Annals of Medicine and Surgery 35 (2018) 169–172

Contents lists available at ScienceDirect

Annals of Medicine and Surgery

journal homepage: www.elsevier.com/locate/amsu

Thoracoscopic lobectomy with mediastinal lymph node dissection as a standard surgery for T1-2N0M0 non-small cell lung cancer (> 300 surgeries experience)

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ARTICLE INFO

Keywords:
Non-small cell lung cancer
Thoracoscopic lobectomy
VATS
Mediastinal lymph node dissection

ABSTRACT

Background: A lot of clinics worldwide in recent years recommend the use of minimally invasive surgical procedures in the early stages of lung cancer claiming that this technique helps reduce the number of postoperative complications, shortens the period of social rehabilitation of patients, without significantly affecting the long-term results of treatment. In this study we evaluate immediate and long-term results of surgical treatment of patients with early stages of non-small cell lung cancer (NSCLC) after video-assisted thoracoscopic lobectomy (VATS) with mediastinal lymph node dissection.

Materials and methods: Since 2008 317 patients with T1-2N0M0 NSCLC over 20 (median age was 65.3 ± 2.5) years underwent VATS with mediastinal lymphadenectomy. Total number of men was 186 (58.7%), women – 131 (41.3%). Histologically verified adenocarcinoma was in 278 (87, 7%), Squamous cell carcinoma in 39 (12.3%). A group of patients who underwent thoracotomy lobectomy (n = 189) was taken to compare immediate and long-term results. Median age in this group was 66.5 ± 1.7. Total number of men was 115, women – 74. Histologically verified adenocarcinoma was in 154 (82.4%), Squamous cell carcinoma in 35 (17.6%).

Results: Conversion to thoracotomy during VATS was in 14.3% of surgeries. There was no postoperative mortality in VATS group, whereas in open surgeries this happened in 2.6%. The 3 and 5-year overall survival (OS) rate was 94.0% and 94.0% in the VATS group respectively, 83.0% and 78.0% in the thoracotomy group for clinical stage T1N0M0 NSCLC (p = 0.04554).

Conclusion: Considering the results of our research and the literature review we made sure that VATS lobectomy with mediastinal lymph node dissection is an alternative procedure to open approaches: it is much safer, reduce the frequency of post-operative complications and the rehabilitation period. We believe that complete VATS lobectomy with mediastinal lymph node dissection must be taken as a standard in surgical treatment of patients with early stages of non-small cell lung cancer.

1. Introduction

Thoracoscopic Lobectomy (TL) was first mentioned in the literature at the beginning of the 1990s [6]. Over time TL was widely used in the surgical treatment of Non-Small Cell Lung Cancer (NSCLC) and many studies have been published [2,10,21]. However, the safety of performing TL and long-term oncological results still cause concern for most surgeons. This fact explains why according to the Association of Thoracic Surgeons TL is performed in only 30% of patients undergoing lobectomy for lung cancer [1]. There are no large randomized studies and many published studies in the literature are mainly conducted on a heterogeneous group of patients including oncological, specific and inflammatory lung diseases. In a number of studies incorrect analyses were performed: results of surgical treatment were compared with results of patients who received combined therapy. Our work is devoted to a comparative analysis of immediate and long-term results of treatment of patients with early stages of NSCLC after TL and open surgery lobectomy (OSL).

2. Materials and methods

Since 2008 317 patients with T1-2N0M0 NSCLC underwent TL with mediastinal lymph node dissection in thoracic department of XXXXXX Cancer Research Center. All surgeries were accompanied by lymphodissection of the hilum of the lung and mediastinum. Regardless of the location of the primary tumor lymphodissection of the upper and lower

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https://doi.org/10.1016/j.amsu.2018.09.022
Received 17 June 2018; Received in revised form 1 September 2018; Accepted 18 September 2018

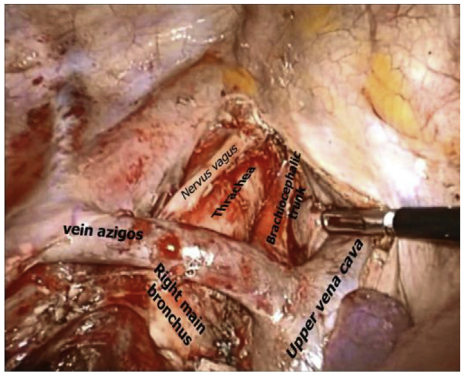

Fig. 1. Thoracoscopic paratracheal lymphadenectomy.

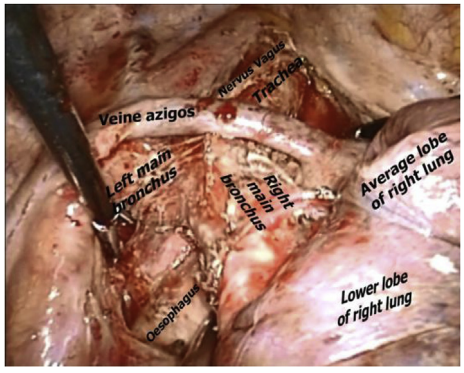

Fig. 2. Thoracoscopic Lymph node dissection of the bifurcation.

mediastinum was performed. The area in thoracic cavity after thoracoscopic mediastinal lymph node dissection is shown in Figs. 1 and 2.

A group of 189 patients with a similar stage of NSCLC underwent OSL was used to compare long-term results. The characteristics of the compared groups are given in Table 1.

There were no statistically significant differences in the compared groups. We use a program Statistica 6.0 to analyze immediate and long-term results.

3. Results

Conversion to thoracotomy was in 14.3% of cases in the group of patients underwent TL. Postoperative mortality rate after thoracoscopic approach was absent, whereas, after OSL it was 2.6%.

In 6 (2.8%) patients after TL prolonged bleeding through pleural drainage was noted. Two of them were taken in an emergency surgical room to make a re-thoracoscopy, suturing the pulmonary parenchyma and 4 patients underwent chemical pleurodesis. A similar complication in the group of patients operated from thoracotomy approach was observed in 11 (5.8%) patients. The average duration of standing of pleural drainages in the TL group was 3.8 days, versus 5.7 days after OSL. The average length of stay in the hospital after thoracoscopic approach was 7.3 days, whereas after thoracotomy approach this period was 13.3 days. 3 and 5-year overall survival (OS) in the general group

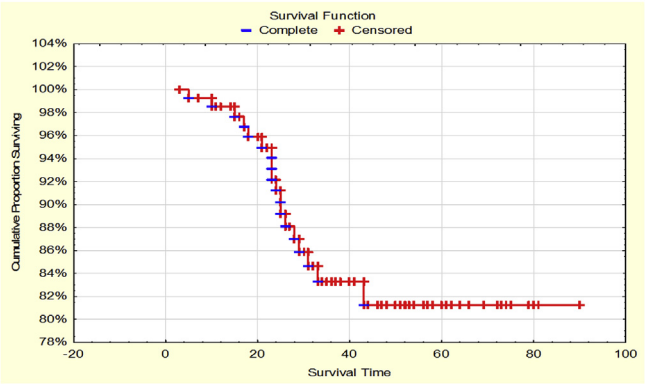

Fig. 3. OS of patients with T1-2N0M0 NSCLC.

of patients with.

T1-2N0M0 NSCLC was 86% and 81% respectively (Fig. 3).

We compare long-term results after TL and OLS depending on the type of surgical approach in patients with T1-2N0M0 NSCLC. The results are as follows: 3 and 5-year overall survival after TL was 93% and 93% respectively, after OLS the results were 82% and 75% respectively. (Test statistic = 1,955203, p = , 05056, Log-Rank Test), Fig. 4.

Compare the long-term results in the group of patients with prevalence of T1N0M0 the following results were obtained: 3 and 5-year survival after TL was 93% and 94%, after OSL 83% and 78% respectively. (Test statistic = 1.999667, p = , 04554, Log-Rank Test), Fig. 5.

4. Discussion

Our study demonstrates the advantages of TL in comparison with OSL, which were expressed by a decrease in the number of postoperative complications, a decrease in the duration of standing of pleural drainages and a reduction of the hospital stay. There was no statistically significant difference in the duration of the surgery. Whitson et al. reported the results, which did not contradict our data [20]. 39 studies were included in the review, 3256 patients underwent TL and for 3114 patients were performed thoracotomy approach. 10 out of 39 studies were devoted to comparative analyses of both methods of surgery. In these studies, thoracoscopic approach were characterized by shorter postoperative standing of pleural drainages (4.2 days compared with 5.7 days, P = 0.025) and shorter hospital stay (8.3 days compared with 13.3 days, P = 0.016) compared with patients underwent OSL.

Another systematic literature review comparing TL and OSL showed vague advantages of group of patients underwent thoracoscopic approach. However, the data obtained in this meta-analysis included non-uniform groups of compared patients and the resulting outcomes were not correct [22]. Analyses of some studies showed no significant differences in intraoperative blood loss, pleural drainage standing and postoperative hospital stay depending on the performed surgery. However, there were statistically significant differences in the duration of surgical procedure, which was less in the group of patients, underwent thoracotomy lobectomy [12,14,15,23]. In other studies significant differences in the duration of surgery depending on the type of approach were not revealed and the results were comparable [7,11,17,18]. The main factor affecting the duration of thoracoscopic

Table 1
Distribution of parents depending on the type of surgical approach.

Type of surgical approach	Number of patients	Age	Gender		Adenocarcinoma	Squamous cell carcinoma
			Male	Female		
Thoracoscopy	317	65.3 ± 2.5	186	131	278(87.7%)	39(12.3%)
Thoracotomy	189	66.5 ± 1.7	115	74	154(82.4%)	35(17.6%)