)	3 (5.9%)	6 (12.2%)	0.068
No	41 (100%)	48 (94.1%)	43 (87.8%)	
HTN:				
Yes	7(17.1%)	10 (19.6%)	16 (32.7%)	0.160
No	34(82.9%)	41 (80.4%)	33 (67.3%)	
IHD:				
Yes	0(0.0%)	4 (7.8%)	6 (12.2%)	0.044
No	41(100%)	47 (92.2%)	43 (87.8%)	
Lung disease:				
Yes	9(22.0%)	13 (25.5%)	13 (26.5%)	0.874
No	32(78.0%)	38 (74.5%)	36 (73.5%)	
Smoking:				
Yes	28(68.3%)	41 (80.4%)	38 (77.6%)	0.381
No	13(31.7%)	10 (19.6%)	11 (22.4%)	
Cause of surgery:				
Adenocarcinoma	12 (29.3%)	21 (41.2%)	25 (51.0%)	0.000
SCC	1 (2.4%)	9 (17.6 %)	11 (22.4%)	
Carcinoid	3 (7.3%)	3 (5.9%)	6 (12.2%)	
Large cell tumor	1 (2.4%)	0(0.0%)	0(0.0%)	
Benign	13 (31.7%)	9 (17.6 %)	0(0.0%)	
Metastasis	7 (17.1%)	8 (15.7%)	0(0.0%)	
Mesothelioma	0(0.0%)	1 (2%)	2 (4.1%)	
Thymoma	4 (9.8%)	0(0.0%)	0(0.0%)	
Sarcoma	0(0.0%)	0(0.0%)	4 (8.2%)	
MALT lymphoma	0(0.0%)	0(0.0%)	1 (2.0%)	
Procedure:				
Lobectomy	17(41.5%)	31 (60.8%)	38 (77.6%)	0.000
Wedge resection	11(26.8%)	17 (33.3%)	1 (2.0%)	
Pneumonectomy	0(0.0%)	0(0.0%)	5 (10.2%)	
Thymectomy	6(14.6%)	0(0.0%)	0(0.0%)	
Chest wall resection	0(0.0%)	0(0.0%)	4 (8.2%)	
Pleurectomy + bx	4(9.8%)	3(5.9%)	1 (2.0%)	
Mediastinal biopsy	3(7.3%)	0(0.0%)	0(0.0%)	
Stage:				
I	17(41.5%)	24 (47.1%)	27(55.1%)	0.000
II	4(9.8%)	7 (13.7%)	14 (28.6%)	
III	0(0.0%)	2 (3.9%)	7 (14.3%)	

IV(metastasectomy)	7(17.1%)	9 (17.6%)	1 (2.0%)	
Benign	13(31.7%)	9 (17.6%)	0(0.0%)	

The volume of lung resection differed between groups. In the open group, 77.6% had a lobectomy, and 10.2% had a pneumonectomy. In the VATS group, 60.8% underwent lobectomy, and the RATS group, 41.5% had a lobectomy, with no pneumonectomy completed via the minimally invasive approaches.

The diagnoses amongst the groups also varied, with lung cancer, specifically lung adenocarcinoma, confirmed in 51% of the open group, compared to 41.2% in the VATS group and 29.3% in the RATS group. The majority of patients overall had a diagnosis of Stage I lung cancer, with 55.1% of the open approach confirmed Stage I, 47.1% of the VATS group and 41.5% of the RATS group. Tab.1

Mobility, Self-care, and usual activities were not significantly different between the three groups. There was a statistically significant difference in pain post-operatively. In the open approach group, 36.8% of the patients reported no pain compared to 62.7% of the VATS group report no pain, and 51.3% of the RATS group reporting no pain at more than 6 months post-operatively, with a p-value of 0.037. There was also a statistically significant difference in the levels of self-identified feelings of anxiety and depression, with a higher proportion of patients in the open group describing feelings of anxiety compared to those in the VATS and RATS group, with a p-value of 0.022. Tab.2

Tab. 2: The EQ-5D-5L questionnaire.

	RATS N=41	VATS N=51	OpenN=49	P value
MOBILITY				
I have no problems in walking about	26 (63.4%)	31 (60.8%)	28(57.1%)	0.817
I have slight problems in walking about	10 (24.4%)	11 (21.6%)	12(24.5%)	
I have moderate problems in walking about	4 (9.8%)	9 (17.6%)	6(12.2%)	
I have severe problems in walking about	1 (2.4%)	0(0.0%)	2(4.1%)	
I am unable to walk about	0(0.0%)	0(0.0%)	1(2.0%)	
SELF-CARE				
I have no problems washing or dressing myself	38(92.7%)	49(96.1%)	39(79.6%)	0.090
I have slight problems washing or dressing myself	3(7.3%)	2(3.9%)	8 (16.3%)	
I have moderate problems washing or dressing myself	0(0.0%)	0(0.0%)	1(2.0%)	
I have severe problems washing or dressing myself	0(0.0%)	0(0.0%)	0(0.0%)	
I am unable to wash or dress myself	0(0.0%)	0(0.0%)	1(2.0%)	
USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)				
I have no problems doing my usual activities	28 (68.3%)	34 (66.7%)	27(55.1%)	0.617
I have slight problems doing my usual activities	8 (19.5%)	12 (23.5%)	14(28.6%)	
I have moderate problems doing my usual activities	5 (12.2%)	4 (7.8%)	4(8.2%)	
I have severe problems doing my usual activities	0(0.0%)	1 (2.0%)	3(6.1%)	
I am unable to do my usual activities	0(0.0%)	0(0.0%)	1(2.0%)	
PAIN / DISCOMFORT				
I have no pain or discomfort	21(51.3%)	32(62.7%)	18(36.8%)	0.037
I have slight pain or discomfort	16(39%)	13(25.6%)	19(38.8%)	
I have moderate pain or discomfort	3(7.3%)	2(3.9%)	10(20.4%)	
I have severe pain or discomfort	1(2.4%)	4(7.8%)	2(4%)	
I have extreme pain or discomfort	0(0.0%)	0(0.0%)	0(0.0%)	
ANXIETY / DEPRESSION				
I am not anxious or depressed	28(68.3%)	41 (80.4%)	28(57.1%)	0.022
I am slightly anxious or depressed	8(19.5%)	10 (19.6%)	17(34.7%)	
I am moderately anxious or depressed	5(12.2%)	0(0.0%)	3(6.1%)	
I am severely anxious or depressed	0(0.0%)	0(0.0%)	1(2.0%)	
I am extremely anxious or depressed	0(0.0%)	0(0.0%)	0(0.0%)	
How good or bad your health is TODAY: % (0 – 100)	71.6	71.6	70.7	0.551

DISCUSSION

Over the last decade, despite the evolving surgical techniques in thoracic surgery and overall increasing utilisation of minimally invasive approaches of VATS and RATS, many surgeons will still consider open

approach in specific cases.^[8,9] As there has been international improvement in diagnostic techniques and overall healthcare, lung cancer is increasingly diagnosed at an early stage, and is also seen to have an increased median age at diagnosis.^{[10],[11],[12]}

Our study has demonstrated that minimally invasive approaches, such as VATS and RATS provides patients with a better quality of life and less pain compared to those who undergo an open approach thoracic surgery procedure, in the long-term.

Similar to our results, Bendixen et.al from Denmark performed a randomised, double-blinded study, to compare postoperative pain and quality of life after surgical resection of early-stage non-small cell lung cancer (NSCLC) between VATS and anterolateral thoracotomy. Their study included 206 patients. In their study, patients were followed up to 1 year post-operatively. They concluded that VATS approach was associated with less post-operative pain and overall better quality of life compared to an anterolateral thoracotomy approach for the first year after surgery. This recommends that VATS should be the preferred surgical approach for lobectomy in stage I NSCLC.^[13]

Augustinus et.al from the Netherlands performed a retrospective study on 57 patients who had proceeded to lung surgery, and compared the post-operative pain between RATS, VATS and thoracotomy. However, in their small cohort, they found that post-operative pain scores did not differ between the three different modalities of surgery for surgical resection of NSCLC.^[14]

The limitations of our study are that it is a retrospective and non-matched study, and it is the experience of a small patient number in one institution. This study may assist in encouraging further surgeons to adopt minimally invasive approach in wider group of patients who require thoracic surgery, both for benign and malignant conditions.

CONCLUSION

Patients who underwent a minimally invasive approach to thoracic surgery have a better long-term quality of life, with less pain and less anxiety post-operatively, compared to patients who underwent an open approach thoracic surgery procedure. Thus, a minimally invasive approach should be adopted where possible to improve post-operative outcomes for these patients.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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