High Risk for Thoracotomy but not Thoracoscopic Lobectomy

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Background. **Pulmonary lobectomy is the standard of care for resection of non-small cell lung cancer (NSCLC). Patients with compromised lung function who are considered high risk may be denied surgical treatment; thus, proper identification of those truly at high risk is critical. Video-assisted thoracic surgery (VATS) may reduce the operative risk. This study reviews our institutional experience of pulmonary lobectomy by open thoracotomy or VATS techniques in patients deemed to be high risk.**

Methods. **A retrospective review of an institutional database was performed for all patients undergoing lobectomy from 2002 to 2010. Patients were grouped into high-risk (HR) and standard-risk (SR) cohorts according to the American College of Surgeons Oncology Group Z4099/Radiation Therapy Oncology Group 1021 criteria.**

Results. **From 2002 to 2010, 72 HR and 536 SR patients underwent lobectomy. Mean age was 73 years for HR and 66 years for SR ($p < 0.0001$). Rates of overall ($p < 0.0001$) and pulmonary complications ($p < 0.0001$) were significantly higher in the HR group. However, when HR patients were resected by VATS, there was no significant difference in overall ($p = 0.1299$) or pulmonary complications ($p = 0.2292$) compared with the SR VATS group. Moreover, overall survival was significantly lower for HR patients who had an open operation compared with VATS lobectomy or SR open ($p = 0.0028$).**

Conclusions. **VATS lobectomy offers patients who are considered to be at increased risk for open lobectomy a feasible procedure, with no difference in overall survival compared with SR patients, and decreased morbidity compared with open lobectomy. VATS lobectomy should be considered for patients who historically may not have been considered for surgical resection.**

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Pulmonary lobectomy is the standard of care for resection of non-small cell lung cancer (NSCLC). Patients with compromised lung function who are considered high risk may be denied surgical treatment or may be offered nonanatomic resection. Video assisted thoracic surgery (VATS) may reduce the operative risk and allow patients who were previously considered nonoperative candidates to undergo pulmonary resection [1]. This study reviews our institutional experience of pulmonary lobectomy by open thoracotomy or VATS techniques in patients deemed to be high risk. We hypothesized that high risk patients can undergo VATS lobectomy without increased complications.

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Material and Methods

After Research Ethics Board approval, our institutional database was queried for patients who underwent pulmonary lobectomy for primary NSCLC between 2002 and 2010. Requirement for patient consent was waived because of the retrospective nature of the study. A detailed record review was then performed. Patients at clinical stage I and II were included, whereas those with advanced clinical stage, multiple synchronous primary tumors, or who underwent sleeve resection, bronchoplasty, or arterioplasty procedures were excluded. The remaining 608 patients were grouped into standard-risk (SR, n = 536) and high-risk (HR, n = 72) cohorts according to the American College of Surgeons Oncology Group (ACOG) Z4099/Radiation Therapy Oncology Group (RTOG) 1021 criteria (Fig 1) [2].

Staging

Clinical stage was assigned according to the Sixth edition of the Union for International Cancer Control TNM Staging System, which was in use at the time of data

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Abbreviations and Acronyms

ASCOG = the American College of Surgeons Oncology Group
DLCO = diffusing capacity for carbon monoxide
FEV_1 = forced expiratory volume in 1 second
HR = high risk
LVEF = left ventricular ejection fraction
NSCLC = non-small cell lung cancer
ppoDLCO = postoperative predicted diffusing capacity of the lung for carbon monoxide
ppoFEV_1 = postoperative predicted forced expiratory volume in 1 second
RTOG = Radiation Therapy Oncology Group
RVSP = right ventricular systolic pressure
Spo_2 = oxygen saturation by pulse oximetry
SR = standard risk
VATS = video-assisted thoracic surgery

collection. Preoperative staging included computed tomography of the chest and abdomen and magnetic resonance imaging of the brain. After 2005, all patients were staged with positron emission tomography–computed tomography, whereas those in the early part of the series were staged with bone scans.

Preoperative lymph node staging was performed using mediastinoscopy, endobronchial ultrasound-guided fine needle aspiration, or both. Patients with N2 disease identified before resection were excluded from the study. Intraoperative lymph node assessment by systematic sampling or mediastinal lymph node dissection was performed at the time of resection. Rates of lymph node sampling have been reported previously [3]. The study included patients with incidental findings of N2 nodal metastases at the time of resection (pathologic stage III).

Patients with medical comorbidities were assessed preoperatively with pulmonary function tests, echocardiogram, and exercise oximetry. The operating surgeon determined patient fitness for the surgical intervention.

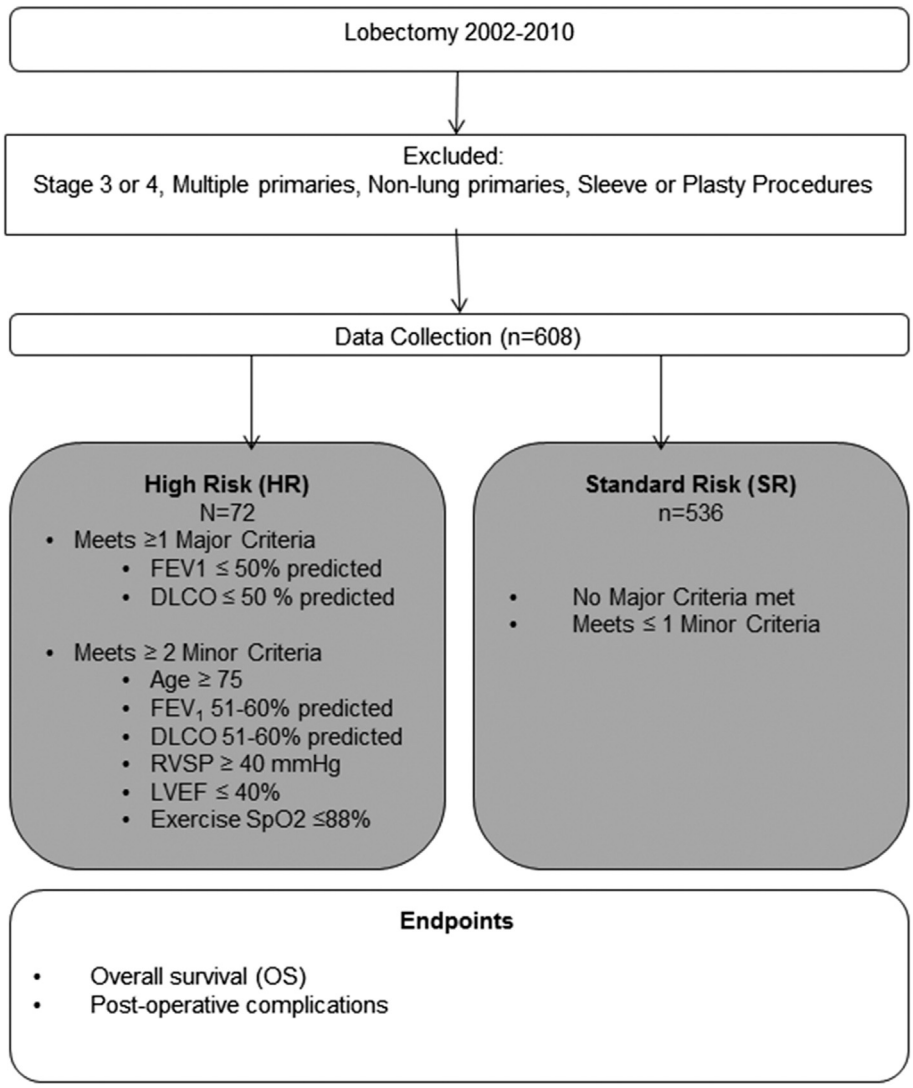

Fig 1. Schema. (DLCO = diffusing capacity of the lung for carbon monoxide; FEV_1 = forced expiratory volume in 1 second; LVEF = left ventricular ejection fraction; RVSP = right ventricular systolic pressure; Spo_2 = oxygen saturation by pulse oximetry.)