Surgical management in Lung cancer

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Disclosures & Acknowledgements

- No relevant disclosures
- No relevant Conflicts of Interests
- Special thanks to my MCh Residents who helped prepare the presentation & video

Topics

- Indications for Surgery in Lung Cancer
- Preoperative assessment & Optimization
- Relevant Surgical Anatomy
- Surgery– Primary & Mediastinal Lymph nodes
- Post operative Management
- Adjuvant Treatment & Followup

Indications

- Early stage NSCLC
  - Stage IA,IB,IIA,IIB
- Locally Advanced NSCLC
  - Stage IIB/IIIA (T3 N0/N1, T4 N0/N1)
  - Stage IIIA/IIIB (cT1-3 N2/3) → Pathological mediastinal LN Negative
- Early Stage SCLC - T1/2 N0 → Pathological mediastinal LN Negative
- Resectable recurrence
- Palliative

Indications

- Separate Nodules/Multiple cancers in same lobe/same side lung
  - Parenchyma preserving resection
- Chest wall/parietal pleura/parietal pericardium/phrenic nerve – No problem
- Superior sulcus tumours?

Preoperative Assessment & Optimization

- MDT
  - Surgical Oncologist/Thoracic Surgeon
  - Medical Oncologist
  - Radiation Oncologist
  - Radiologist
  - Pulmonologist
  - Specialist Nurses
  - Pathologists
- Patient and Family

Preoperative Assessment & Optimization

Medically Fit Patient

Resectable Disease

Preoperative Assessment & Optimization

- Clinical Assessment including Performance status
- CT Chest and Abdomen or PETCT
- Bloods
- Smoking cessation
- Pathology
- Bronchoscopy
- Pulmonary function tests/CPET

Preoperative Assessment & Optimization

Mediastinal Evaluation – Clinical(Imaging) → Pathological

Rule out N2/N3 disease

N1 – Ipsilateral peribronchial/hilar/intrapulmonary LN
N2 – Ipsilateral mediastinal or subcarinal LN
N3 – Contralateral LN or supraclavicular LN

Mediastinal Evaluation

- EBUS TBNA
- EUS FNA/B
- CT guided needle biopsy
- Mediastinoscopy
- Thoracoscopy
- Mediastinotomy

EBUS TBNA Neg but CT/PET suspicious

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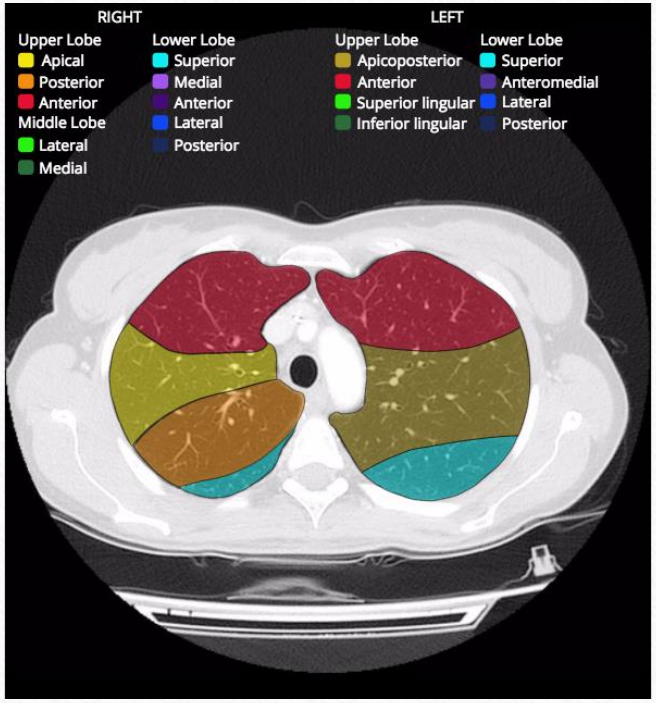
Mediastinoscopy biopsy

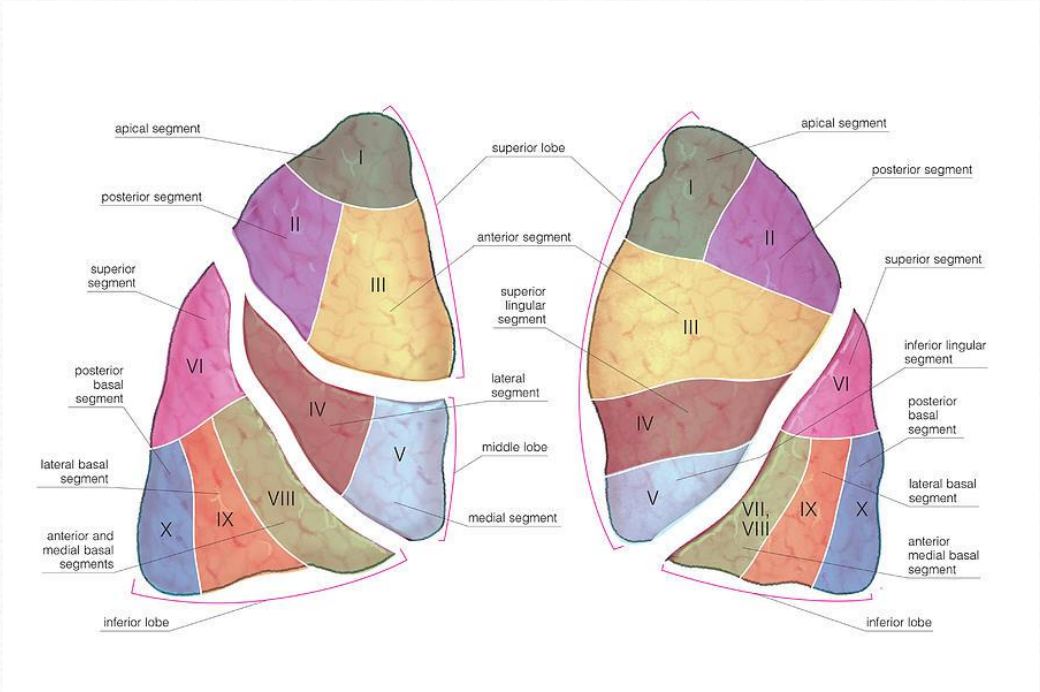
Relevant Surgical Anatomy

Lung

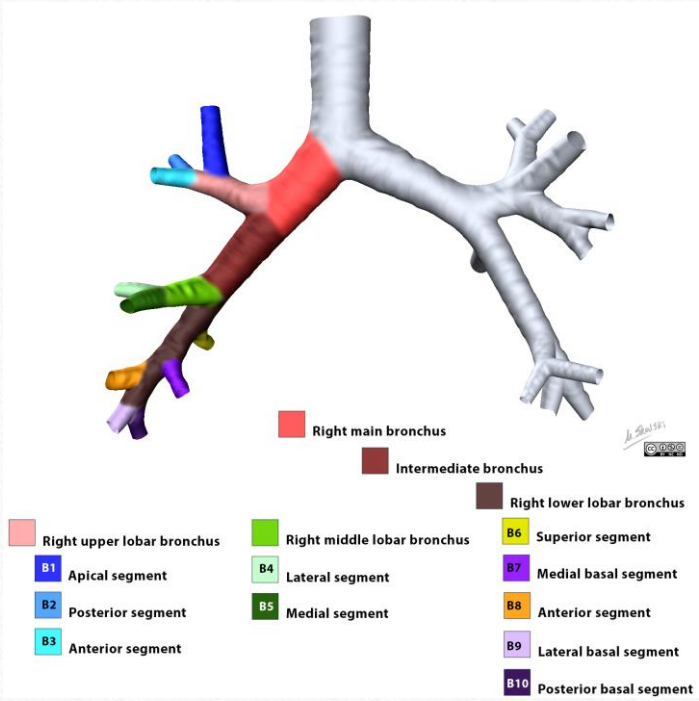
Lymph Nodes

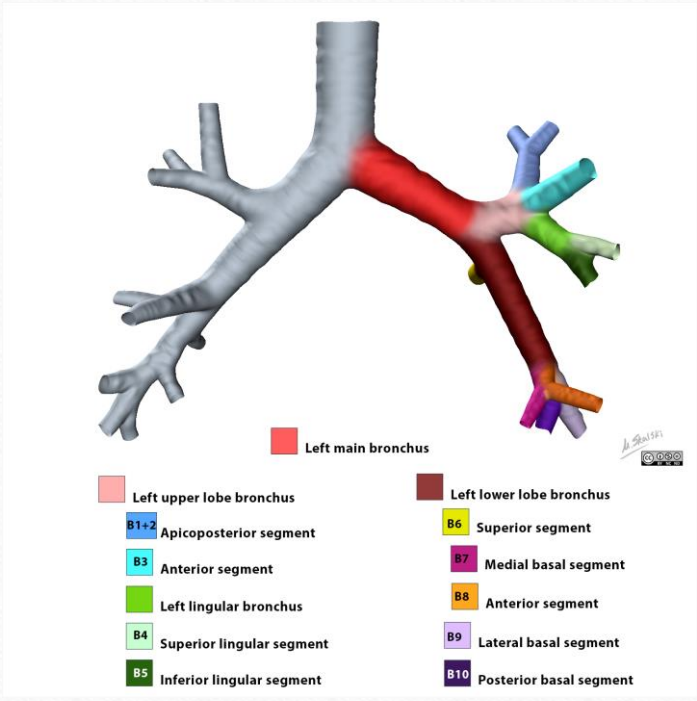
Lungs


RIGHT
Upper Lobe
Apical
Posterior
Anterior
Middle Lobe
Lateral
Medial
Lower Lobe
Superior
Medial
Anterior
Lateral
Posterior
LEFT
Upper Lobe
Apicoposterior
Anterior
Superior lingular
Inferior lingular
Lower Lobe
Superior
Anteromedial
Lateral
Posterior


apical segment
posterior segment
superior segment
posterior basal segment
lateral basal segment
anterior and medial basal segments
inferior lobe
superior lobe
anterior segment
superior lingular segment
lateral segment
middle lobe
medial segment
I
II
III
IV
V
VI
VIII
IX
X
apical segment
posterior segment
superior segment
inferior lingular segment
posterior basal segment
lateral basal segment
anterior medial basal segment
inferior lobe
I
II
III
IV
V
VI
VII, VIII
IX
X

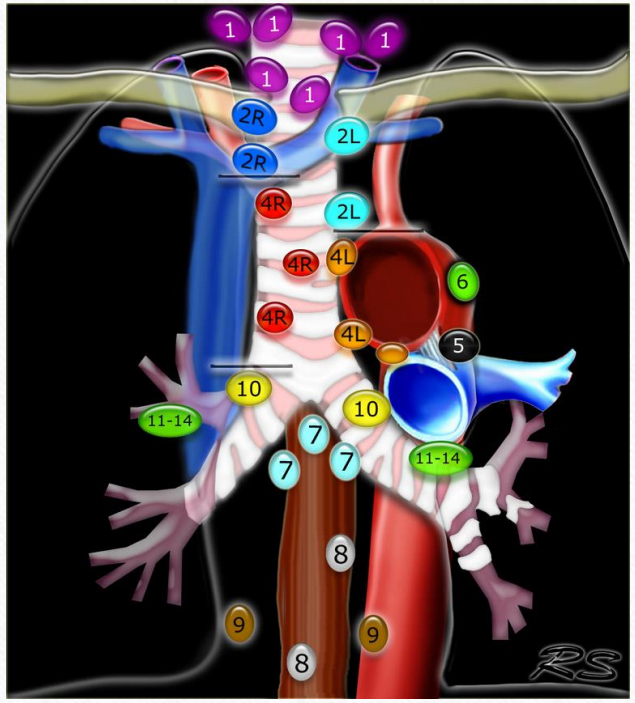
Lungs

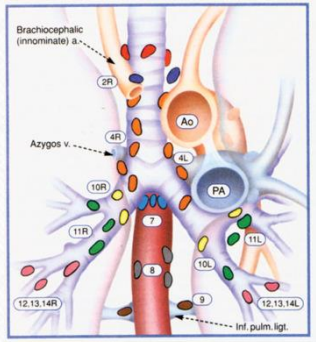


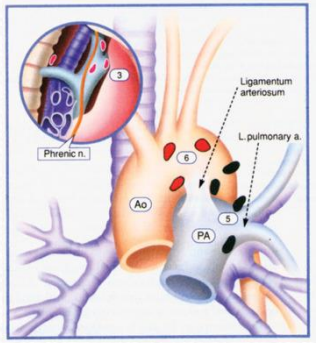


Courtesy of Dr Matt Skalski, Radiopaedia.org

Lymph Nodes







Superior Mediastinal Nodes

- 1 Highest Mediastinal
- 2 Upper Paratracheal
- 3 Pre-vascular and Retrotracheal
- 4 Lower Paratracheal (including Azygos Nodes)

N_2 = single digit, ipsilateral
N_3 = single digit, contralateral or supraclavicular

Aortic Nodes

- 5 Subaortic (A-P window)
- 6 Para-aortic (ascending aorta or phrenic)

Inferior Mediastinal Nodes

- 7 Subcarinal
- 8 Paraesophageal (below carina)
- 9 Pulmonary Ligament

N_1 Nodes

- 10 Hilar
- 11 Interlobar
- 12 Lobar
- 13 Segmental
- 14 Subsegmental

Surgery

Primary-Lung Lesion

Mediastinal LN

Surgery - Primary

- Anatomic Pulmonary Resections – lobectomy/pneumonectomy – preferred
- Sublobar resections – Segmentectomy/Wedge resections
  - <=2 cm tumours
  - >= 2 cm margin
  - Peripheral nodule
  - Poor pulmonary reserve or major comorbidity
  - Includes LN sampling of appropriate N1/N2 stations

Surgery -VATS

- High volume centres
- No compromise of oncological safety
- Improved early post op outcomes
- Reduced hospital stay
- Rapid return to function
- Reduced delay in adjuvant Rx

Surgery - Primary

- Separate nodules in same lobe/same lung – Lung parenchyma preserving sleeve lobectomy > pneumonectomy
- T3/T4 local invasion/extension – en bloc resections
- No surgery in N2/N3 disease

Surgery – Lymph nodes

- Formal Ipsilateral mediastinal LN dissection esp. in Stage IIB/IIIA tumours

- All N1 and alteast 3 N2 LN stations should be sampled if formal dissection not done.

Surgery

- Left Upper Lobectomy – Segments I-V + LN 10-14L (N1 Nodes) + 2L,4L,5,6,7,8,9 (N2 Nodes)
- Left Lower Lobectomy – Segments VI-X + LN 10-14L (N1 Nodes) + 4L,5,6,7,8,9(N2 Nodes)
- Right Upper Lobectomy – Segments I-III ± IV-V + LN 10-14R (N1 Nodes) + 2R,4R,7,8,9 (N2 Nodes)
- Right Lower Lobectomy – Segments VI-X ± IV-V + LN 10-14R (N1 Nodes) +2R,4R,7,8,9(N2 Nodes)

Surgery

Video – Left Upper lobectomy

Post operative Care

- Early post operative period – ICU/HDU
- Chest drain – bronchopleural fistula
- Chest physiotherapy
- Analgesia

Adjuvant Treatment

- Post operative histopathology → MDT
- T1/2 + N0 +R0 – observe/chemotherapy
- T3 or T4 or N1 or N2 or R1 – Chemo + RT

Thank you

Post Test MCQs

Question 1

In which of the following clinical stages of NSCLC is surgery NOT the primary modality of treatment?

a) T2 N1

b) T3 N1

c) T4 N1

d) T2 N2

Question No 2

Which of the following T stages is matched correctly as per TNM 8Th Edition staging system for NSCLC?

a) T1 – involves visceral pleura

b) T2 – involves main bronchus

c) T3 – involves recurrent laryngeal nerve

d) T4 – involves phrenic nerve

Question 3

Which of the following N stages is matched correctly as per TNM 8Th Edition staging system for NSCLC?

a) N1 – Ipsilateral scalene LN

b) N2 – Subcarinal LN

c) N3 – Intrapulmonary LN

d) N3 – Ipsilateral mediastinal LN

Question 4

- Which of the following IASLC LN stations are NOT correctly matched?
  - 3 – Prevascular
  - 4 – Subaortic
  - 5 – AP window
  - 6 – Para aortic

Question 5

- Which of the following is not a contraindication for surgery in lung cancer?
  a) Tumour nodule in contralateral lobe
  b) Single extrathoracic metastases
  c) Involvement of superior mediastinal LN
  d) Involvement of chest wall

Question 6

- Which of the following statements is TRUE regarding surgery of lung cancer?
  a) Sublobar resections are preferred over anatomic resections
  b) Poor pulmonary reserve is a contraindication for surgery
  c) Pneumonectomy is preferred over sleeve lobectomy in patients with multiple cancers
  d) Atleast 3 N1 LN stations should be sampled

Question 7

- Which of the following is NOT an indication for adjuvant radiation treatment post lung cancer surgery?
  - Margin positive T1 N0 cancer treated with a lobectomy + MLND
  - En bloc resection of chest wall for a T3 left upper lobe tumour
  - T2 N0 tumour treated with lobectomy + MLND. Margins are negative
  - T2 N1 tumour treated with lobectomy + MLND. Margins are negative

Question 8

- Which of the following is true regarding the surgical anatomy of the Lung?
  - Right lung does not have a horizontal fissure
  - Right lung has 10 segments, Left lung has 8 segments
  - Lingula contains 2 segments on the left side
  - Right middle lobe is divided into superior and inferior segments