A Surgeon's Approach to Lung Cancer

TRENT HOWARD, DO

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ASCENSION ALABAMA CME CONFERENCE

Disclosures

- None except I hate lung cancer!!

Objectives

- Understand the presentation, workup, and preparation for lung cancer surgery
- Operative options for lung cancer
- Lung cancer staging and treatment

Background

- Second most common cancer among men and women
- Leading cause of cancer death among both
  - In 2019, 220,000 new lung cancer diagnosis/ 142,000 deaths
  - 18% 5 year survival (all comers)
- 85-90% caused by smoking

- National Lung Screening Trial (NLST): CT screening of high risk individuals reduced risk of death by 20%

- 3 types:
  - Adenocarcinoma
  - Squamous
  - Small cell

Presentation

- Incidental lung nodules
  - LDCT vs other imaging
- Symptoms:
  - Cough, weight loss, chest pain, difficulty breathing, recurrent infection, etc.

Lung nodules

- Solid
- Non solid
  - GGO, or GGNs
  - Part solid: both ground glass and solid components
  - Often Adeno in situ or minimially invasive (BAC)
  - 100% 5 year survival if resected

- Solid and part solid nodules are more likely neoplastic and followed and treated more aggressively

Solid nodule

- Low risk:
  - <6mm: no followup
  - 6-8mm: CT f/u in 6-12 months
  - >8mm: CT in 3 months vs PET vs biopsy

- High Risk:
  - >6mm: CT in 12 months
  - 6-8mm: CT in 6-12 months
  - >8mm: CT in 3 months vs PET vs biopsy

Subsolid Nodule

- Pure ground glass:
  - <6mm: Nothing
  - >6mm: CT in 6-12 months
- Part solid:
  - <6mm: Nothing
  - >6mm: CT in 3-6 months; if solid >6mm consider biopsy/PET
- Multiple nodules:
  - <6mm: CT in 3-6 months
  - >6mm: CT in 3-6 months; further based on most suspicious nodule

Principles of Diagnostic Evaluation

- Patients with strong suspicion of stage I or II cancer does not require a biopsy (based on risk factors and radiologic appearance)
  - Adds time, costs, and procedural risk
  - May be appropriate if intraop biopsy appears difficult (anatomically)
- Diagnostic tools:
  - Sputum cytology
  - Bronchoscopy with biopsy
  - Image guided transthoracic biopsy
  - Thoracentesis
  - Mediastinoscopy
  - Surgical biopsy

- Other helpful diagnostic tools:
  - EBUS
  - EUS
  - Navigational bronchoscopy

- Bronchoscopy:
  - Should be performed before surgical resection; not necessarily preoperatively unless needed for surgical planning (sleeve rxn, etc.)
- Mediastinal staging:
  - Should be done before surgical resection for most resectable cancers
  - Should not be done as a separate procedure
- PET:
  - Frequently best performed before a diagnostic biopsy
- PFTs and frailty assessment to evaluate patient tolerance for resectability
- Multidisciplinary Evaluation

Indications for Mediastinal Lymph Node bx

- PET avid
- >1cm
- Strong suspicion of mediastinal node involvement
- Tumor size >2cm
- As recommended by NCCN Guidelines

Stage IA1

- T1aN0M0:
  - Tumor <1cm

- Treatment:
  - Surgical resection with MLND if a surgical candidate
  - If not a surgical candidate; definitive RT possibly SABR

Stage IA2

- T1bN0M0
  - Tumor 1-2cm

- Treatment:
  - Surgical resection with MLND if a surgical candidate
  - If not a surgical candidate; definitive RT possibly SABR

Stage IA3

- T1cN0M0
  - Tumor 2-3cm

- Treatment:
  - Surgical resection with MLND if a surgical candidate
  - If not a surgical candidate; definitive RT possibly SABR

Stage IB

- T2aN0M0
  - Tumor 3-4cm

- Treatment:
  - Surgical resection with MLND if a surgical candidate; consider chemo for high risk
  - If not a surgical candidate; definitive RT possibly SABR; consider adjuvant chemo

Stage IIA

- T2bN0M0
  - Tumor 4-5cm

- Treatment:
  - Brain MRI
  - Surgical resection with MLND if a surgical candidate; consider chemo for high risk; if positive margins chemo +/- RT
  - If not a surgical candidate; definitive RT possibly SABR

Notes on T2

- 3-5cm in size
- Involving main bronchus without carinal involvement
- Invading visceral pleura
- Atelectasis or obstructive pneumonia

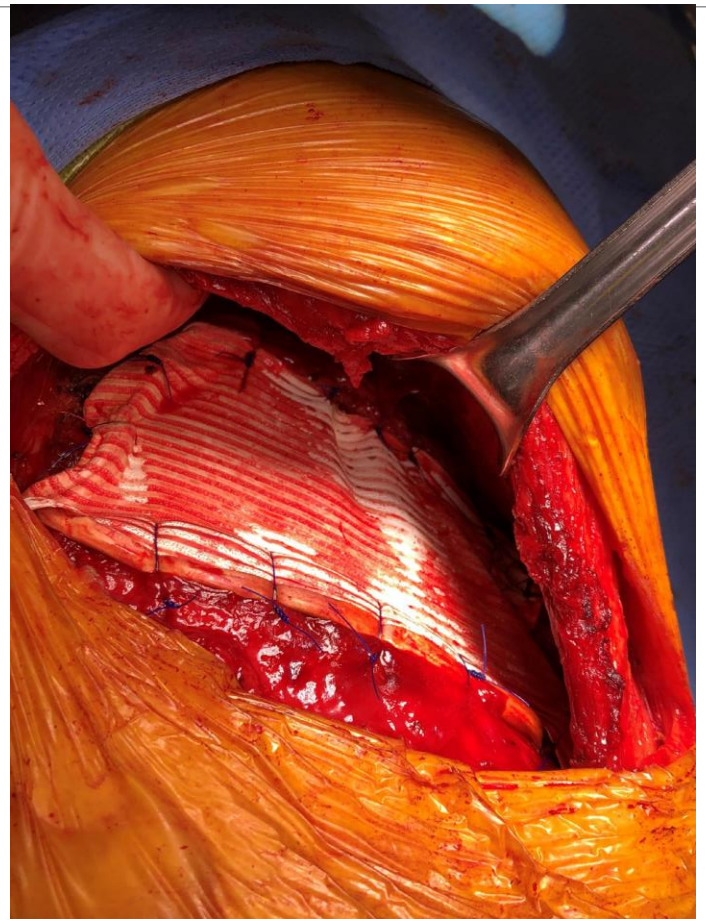
Stage IIB

- T3N0M0
  - T3= tumor 5-7cm, directly invading parietal pleura, chest wall (not superior sulcus), parietal pericardium, phrenic nerve, or separate nodule in same lobe
- T1abcN1M0
- T2abN1M0

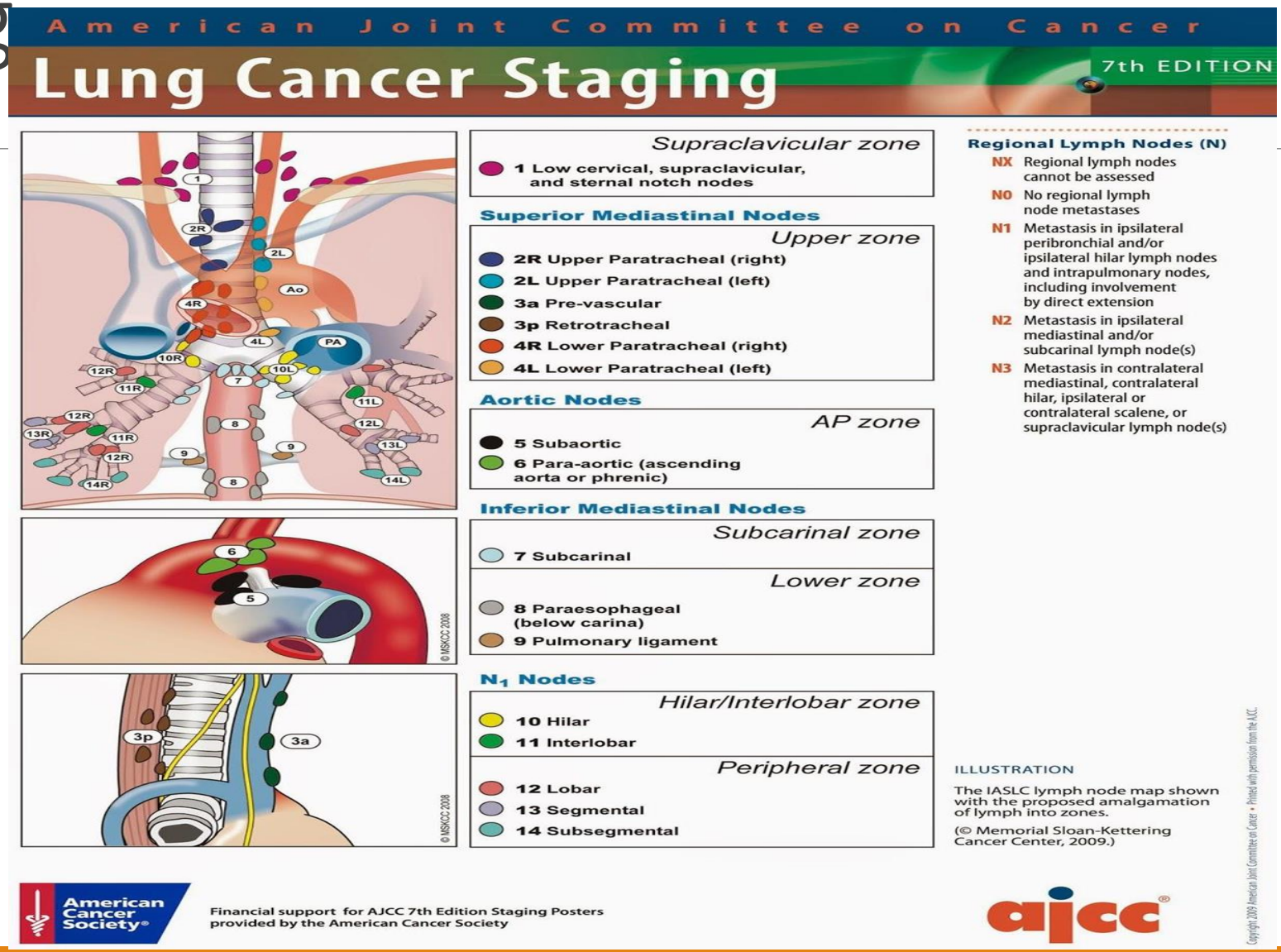
- Treatment:
  - Resection with MLND; Chemo; RT if positive margins

T3

- 5-7 cm or directly invading: Parietal pleura, chest wall including superior sulcus tumors, phrenic nerve, parietal pericardium, or separate tumor nodule in the same lobe



N Staging


American Joint Committee on Cancer
Lung Cancer Staging
7th EDITION
Supraclavicular zone
1 Low cervical, supraclavicular, and sternal notch nodes
Superior Mediastinal Nodes
Upper zone
2R Upper Paratracheal (right)
2L Upper Paratracheal (left)
3a Pre-vascular
3p Retrotracheal
4R Lower Paratracheal (right)
4L Lower Paratracheal (left)
Aortic Nodes
AP zone
5 Subaortic
6 Para-aortic (ascending aorta or phrenic)
Inferior Mediastinal Nodes
Subcarinal zone
7 Subcarinal
Lower zone
8 Paraesophageal (below carina)
9 Pulmonary ligament
N1 Nodes
Hilar/Interlobar zone
10 Hilar
11 Interlobar
Peripheral zone
12 Lobar
13 Segmental
14 Subsegmental
Regional Lymph Nodes (N)
NX Regional lymph nodes cannot be assessed
N0 No regional lymph node metastases
N1 Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes and intrapulmonary nodes, including involvement by direct extension
N2 Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)
N3 Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)
ILLUSTRATION
The IASLC lymph node map shown with the proposed amalgamation of lymph into zones.
(© Memorial Sloan-Kettering Cancer Center, 2009.)
American Cancer Society
Financial support for AJCC 7th Edition Staging Posters provided by the American Cancer Society
ajcc
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T4

- Tumor >7cm
- Invading diaphragm, mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, or separate tumor nodule in ipsilateral lobe

Stage IIIA

- T1abcN2M0
- T2abN2M0
- T3N1M0
- T4N12M0

Superior Sulcus Tumors

- At least Stage IIIA
- Invades chest wall and/or structures of the thoracic outlet

- Treatment involves ruling our N2 disease (non resectable) and neoadjuvant CRT followed by restaging and resection

Treatment

- Some IIIA disease may need neoadjuvant treatment
- Some IIIA disease is unresectable

- Most all will require chemo and/or radiation

Treatment controversies

- IIIA N2 ds:
  - Surgery has not consistently shown to increase survival
  - Neoadjuvant vs adjuvant chemo
  - Timing of RT and if necessary still not known
  - Surgery may be appropriate to those that respond to induction therapy

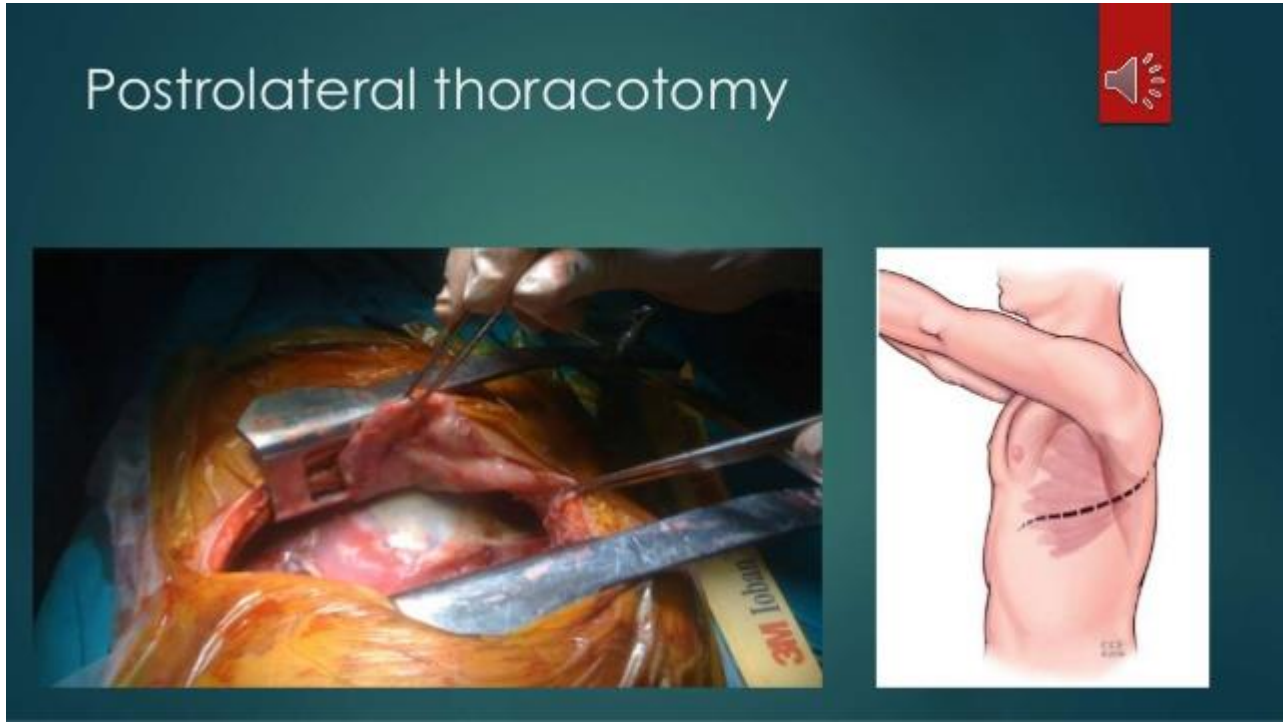
Stage IIIB

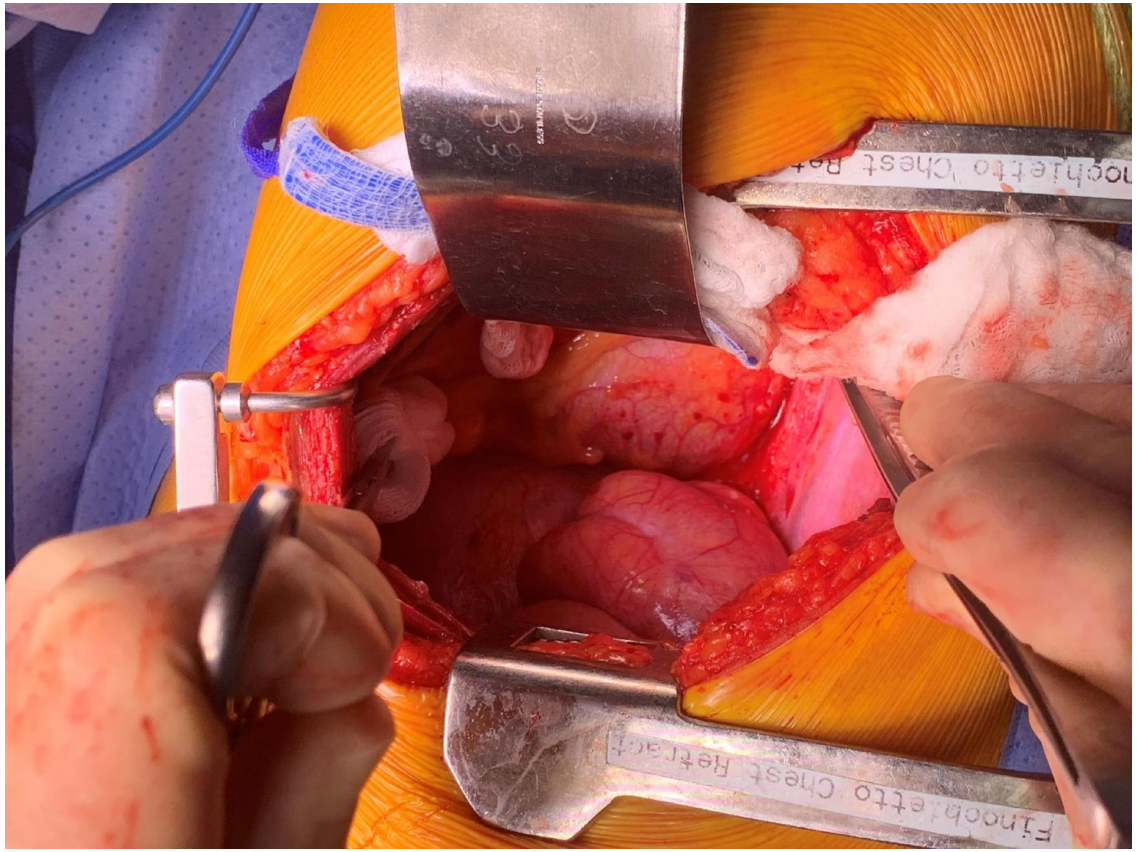
- T1abcN3M0
- T2abN3M0
- T3N2M0
- T4N2M0

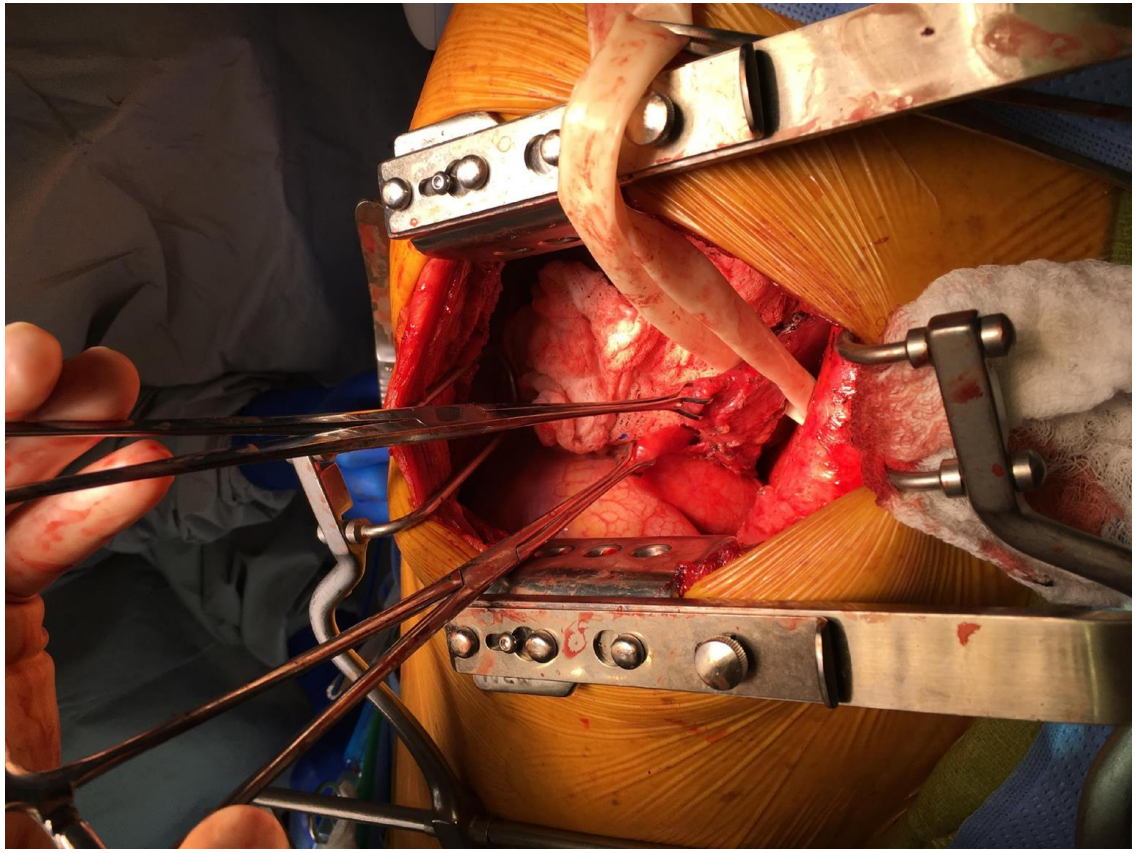
- Technically non resectable!

Operative Approaches

- Traditional Thoracotomy







- VATS


"OK Stryker"
stryker
PIP
BRIGHT
SPECIALTY
INPUT

- https://youtu.be/KaARmm-lBbg

- Robotic

https://youtu.be/n85q2ix1C_Q

Advantages of Robotic Approach

- Less pain
- Shorter length of stay
- Less air leak
- Improved lymph node dissection

Research Review

- Why lobectomy
- Mediastinal lymph node dissection vs sampling
- Segmentectomy

Why Is Lobectomy the “Proper” Operation

- Randomized Trial of Lobectomy Versus Limited Resection(2cm margin) for T1 NO Non-Small Cell Lung Cancer
- Lung Cancer Study Group (Prepared by Robert J. Ginsberg, MD, and Lawrence V. Rubinstein, PhD)
- A prospective, multiinstitutional randomized trial was instituted comparing limited resection with lobectomy for patients with peripheral T1 NO non-small cell lung cancer documented at operation. There were 276 patients randomized,
- In patients undergoing limited re- section, there was an observed 75% increase in recurrence rates ($p = 0.02$, one-sided) attributable to an observed tripling of the local recurrence rate ($p = 0.008$ two-sided), an observed 30% increase in overall death rate ($p = 0.08$, one-sided), and an observed 50% increase in death with cancer rate ($p = 0.09$, one-sided) compared to patients undergoing lobectomy ($p = 0.10$, one-sided was the predefined threshold for statistical significance for this equivalency study).
- (Ann Thorac Surg 1995;60:615-23)

MLND vs Sampling

J. MAXWELL CHAMBERLAIN MEMORIAL PAPER

Morbidity and Mortality of Major Pulmonary Resections in Patients With Early-Stage Lung Cancer: Initial Results of the Randomized, Prospective ACOSOG Z0030 Trial

Mark S. Allen, MD, Gail E. Darling, MD, Taine T. V. Pechet, MD, John D. Mitchell, MD, James E. Herndon II, PhD, Rodney J. Landreneau, MD, Richard I. Inculet, MD, David R. Jones, MD, Bryan F. Meyers, MD, David H. Harpole, MD, Joe B. Putnam, Jr, MD, Valerie W. Rusch, MD, and the ACOSOG Z0030 Study Group*

- Early stage ds with complete MLND had no increase in survival.
- For advanced disease IIIA MLND should be performed
- Right sided cancer sampling from stations 2, 4, 7, 8, 9
- Left sided cancer sampling from station 4, 5, 6, 7, 8, and 9
- Minimum 3 N2 stations sampled

- Newer research and practice is leaning toward MLND on all
- We have seen patients upstaged by aggressive mediastinal node harvest.

Segmentectomy versus lobectomy for stage I non-small cell lung cancer: a systematic review and meta-analysis

Journal of Thoracic Disease. All rights reserved. J Thorac Dis 2017;9(6):1615-1623

Retrospective data. The size of the cohorts varied from 17 to 11,520, with a total number of 24,542 patients. The pooled HR was 1.04 [95% confidence interval (CI), 0.92–1.18; P=0.50].

Conclusions: The survival in the segmentectomy group was not inferior to patients treated with lobectomy; more evidence is needed, in particular, a large numbered, prospective, randomised trials, which should dissolve the uncertainties and the questions raised by retrospective data

- NCCN Guidelines now suggest segmentectomy MAY be appropriate for:
  - Not eligible for lobectomy
  - Peripheral nodule <2cm
  - Can achieve clear margins >2cm or the size of the nodule

Building a comprehensive lung cancer program

- PCP and patient education
- Lung cancer screening
- Lung cancer “task force” to evaluate, refer to appropriate specialists, and follow up progress
- Multidisciplinary coordination/cooperation
- Available resources necessary for proper work up and treatment

Who Qualifies for Lung Cancer Screening?

- High Risk individuals:
  - 55-77 y/o and >30 pack/yr smoking hs with <15 yr sessation
  - >50 and >20 pack yr hx and one additional risk factor not second hand smoke
    - Radon, cancer hx, family hx, COPD or pulm fibrosis

- Low dose screening CT

- Based on findings annual screening (if no abnormalities) until patient is no longer a candidate for treatment
- Or f/u based on any findings/nodules/masses

Questions