



Original Research

Sublobectomy versus lobectomy for stage I non-small cell lung cancer in the elderly



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HIGHLIGHTS

- Sublobectomy might achieve similar survival rates when compared with lobectomy in elderly stage I NSCLC patients.
- Sublobectomy can be safely and effectively performed for elderly patients with early stage NSCLC.
- Sublobectomy is a reasonable option for a select set of patients who are poor candidates for lobectomy.

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ABSTRACT

Objective: The aim of our study was to compare the operative characteristics and long term survival for elderly patients with stage I non-small cell lung cancer (NSCLC) who underwent sublobectomy versus lobectomy.

Methods: We identified 245 consecutive elderly patients (≥ 65 y) with pathologic stage I NSCLC who underwent lobectomy or sublobectomy at our institution between 2006 and 2012, and assessed the operative characteristics, recurrence, and survival differences between these approaches.

Results: A total of 39 patients underwent sublobectomy and 206 patients had lobectomy. There were significantly more COPD ($p = 0.046$) and low percent of predicted FEV1 ($p = 0.034$) in sublobectomy patients compared to the lobectomy group. Sublobectomy patients had significantly shorter operating time ($p = 0.001$), less blood loss ($p = 0.000$), and trended toward fewer chest tube days ($p = 0.001$) and shorter hospital length of stay ($p = 0.030$). The 1-, 3-, and 5-year survival rates in patients with lobectomy were 91.3, 77.7, and 64.1%, respectively, and has no significantly difference with those underwent sublobectomy (87.2, 74.4, and 61.5%, respectively, $p = 0.623$). Subgroups survival analysis showed no significant difference in the OS and DFS for patients with $T < 2$ cm or $\%FEV1 < 80\%$, but survival after sublobectomy was worse if performed on patients with larger tumours ($T \geq 2$ cm) or relatively strong lung function ($\%FEV1 \geq 80\%$).

Conclusion: We concluded that sublobectomy might achieve similar survival rates when compared with lobectomy in elderly stage I NSCLC patients, especially for patients with low $\%FEV1$ and stage IA tumours less than 2 cm in diameter.

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1. Introduction

Lung cancer remains the most commonly diagnosed cancer as well as a leading cause of cancer death. Of the estimated 1.6 million people with lung cancer worldwide [1], approximately 55% are aged 65 years or older and constitutes the fastest-growing

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segment [2].

Lobectomy remains the standard of care for optimal oncologic resection for early-stage NSCLC despite advances in chemotherapy and radiation therapy [3]. However, sublobar resections, including wedge resection or segmentectomy, have been reported as an alternative surgical technique. Potential advantages of sublobectomy over lobectomy include preservation of lung function and reduced morbidity and disability [4,5]. Preservation of lung function may be particularly important for elderly patients, those with borderline preoperative cardiopulmonary function.

In the past ten years, several authors have compared the lobectomy with sublobar resection. The Lung Cancer Study Group randomized trial comparing lobectomy with limited resection showed an increase in local recurrence (7% vs 17%) with limited resection, with a trend toward lower survival [6], and several retrospective studies revealed that lobectomy rather than segmentectomy or wedge resection is the optimal choice for Stage I NSCLC, which is in line with the recommendation from National Comprehensive Cancer Network (NCCN) Clinical Practice Guideline in oncology for NSCLC (version 2.2013) [3]. However, a number of current investigations have found sublobectomy achieved equivalent recurrence and survival compared with lobectomy for patients with stage IA NSCLC, furthermore, controversy remains as to whether sublobar resections are adequate oncologic procedures for patients with severely impaired pulmonary function who could not withstand lobectomy, especially for elderly patients.

The aim of our study was to compare the operative characteristics and long term survival for elderly patients with stage I NSCLC who underwent sublobectomy versus lobectomy.

2. Material and methods

2.1. Ethics statement

The lung cancer data bases used in this study had a general ethic committee admittance from the Ethic Committee of Shandong Provincial Hospital. The data were to be handled and analyzed without possibility to identify individual patients, and no written consents were thus requested. The study was approved by the Ethic Committee of Shandong Provincial Hospital.

2.2. Data collection

A retrospective study was performed analyzing data of 245 consecutive eligible.

patients treated at our institution from January 2006 to December 2012. The inclusion criteria were: aged ≥ 65 years, definitive postoperative diagnosis of stage I NSCLC according to the 7th edition NCCN tumour-node-metastasis (TNM) classification [7], underwent lobectomy or sublobectomy for NSCLC.

All patients underwent physical examination, computed tomography (CT) or magnetic resonance imaging (MRI) of the brain, chest, and abdomen, emission computed tomography (ECT) of bone preoperatively to make a definite diagnosis.

The hospital and office records of each patient were reviewed and demographic and clinical data were recorded. We collected data on basic demographics (age, gender), patient comorbidities (coronary artery disease, chronic obstructive pulmonary disease [COPD], diabetes), operative details (operative time, blood loss, type of surgery, anatomic location), postoperative complications (pneumonia, atrial arrhythmia, wound infection, strokes), tumour pathological characteristics (histology, differentiation), length of postoperative hospital stay, and disease recurrence.

Operative mortality included patients who died within the first 30 days after surgery or beyond 30 days during the same

hospitalization, and local recurrence is defined that disease recurrence at the surgical resection margin, ipsilateral hilum, and mediastinum.

2.3. Treatment and follow-up

The patients underwent lobectomy, segmentectomy or wedge resection were enrolled in this study. Hilar and (or) mediastinal lymph nodes were sampled or systematically dissected during lobectomy or segmentectomy, only swollen nodes were sampled in the patients who underwent wedge resection. The margin distance between the tumour and the nearest resection line was at least 2 cm, and intraoperative frozen section examination was carried out to ensure that the negative margin was obtained.

The indications for selecting sublobar resection were defined as the following: 1. Poor pulmonary reserve or other major comorbidity that contraindicated lobectomy including insufficient pulmonary function or chronic lung diseases (abnormal spirometry test and [or] apparent interstitial shadow or emphysema detected by chest CT); insufficient cardiac function or cardiovascular diseases. 2. Peripheral nodule ≤ 2 cm with at least one of the following: pure AIS histology; nodule had $\geq 50\%$ ground-glass appearance on CT; radiologic surveillance confirmed a long doubling time (≥ 400 days).

Pathologic staging was based on the current 7th edition of the TNM classification [7]. The main adjuvant treatment that patients underwent after operation was chemotherapy. The chemotherapy was routine program for NSCLC according to the National Comprehensive Cancer Network.

Patients were followed up every 3 months for 1 year after operation, every 6 months for 3 years, and every year thereafter, with a median follow-up period of 95 (range, 3 to 128) months. A total of 245 patients were followed up until death or the last day of follow-up (15 Aug 2016). The overall survival (OS) was defined as the time from the date of surgery to the last date of follow-up for patients who remained alive, or to the date of death. Disease free survival (DFS) was defined as the time from the date of surgery to the date of recurrence recognition, death, or to the end of observation.

2.4. Statistical analysis

Descriptive statistics were used to describe the patients' characteristics and outcomes. The means of the groups were compared with one-way ANOVA, and chi-squared test and Fisher's exact tests were used to compare the frequencies of the two groups with the clinicopathological variables. The Kaplan–Meier method was used to plot the survival curves, and the log-rank test was used to evaluate differences among the subgroups. The result was considered to be significant when the P value was less than 0.05. All statistical analysis was performed using the SPSS Statistics software package v.17.0 (SPSS Inc., Chicago, IL, USA).

3. Results

3.1. Patient characteristics

From January 2006 to December 2012, 3236 patients underwent curative resection for NSCLC at our institution, the study composed of 245 patients who were ≥ 65 years of age with pathologic stage I NSCLC.

According to the types of resection, 245 patients were divided into two groups. Table 1 outlines the characteristics of the patients for both groups. 39 (15.9%) patients underwent limited resection as segmentectomy or wedge resection, 206 (84.1%) had lobectomy.

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