

EDITORIAL

Surgical treatment of Early Non-Small Cell Lung Cancer in special groups of patients is superior to stereotactic radiotherapy

Nikolaos Baltayiannis¹, Andreas Lagoudellis¹, Christos Douvli¹, Aikaterini Gavalaki¹, Pelagia Batika¹, Xrysoula Petala¹, Afroditi Pavlakou², Antonios Chatzimichalis¹

¹Department of Thoracic Surgery, ²Anesthesiology Department, “Metaxa” Cancer Hospital Piraeus, Greece

ABSTRACT

Lung cancer is the most commonly occurring cancer in men and the third most commonly occurring cancer in women. Contrary to other cancers, lung cancer often occurs in patients with comorbidities that can prevent the realisation of some treatments. The recommended treatment for patients presenting with stage I non-small cell lung cancer (NSCLC) is an anatomical surgical resection-lobectomy- and a systematic lymph node dissection. Many patients are, however, unfit to undergo surgery and consequently they often do not receive any curative therapy. This involves the elderly patients or patients with many co-morbidities. When an elderly patient with co-morbidities comes to the thoracic surgeon with early-stage lung cancer, if he is healthy and in good general condition he is taken to the operating room and undergoes lobectomy and lymph node dissection. If he is vulnerable and appropriate treatment is considered high risk he is treated with alternative therapies. SBRT is important alternative therapy. Stereotactic body radiation therapy (SBRT), interchangeably known as stereotactic ablative radiotherapy (SABR) is a modality that delivers ablative doses of radiation to extra-cranial targets with a degree of precision and accuracy above what can be reasonably achieved with conventionally fractionated external beam radiotherapy. Additionally, SBRT as a noninvasive therapy offers an attractive option for patients who are opposed to a surgical option. But questions have arisen regarding the suitability of SBRT for medically operable patients. Data from new trials are needed more than ever to inform and guide our multidisciplinary decisions for patients with early-stage NSCLC who are fit enough to undergo lung cancer surgery but may instead be more interested in SBRT. In any case, good cooperation between surgeons and radiotherapists is of particular importance for the better treatment of these vulnerable patients.

Keywords: Lung cancer, early lung cancer, elderly, co-morbidities, surgery, Stereotactic body radiation therapy (SBRT)

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INTRODUCTION

Lung cancer is the most commonly occurring cancer in men and the third most commonly

occurring cancer in women. There were 2 million new cases in 2018. Greece had the highest rate of lung cancer in 2018, behind

Hungary, Serbia and New Caledonia. Moreover, Greece had the highest rate of lung cancer in men 2018, behind Hungary, Serbia and Turkey.[1]

Contrary to other cancers, lung cancer often occurs in patients with comorbidities that can prevent the realisation of some treatments. [2]

The recommended treatment for patients presenting with stage I non-small cell lung cancer (NSCLC) is an anatomical surgical resection-lobectomy and a systematic lymph node dissection. [3]

Many patients are, however, unfit to undergo surgery and consequently often do not receive any curative therapy. This involves the elderly patients or patients with many comorbidities.

Co-morbidities are an independent predictor of post-surgical mortality in early-stage NSCLC. [4]

Furthermore, co-morbidities and the patient's age have been associated with a higher incidence of extended post-operative length of hospital stay and are known to influence surgeons' willingness to perform a lobectomy. [5]

The high frequency of comorbidities is mainly due to common risk factors, i.e., tobacco use, chronic obstructive pulmonary disease (COPD), emphysema, bronchiectasis, interstitial lung diseases, but also due to the fact that the median age of patients with lung cancer is around 70 years (elderly patients) with the inherent development of cardiovascular diseases (CVDs), renal

insufficiency, diabetes mellitus etc. that are related to an advanced age. [6]

In development data set, 94.6% of the comorbidity was related to 10 major diagnoses:

Smoking addiction (27.1%), history of cancer (11.8%), COPD (11.5%), arterial hypertension (10.5%), heart disease (10.4%), diabetes mellitus (7.6%), peripheral vascular disease (6.1%), Obesity (4.9%) and alcoholism (4.7%). No other diagnoses, with the exception of hyperlipemia (2.9%) were mentioned for more than 1% of patients. [7]

The general population in many developed countries is aging. According to the Japanese national statistics on population in 2017, the average life expectancy was 81.1 years in men and 87.3 years in women. [8]

Non-Small Cell Lung Cancer is a typical disease of the elderly and is becoming increasingly more common as a result of the gradual aging of the population. [9]

In these patients careful evaluation and selection and preoperative preparation and postoperative care are very important, particularly, in elderly patients.

In early-stage NSCLC, surgery is the treatment of choice. [10]

Although patient age is known to be an independent prognostic factor of postoperative survival, lung resection should not be denied on the basis of age alone. The 5-year survival rate in octogenarians exceeds 40% but is much lower in pneumonectomized patients (close to 10%). [11]

SURGICAL TREATMENT

When a patient comes to a thoracic surgeon, the surgeon will first consider how healthy the patient is. If the patient looks healthy or in fit condition, the surgeon offers standard treatment. [12]

Similarly, when an elderly patient comes to the thoracic surgeon with early-stage lung cancer, if he is healthy and in good general condition he is taken to the operating room and undergoes lobectomy and lymph node dissection.

If he is vulnerable and appropriate treatment is considered high risk, he is treated with alternative therapies. However, if the patient belongs to a particularly vulnerable group, he is not treated [13], (Figure 1).

THE DEFINITION OF “OPERABILITY”

The definition of “operability”, following recent ACCP guidelines, suggests that when postoperative FEV1 and DLCO of the patients are >60% of predicted, no further testing is required prior to resection. For either value between 30–60% predicted, further evaluation with exercise testing (e.g., stair climb/shuttle walk) should be performed. [14]

LOBAR VERSUS SUBLOBAR RESECTION FOR EARLY-STAGE LUNG CANCER

Between June 15/2007 and March 13/2017, 697 patients with NSCLC clinically staged as T1aN0 were intraoperatively randomized (after pathological confirmation of absence of nodal metastases in major hilar and mediastinal nodes) to either lobar (A: 357

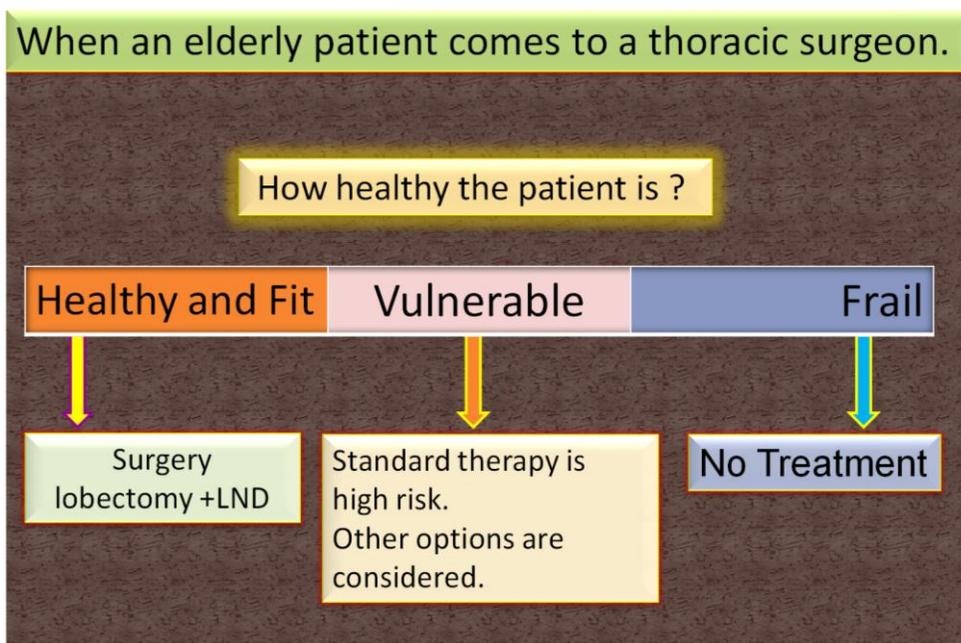


Figure 1. What happens when an elderly patient comes to the thoracic surgeon with early stage lung cancer.

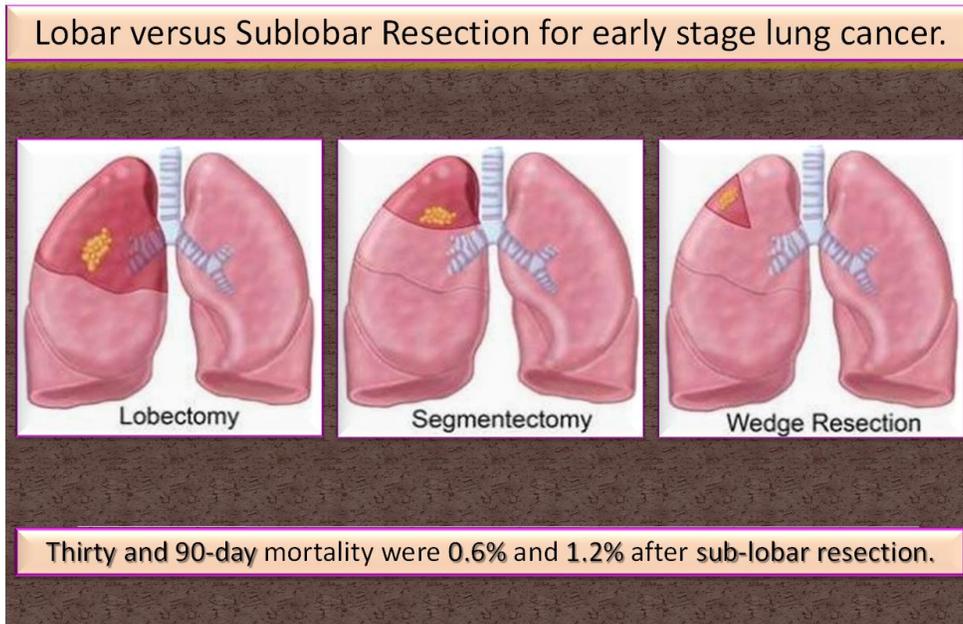


Figure 2. Thirty and 90-day mortality were 1.1% and 1.7% after lobar resection and 0.6% and 1.2% after sub-lobar resection respectively, without reaching statistical significance.

patients) or sublobar resection (B: 340 patients - 58% wedge resections). Thirty and 90-day mortality were 1.1% and 1.7% after lobar resection and 0.6% and 1.2% after sub-lobar resection yielding a difference between arms of 0.5% (95%CI:-1.1,2.3) and 0.5% (95%CI:-1.5,2.6), respectively, without reaching statistical significance. [15] (Figure 2).

This study showed that perioperative mortality and morbidity did not seem to differ between lobar and sublobar resection in physically and functionally fit patients with clinical T1aN0 non-small-cell lung cancer. These data may affect the daily choices made by patients and their doctors in establishing the best treatment approach for stage I lung cancer.

In 2016, Nguyen and colleagues [16] published an article in the Journal of Medicine of Baltimore entitled: "Is surgery indicated for elderly patients with early stage nonsmall cell lung cancer, in the era of stereotactic body radiotherapy?". According to this publication, the authors searched the Pubmed online database for the keywords: NSCLC, early stage (stage I), elderly, comorbidity, lobectomy, mortality, survival, and SBRT. After compiling all the articles, they analyzed them based on the following criteria: prevalence of comorbidity among elderly lung cancer patients, impact of comorbidity on survival following lobectomy and SBRT, and complications. The age cutoff of 70 was chosen because of anthropometric studies reporting increased weight loss and sarcopenia in men and women after the age of 70. Finally, 43 full papers were included in

analysis. In the surgery arm, among studies which included patients who were at least 70-year-old the mortality and morbidity rates ranged from 1.1% to 22.2% and 7.4% to 55.2%, respectively.

Mortality and Morbidity rates of elderly patients with early-stage NSCLC who underwent SBRT ranged from 0% to 1.7%, and 0.9% to 10% respectively.

But what happened with survival? In surgery arm, the survival of the patients ranged from 20% to 57% at 5 years. Among elderly patients with NSCLC who underwent SBRT, 3-year overall survival ranged from 40.7% to 53%. [16]

Chi and colleagues published in JAMA a comparison of surgical treatment and SBRT in patients with early lung cancer [17]. The authors used data from the National Cancer Database for patients with lung cancer diagnosed between 2004 and 2015. This was the most recent data set available at the time of the study. The National Cancer Database is a joint project of the Commission on Cancer of the American College of Surgeons and the American Cancer Society. This hospital-based nationwide database captures approximately 70% of incident cancer cases in the United States.

Overall, all surgical modalities studied were associated with superior long-term OS when compared with SBRT in patients with clinical stage T1 to T3, N0, M0 NSCLC. This survival advantage is further enhanced by regional LNE, especially when more than 10 lymph nodes were examined.

In this study, the authors identified early-stage lung cancer patients from the Veteran's Affairs Informatics and Computing Infrastructure (VINCI), which represents a comprehensive informatics platform that allows researchers access to patient-level electronic health record information and administrative data for all veterans within the VA health care system.

Of the 4,069 study subjects, 2,986 (73%) underwent lobectomy, 634 (16%) underwent sublobar resection, and 449 (11%) received SBRT.

The median follow-up for lobectomy, sublobar resection, and SBRT patients was 2.9, 2.6, and 1.5 years, respectively. The 30-day mortality was 1.9% for lobectomy, 1.7% for sublobar resection, and 0.5% for SBRT; and the 90-day mortality was 3.6% for lobectomy, 2.5% for sublobar resection, and 1.4% for SBRT.

In the lobectomy group, the unadjusted 5-year overall survival was 70%, followed by sublobar resection at 56% and SBRT at 44%.

Patients with non-small cell lung cancer early stage and concomitant diseases.

THE IMPACT OF COPD

COPD is the fourth leading cause of death, causing > 2.5 million deaths per year worldwide. COPD has also been found to be an important risk factor for lung cancer, one of the most common cancers worldwide. [18] The risk of lung cancer in patients with COPD

is approximately fivefold greater than that of smokers without COPD. [19]

In another interesting study [20], 902 patients with early-stage (stage IA-IIB) NSCLC treated with surgical resection were retrospectively analyzed. The authors assessed the impact of COPD on overall survival (OS) of these patients. The 5-year OS rates in patients with COPD (54.4%) was significantly lower than that in patients without COPD (69.0%) ($p=0.0002$). The results of this study have clinical implications for the early identification of those at greater risk of NSCLC prognosis and those who will benefit from more optimal targeted treatment.

SBRT OR SURGERY

SBRT's advantage is its ability to provide high radiotherapy doses to a tumor in a short timeframe, without the risk of postoperative complications and mortality.

Few innovations have had the same impact as stereotactic body radiotherapy in early stage medically inoperable non-small cell lung cancer, with local control rates currently in the region of 85–90%.

Questions have therefore arisen regarding the suitability of SBRT for medically operable patients.

Additionally, SBRT as a noninvasive therapy offers an attractive option for patients who are opposed to a surgical option. [21]

Puri and colleagues [22] compared radical surgical treatment with SBRT in patients with early-stage non-small cell lung cancer. Of

117618 stage I patients with NSCLC 111731 (95.0%) underwent surgery and 5887 (5.0%) underwent SBRT. The mean follow-up for the entire study group was 36.5 months. The median follow-up was longer for surgical patients (27.5 months vs. 16.6 months, $p<0.001$). Thirty-day surgical mortality was 2596/109485 (2.4%). Median overall survival favored the surgery group in both unmatched (68.4 months vs. 33.3 months, $p<0.001$). Puri and colleagues conclude that patients with clinical stage I NSCLC selected for surgery appear to show better long-term overall survival compared to SBRT. Outcomes in both treatment cohorts are strongly influenced by comorbidity and risk. Unmeasured co-variables likely play an important part in treatment allocation and may be associated with survival.

The authors believed that rigorous prospective studies are urgently needed to accurately define the high-risk surgical patient and optimize patient selection for SBRT in this population.

A recent study with a relatively small number of patients from Sweden comparing surgery to SBRT found that the median overall survival was 7.7 years for the surgery group and 3.72 years for the SBRT group ($p < 0.001$). Five years survival was 65.5% in the surgery group and 31.6% in the SBRT group ($p<0.001$). [23]

- **Surgery is minimally invasive and safe**

The Cancer and Leukemia Group B 39802 trial was a prospective, multi-institutional study

designed to elucidate the technical feasibility of VATS in early non-small-cell lung cancer (NSCLC) using a standard definition for VATS lobectomy (one 4- to 8-cm access and two 0.5-cm port incisions) that mandated videoscopic guidance and a traditional hilar dissection without rib spreading. Minimally invasive surgery has improved the treatment of surgical patients. These surgical techniques minimize trauma and optimize patient recovery without compromising the surgical outcome. [24]

Today, early-stage NSCLC is resected by a minimally invasive lobectomy or segmentectomy with mediastinal lymphadenectomy in 60–80% of patients at specialized centres, by either multiportal or uniportal video-assisted thoracoscopic surgery or robotic-assisted approaches. [25]

Following surgery, hospitalization time is typically 3–6 days, and most patients are back to normal life within 2–4 weeks. Thirty-day mortality, including high-risk patients, is less than 1% at specialized centres. [26]

- **Surgery ensures accurate histological diagnosis and detailed staging**

Even among suspected lung cancer patients enrolled in clinical trials, up to 16% of patients will have benign nodules [27]. In large series of SBRTs, (n = 177 patients, were found to be potentially operable) 26–67% of patients did not have tissue confirmation [28].

These patients are included in long-term survival data!!!

The most diligent clinical staging will have occult nodal disease in 13–15% of clinical stage Ia patients. [29]

Furthermore, it has been recognized that the histological subtypes of adenocarcinoma determined by pathological evaluation are important for prognosis of progression or recurrence after limited field treatment. [30, 31]

This information is unavailable with SBRT.

Moreover, according to Kohman and his colleagues, the biopsy comes first. [32]

- **Surgery protects against exposure to radiation from imaging tests**

An analysis of Surveillance, Epidemiology and End Results (SEER)-Medicare data recently demonstrated that SBRT patients received a median of 6 computed tomography (CT) scans and 2 positron emission tomography (PET) scans in their first 2 years post-treatment compared to just 4 CT scans and 0 PET scans for matched surgery patients. [33]

- **Surgery does not worsen the respiratory function**

The reduction of FEV1(lobectomy 9-16%, sublobar resection 3-11%) does not affect the respiratory function of the patients with an adequate pulmonary reserve prior to surgery. [34, 35]

It is interesting in patients with moderate-to-severe emphysema and hyperinflation, lung function may even improve at 3 months due to the volume reduction effect and improved respiratory mechanics. [36]

- **Surgery or SBRT on the treatment of stage I non-small cell lung cancer.**

The opinion of experts

Hopmans *et al.* performed a binary choice experiment using vignettes with hypothetical cases in which thoracic oncologists recommended either surgery or SABR to patients with a stage I NSCLC. [37]

All cases involved stage I lung tumors, and current guidelines of the European Society for Thoracic Surgeons recommend an anatomical lobectomy for such cases.

In total, 126 of 245 (51.4%) clinicians who were approached completed the surveys. Dutch Lung Cancer Research Group, Dutch Society of Clinicians for Lung Diseases and Tuberculosis, Dutch Society for Thoracic Surgery as well as National Platform Radiotherapy and Lung Cancer.

Therefore, 16 main scenarios were selected with which it was possible to estimate all possible cases. Cases varied on five patient-related characteristics: patient age, Chronic Obstructive Pulmonary Disease (Global Initiative for Chronic Obstructive Lung Disease COPD- GOLD score), Charlson comorbidity index, World Health Organization performance status (WHO-PS) and patient treatment preference (surgery/SABR).

Responses provided by clinicians to the statement that “surgery and SABR are comparable treatments”.

Main reasons why surgery remains the preferred treatment option (N = 57) was that the pathological diagnosis is not always available before SABR, sub-optimal lymph node staging (N = 32- 56.1%), insufficient evidence as no randomized clinical studies have been reported (N = 23- 40.4%) and it cannot be considered a comparable option for young and fit patients, who should undergo surgery (N = 8- 14.0%).

Main reasons why surgery and SABR were considered to be comparable (N = 69), was that the current clinical evidence shows comparable results, less risks and complications seen with SABR. SABR is especially suited for treating elderly patients and other reasons including organ sparing therapy, less invasive procedure.

This study suggests that more efforts are needed to develop uniform approaches for making treatment recommendations, and to incorporate patient preferences when making treatment decisions for stage I NSCLC.

SBRT OR SURGERY IN PATIENTS WITH CONCOMITANT DISEASES

Surgery is the standard of care for patients with early-stage NSCLC, but a substantial number of patients cannot tolerate surgery owing to comorbidity. So which path should we choose and based on what criteria? (Figure 3)



Figure 3. SBRT or surgery in patients with concomitant diseases. What is the ideal curative path? Surgery is the standard of care for patients with early-stage NSCLC, but a substantial number of patients cannot tolerate surgery owing to comorbidity. So which path should we choose and based on what criteria?

According to the guidelines of ASTRO regarding SBRT in patients with non-small cell lung cancer at an early stage, for patients with “standard operative risk” (ie, with anticipated operative mortality of <1.5%) and stage I NSCLC, SBRT is not recommended as an alternative to surgery outside of a clinical trial.

Therefore, ASTRO accepts in patients with this stage of the disease as an expected operative mortality of 1.5% [38].

If we consider this acceptable mortality as the limit, any mortality above this limit by any method and if calculated is not accepted.

What scientific methods can be used to calculate or determine operative mortality and identify high-risk patients?

In 2007 Falcoz and his colleagues developed a method for predicted death rate based on 9 variables [7, 39], (Table I).

Based on thoracscore a 65-year-old male patient in good general condition-

performance status 0 undergoing elective thoracic surgery- lobectomy for malignancy has predictive death rate 0,97 % (Figure 4).

When the same patient has 3 concomitant diseases predictive death rate is 2,30 % non accepted according to ASTRO guidelines (Figure 5).

Richard Berrisford and collaborators to identify pre-operative factors associated with in-hospital mortality following lung resection analyzed data were submitted to the European Thoracic Surgery Database from 27 units in 14 countries. The final conclusions of the study were drawn from 3426 adult patients that had a first lung resection for whom mortality data were available. (40) Unlike thoracscore, the authors used only two variables, age and the postoperative predicted FEV1. The risk of death of patients is derived from the equation:

$$\square \text{ logit2} = -5.58858 + (0.5001 \times \text{age}) - (0.0218 \times \text{ppoFEV1}\%)$$

Variable		code
Age	<55	0
	56-65	1
	>65	2
sex	Female	0
	Male	1
ASA	≤2	0
	≥3	1
Zubrod score	≤2	0
	≥3	1
Dyspnoea score	≤2	0
	≥3	1
Priority	Elective surgery	0
	Urgent surgery	1
Procedure	≤lobectomy	0
	pneumonectomy	1
Diagnosis	Benign	0
	Malignant	1
Comorbidity score	0	0
	≤2	1
	≥3	2

**Thoracscore
(The Thoracic Surgery Scoring System)**

Table I. Thoracscore (The Thoracic Surgery Scoring System)

Many patients with bronchogenic carcinoma also have coexistent obstructive lung disease. In these patients, preoperative prediction of functional status after lung resection is mandatory. Baltayiannis and collaborators developed an equation that predicts the postoperative respiratory adequacy of lung cancer patients undergoing lobectomy or pneumonectomy. [41]

According to the researchers the equations are as follows:

□ Equation for lobectomy

FEV1 postoperative = 0.00211 + 0.896660 x FEV1 preoperative.

□ Equation for pneumonectomy

FEV1 postoperative = 0.145 + 0.65318 x FEV1 preoperative.

Chamogeorgakis and associates modified the Thoracscore (The Thoracic Surgery Scoring System) by removing the dyspnea component. The modified Thoracscore was calculated based on the following variables: age, gender, priority of the procedure, malignancy, type of procedure, Zubrod score, ASA class, and number of co-morbidities but not dyspnea score.

The authors found that Thoracscore is a good and useful clinical tool for preoperative prediction of in-hospital and midterm

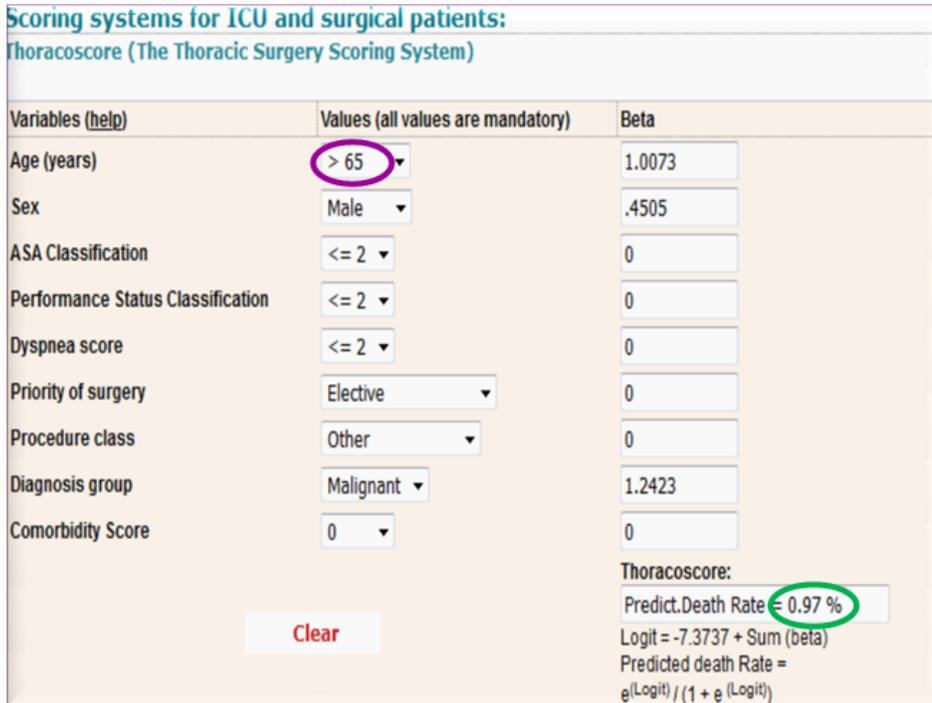


Figure 4. Based on thoracscore a 65-year-old male patient in good general condition-performance status 0 undergoing elective thoracic surgery-lobectomy for malignancy has predictive death rate 0,97%.

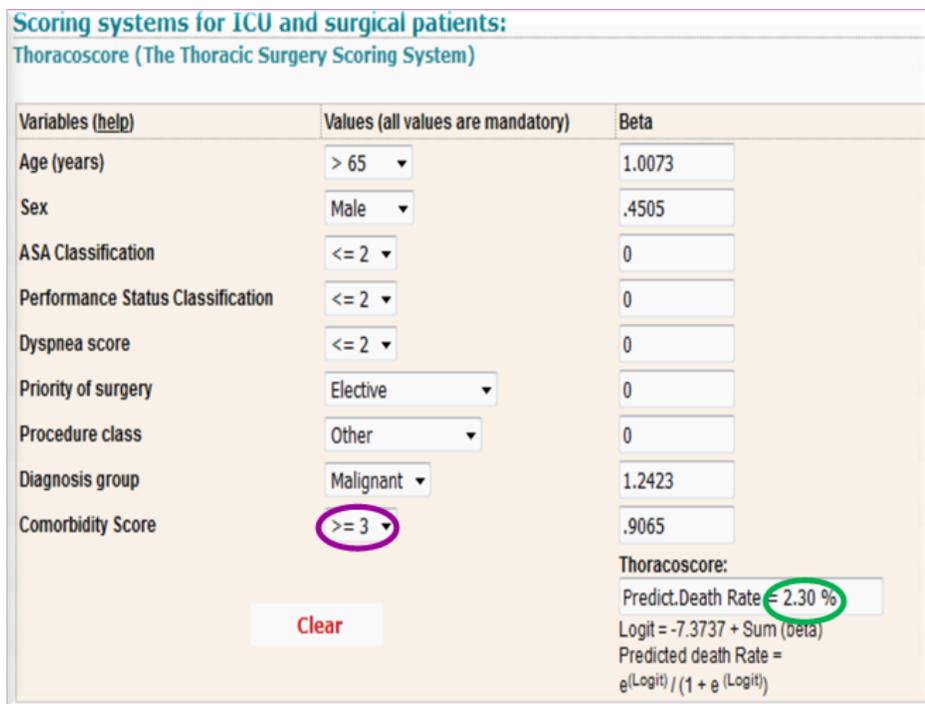


Figure 5. When the same patient has 3 concomitant diseases predictive death rate is 2,30%, non accepted according ASTRO guidelines.

mortality among patients undergoing general thoracic surgery. [42, 43]

Therefore, based on the data of the studies Falcoz, Berrisford, Baltayiannis and Chamogeorgakis we felt that we had the tools with which to calculate with reasonable accuracy the risk of death of patients with non-small cell lung cancer at an early stage who would undergo major thoracic surgery.

This optimism of choosing the best treatment for these patients based on the findings of the above studies evaporated as soon as Qadri published his work which seriously challenged the findings of Falcoz study. [44]

According to the findings of Qadri Thoracoscore does not accurately predict mortality in major surgical operations and even it is possible that Thoracoscore could not be accurate in each surgical procedure.

This state of doubt was intensified by the study of Sharkey *et al.* [45], which claim that both Thoracoscore and ESOS.01 overestimated mortality in the United Kingdom-UK population and conclude that there is a continued need to develop an appropriate risk prediction system for the UK.

Julien Die Loucou tried to reconstruct these claims of Qadri and Sharkey by renewing and adapting the Thoracoscore risk prediction model to modern reality.

In the opinion of Julien Die Loucou and the associates the performance of prediction models tends to deteriorate over time. The purpose of their study was to update the Thoracoscore risk prediction model with

recent data from the Epithor nationwide thoracic surgery database. [46]

From January 2016 to December 2017, a total of 56 279 patients were operated on for mediastinal, pleural, chest wall or lung disease.

From the analysis a total of 56 279 patients operated on for mediastinal, pleural, chest wall or lung disease from January 2016 to December 2017 the authors extracted a new improved risk model. The new Thoracoscore risk model has improved performance and good calibration, making it appropriate for use in current clinical practice.

Julien Die Loucou's work is interesting but does not seem capable of dispelling all doubts.

James D. Murphy an associate professor in the Department of Radiation Medicine and Applied Sciences, at UC San Diego School of Medicine expressed the following opinion:

“With all medicine, the randomized trial is the gold standard that we shoot for when we try to compare two treatments” Murphy said. *“With this particular question of surgery vs. radiation, we don't have really good randomized data...”*

“There are randomized trials going on that will hopefully accrue well and will hopefully have good results in the next several years” he added. *“As of now, I don't think we really know the best treatment, although surgery remains the standard of care.”* [47]

The Clinical Trials that are in progress are:

- VALOR (Veterans Affairs Lung Cancer Or Stereotactic Radiotherapy; NCT02984761)
- STABLEMATES (JoLT-Ca Sublobar Resection (SR) versus Stereotactic Ablative Radiotherapy (SAbR) for Lung Cancer; NCT02468024)
- POSTILV (Radical Resection vs Ablative Stereotactic Radiotherapy in Patients With Operable Stage I NSCLC; NCT01753414) and
- SBRT vs Surgery in high risk patients with early stage lung cancer; NCT02562027) [48].

In the age of progressive specialization of particular fields of medicine, it is particularly important to assess the overall clinical condition of the patient by an interdisciplinary team.

Because the full consequences of such decisions remain unclear, it is the duty of radiation oncologists and thoracic surgeons to support the enrollment of patients in the currently active trials that are randomly allocating patients between resection and SBRT.

Data from these trials are needed more than ever to inform and guide our multidisciplinary decisions for patients with early-stage NSCLC who are fit enough to undergo lung cancer surgery, but may instead be more interested in SBRT.

In any case, good cooperation between surgeons and radiotherapists is of particular importance for the better treatment of these vulnerable patients [48].

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ΑΡΘΡΟ ΣΥΝΤΑΞΗΣ

Η χειρουργική θεραπεία του καρκίνου του πνεύμονος πρώιμου σταδίου σε ειδικές ομάδες ασθενών υπερέχει της στερεοτακτικής ακτινοθεραπείας

Νικόλαος Μπαλταγιάννης¹, Ανδρέας Λαγουδέλλης¹, Χρήστος Ντούβλης¹, Αικατερίνη Γαβαλάκη¹, Πελαγία Μπατικά¹, Χρυσούλα Πεταλά¹, Αφροδίτη Παυλάκου², Αντώνιος Χατζημιχάλης¹

¹ Θωρακοχειρουργική Κλινική, ² Αναισθησιολογικό Τμήμα, ΕΑΝ Πειραιά «Μεταξά»

ΠΕΡΙΛΗΨΗ

Ο καρκίνος του πνεύμονα είναι ο πιο συχνά εμφανιζόμενος καρκίνος στους άνδρες και ο τρίτος πιο συχνά εμφανιζόμενος καρκίνος στις γυναίκες. Σε αντίθεση με άλλους καρκίνους, ο καρκίνος του πνεύμονα εμφανίζεται συχνά σε ασθενείς με συννοσηρότητες που μπορούν να αποτρέψουν την πραγματοποίηση ορισμένων θεραπειών. Η συνιστώμενη θεραπεία για ασθενείς που παρουσιάζουν Μη μικροκυτταρικό καρκίνο του πνεύμονα σταδίου I (NSCLC) είναι η ανατομική χειρουργική εκτομή-λοβεκτομή- και ο συστηματικός λεμφαδενικός καθαρισμός. Πολλοί ασθενείς, ωστόσο, είναι ανίκανοι να υποβληθούν σε χειρουργική επέμβαση. Σε αυτούς περιλαμβάνονται οι ηλικιωμένοι ασθενείς ή οι ασθενείς με πολλές συννοσηρότητες. Όταν ένας ηλικιωμένος ασθενής με συννοσηρότητα έρχεται στον χειρουργό του θώρακα με καρκίνο του πνεύμονα πρώιμου σταδίου, εάν είναι υγιής και σε καλή γενική κατάσταση μεταφέρεται στο χειρουργείο και υποβάλλεται σε λοβεκτομή και συστηματικό λεμφαδενικό καθαρισμό. Εάν ο ασθενής είναι

ηλικιωμένος ή έχει συνοδά νοσήματα και η κατάλληλη χειρουργική θεραπεία θεωρείται υψηλού κινδύνου, αντιμετωπίζεται με εναλλακτικές θεραπείες.

Η στερεοτακτική ακτινοθεραπεία είναι σημαντική εναλλακτική θεραπεία. Η στερεοτακτική θεραπεία ακτινοβολίας σώματος (SBRT), εξασφαλίζει δόσεις ακτινοβολίας σε εξω-κρανιακούς στόχους με υψηλό βαθμό ακρίβειας σε σχέση με τη συμβατική κλασματοποιημένη ακτινοθεραπεία εξωτερικής δέσμης. Επιπλέον, το SBRT ως μη επεμβατική θεραπεία προσφέρει μια ελκυστική επιλογή για ασθενείς που αντιτίθενται στη χειρουργική επιλογή. Ωστόσο, έχουν προκύψει ερωτήματα σχετικά με την καταλληλότητα της SBRT στους χειρουργήσιμους ασθενείς. Τα δεδομένα από νέες δοκιμές χρειάζονται περισσότερο από ποτέ για να καθοδηγήσουν τις διεπιστημονικές αποφάσεις μας για ασθενείς με NSCLC πρώιμου σταδίου που είναι αρκετά κατάλληλοι για να υποβληθούν σε χειρουργική επέμβαση καρκίνου του πνεύμονα, αλλά εκδηλώνουν μεγάλο ενδιαφέρον για την SBRT. Σε κάθε περίπτωση, η καλή συνεργασία μεταξύ χειρουργών και ακτινοθεραπευτών έχει ιδιαίτερη σημασία για την επιλογή της καλύτερης θεραπείας αυτών των ευάλωτων ασθενών.

Λέξεις κλειδιά: Καρκίνος πνεύμονος, πρώιμου σταδίου καρκίνος πνεύμονος, ηλικιωμένος, συννοσηρότητα, χειρουργική θεραπεία, στερεοτακτική θεραπεία ακτινοβολίας σώματος (SBRT)

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