Lung Cancer for Internal Medicine Physicians

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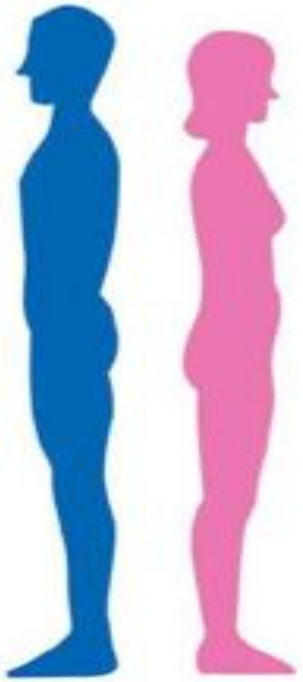
Question # 1

- 45 yo gentleman presents to you for follow up requesting test to make sure that he does not have lung cancer
- Actively smokes 1PPD and has done so for last 15 years
- Asymptomatic aside from morning cough intermittently
- PMX asthma, HTN, BMI 32
- Normal exam aside from blood pressure of 157/82

- In regards to his lung cancer risk, what do you recommend?
  - A. Screening chest x-ray
  - B. Low dose screening chest CT
  - C. Low dose screening chest CT and counseling and discuss RX for smoking cessation
  - D. Regular CT with iv contrast given history of asthma
  - E. Counseling and discuss RX for smoking cessation

Lung Cancer Incidence in the United States

Males			Females		
Prostate	161,360	19%	Breast	252,710	30%
Lung & bronchus	116,990	14%	Lung & bronchus	105,510	12%
Colon & rectum	71,420	9%	Colon & rectum	64,010	8%
Urinary bladder	60,490	7%	Uterine corpus	61,380	7%
Melanoma of the skin	52,170	6%	Thyroid	42,470	5%
Kidney & renal pelvis	40,610	5%	Melanoma of the skin	34,940	4%
Non-Hodgkin lymphoma	40,080	5%	Non-Hodgkin lymphoma	32,160	4%
Leukemia	36,290	4%	Leukemia	25,840	3%
Oral cavity & pharynx	35,720	4%	Pancreas	25,700	3%
Liver & intrahepatic bile duct	29,200	3%	Kidney & renal pelvis	23,380	3%
All Sites	**836,150**	**100%**	**All Sites**	**852,630**	**100%**



Lung Cancer Mortality in the United States

Males			Females		
Lung & bronchus	84,590	27%	Lung & bronchus	71,280	25%
Colon & rectum	27,150	9%	Breast	40,610	14%
Prostate	26,730	8%	Colon & rectum	23,110	8%
Pancreas	22,300	7%	Pancreas	20,790	7%
Liver & intrahepatic bile duct	19,610	6%	Ovary	14,080	5%
Leukemia	14,300	4%	Uterine corpus	10,920	4%
Esophagus	12,720	4%	Leukemia	10,200	4%
Urinary bladder	12,240	4%	Liver & intrahepatic bile duct	9,310	3%
Non-Hodgkin lymphoma	11,450	4%	Non-Hodgkin lymphoma	8,690	3%
Brain & other nervous system	9,620	3%	Brain & other nervous system	7,080	3%
All Sites	**318,420**	**100%**	**All Sites**	**282,500**	**100%**

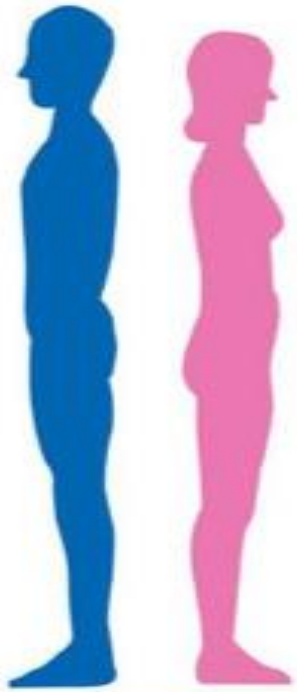
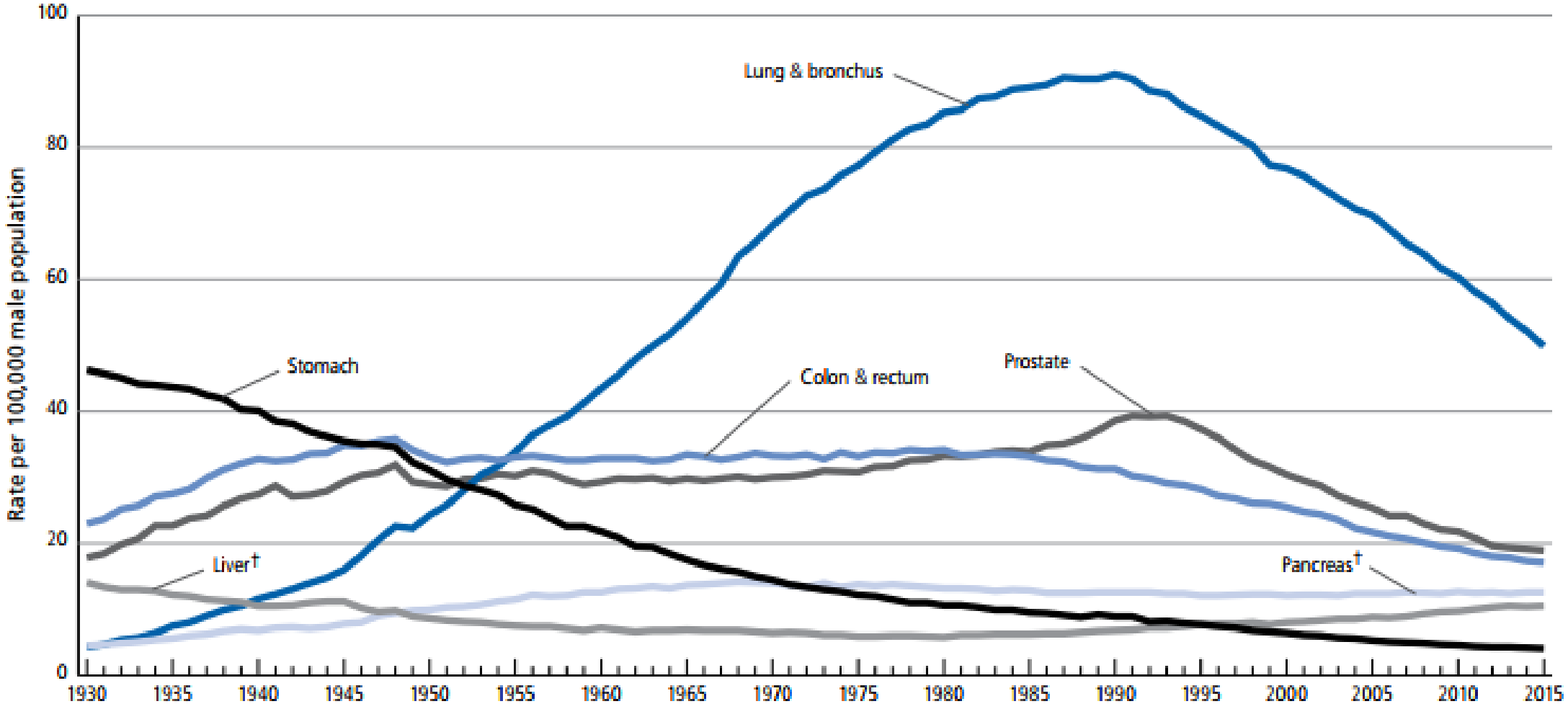


Figure 1. Trends in Age-adjusted Cancer Death Rates* by Site, Males, US, 1930-2015



*Age adjusted to the 2000 US standard population. †Mortality rates for pancreatic and liver cancers are increasing.

Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancers of the liver, lung and bronchus, colon and rectum, and uterus are affected by these coding changes.

Source: US Mortality Volumes 1930 to 1959, US Mortality Data 1960 to 2015, National Center for Health Statistics, Centers for Disease Control and Prevention.

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Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

The National Lung Screening Trial Research Team*

- Massive NCI sponsored multi-centered randomized prospective study which enrolled participants from 08/2002–04/2004 at 33 US medical centers
- Compared 26,722 participants randomized to low-dose screening CT (annual x 3) with 26,732 participants randomized to chest X-ray (annual x 3)
- Primary endpoint was reduction in lung cancer mortality which was met with 20% reduction in lung cancer mortality in the screening CT group
- In low dose CT arm 247 deaths per 100,000 person years vs 309 deaths per 100,000 person years
- NNT to prevent one lung cancer death was 320; Rate of false positives in CT arm 96.4%, CXR 94.5%
- Proof of concept that screening could reduce lung cancer mortality, majority of lung cancers detected in CT arm were early stage (most stage I)

USPSTF Lung Cancer Screening Guideline 2013
(Update soon?)

- Recommendation for annual low dose CT for active or former smokers who are at high risk of developing lung cancer
  - Patients 55 yo – 80 yo (ACCP recommends 55 – 77 yo)
  - 30 pack year history of smoking
  - Active smoker or quit within in the past 15 years

- Based on the National Lung Screening Trial inclusion criteria (age 55-75 yo at time of enrollment)

- Level B evidence supporting recommendation

Radiographic Findings on Screening CT

- Pulmonary nodule = < 3cm lesion surrounded by pulmonary parenchyma
  - Solid Pulmonary Nodule
  - Sub Solid Pulmonary Nodule
    - Pure ground glass
    - Part solid nodule
- Lung mass = > 3cm
- Risk calculators to determine risk of malignancy
  - Low probability = < 5% chance malignant
  - Moderate probability = 5 – 65% chance malignant
  - High probability = > 65% chance malignant

Well, that's kind of the radiologists problem isn't it?

Lung RADS Reporting of CT

Category	Category Descriptor	Category	Findings	Management	Probability of Malignancy	Estimated Population Prevalence
Incomplete	-	0	prior chest CT examination(s) being located for comparison part or all of lungs cannot be evaluated	Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed	n/a	1%
Negative	No nodules and definitely benign nodules	1	no lung nodules nodule(s) with specific calcifications: complete, central, popcorn, concentric rings and fat containing nodules	Continue annual screening with LDCT in 12 months	< 1%	90%
Benign Appearance or Behavior	Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth	2	solid nodule(s): < 6 mm new < 4 mm part solid nodule(s): < 6 mm total diameter on baseline screening non solid nodule(s) (GGN): < 20 mm OR ≥ 20 mm and unchanged or slowly growing category 3 or 4 nodules unchanged for ≥ 3 months			
Probably Benign	Probably benign finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer	3	solid nodule(s): ≥ 6 to < 8 mm at baseline OR new 4 mm to < 6 mm part solid nodule(s) ≥ 6 mm total diameter with solid component < 6 mm OR new < 6 mm total diameter non solid nodule(s) (GGN) ≥ 20 mm on baseline CT or new	6 month LDCT	1-2%	5%
Suspicious	Findings for which additional diagnostic testing and/or tissue sampling is recommended	4A	solid nodule(s): ≥ 8 to < 15 mm at baseline OR growing < 8 mm OR new 6 to < 8 mm part solid nodule(s: ≥ 6 mm with solid component ≥ 6 mm to < 8 mm OR with a new or growing < 4 mm solid component endobronchial nodule	3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component	5-15%	2%
		4B	solid nodule(s) ≥ 15 mm OR new or growing, and ≥ 8 mm part solid nodule(s) with: a solid component ≥ 8 mm OR a new or growing ≥ 4 mm solid component	chest CT with or without contrast, PET/CT and/or tissue sampling depending on the *probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component.	> 15%	2%
		4X	Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy			
Other	Clinically Significant or Potentially Clinically Significant Findings (non lung cancer)	S	modifier - may add on to category 0-4 coding	As appropriate to the specific finding	n/a	10%
Prior Lung Cancer	Modifier for patients with a prior diagnosis of lung cancer who return to screening	C	modifier - may add on to category 0-4 coding	-	-	-

IMPORTANT NOTES FOR USE:

1) Negative screen: does not mean that an individual does not have lung cancer
2) Size: nodules should be measured on lung windows and reported as the average diameter rounded to the nearest whole number; for round nodules only a single diameter measurement is necessary
3) Size Thresholds: apply to nodules at first detection, and that grow and reach a higher size category
4) Growth: an increase in size of > 1.5 mm

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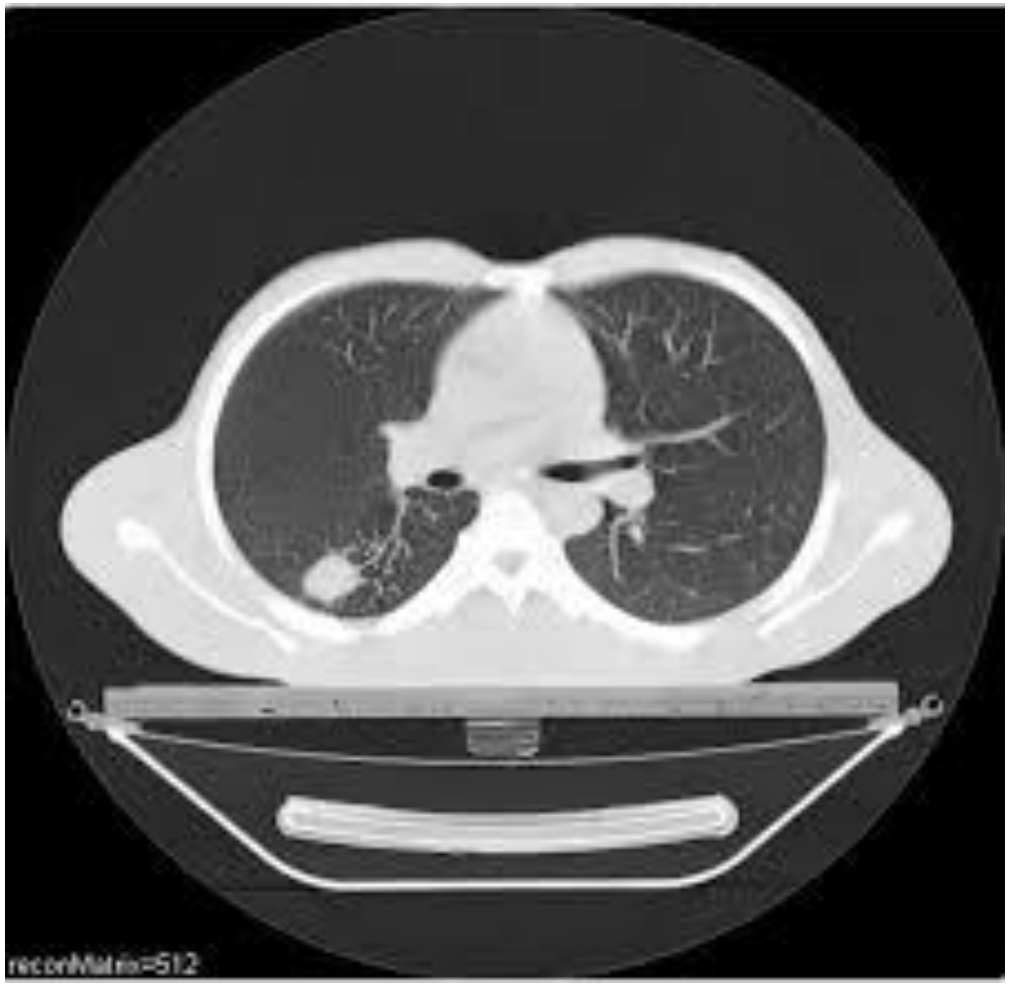
		4X	Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy			
	Clinically Significant or					

Risk Factors for Lung Cancer

- Cigarette smoking (personal and second hand smoke exposure)
- Prior radiation exposure
- Environmental toxins (asbestos, radon, metals and diesel fumes)
- Pulmonary fibrosis
- HIV infection
- Family history of lung cancer
  - Few familial syndromes and environmental factors seem to play a much greater role in the development compared to many other cancers
- Maybe vaping? It seems like we will find out…

Question # 2

- 64 year old gentleman noted to have 3 cm lung mass on screening CT
- PMX with longstanding emphysema and COPD
- 55 pack year history of smoking
- Exam significant for markedly diminished air movement, wheezing, uses 2 liters of oxygen
- CT guided biopsy with poorly differentiated adenocarcinoma



Question 2 continued

- PET/CT and MRI of the head perfomed and there is no evidence of metastatic disease
- Patient with normal myocardial stress test 2 months ago
- PFTs with FEV1 of 50% (1.0 liter) and DLCO of 50%

- What is the best treatment for this patient?
  - A. Surgical resection
  - B. Hospice and palliative care
  - C. Concurrent chemoradiotherapy
  - D. Chemoimmunotherapy
  - E. Stereotactic radiation therapy

Lung Cancer Presentation

- Most common presenting symptoms: cough (50-75%), hemoptysis (25-50%), dyspnea (25%), chest pain (20%)
- 75-80% of lung cancer presents at advanced stage (Stage III or IV)
- Symptoms of metastatic disease: back pain and bone met, seizure and brain met
- Paraneoplastic syndromes (classic test questions)
  - Horner syndrome
  - SIADH
  - Hypercalcemia
  - SVC syndrome

Initial Evaluation of Lung Cancer

- Example: patient presents with hemoptysis
- CT Chest with iv contrast (+/- oral). If suspicious lung mass then additional imaging
- PET/CT or CT A/P and bone scan
- Need biopsy (potentially bronchoscopy and biopsy or CT guided biopsy)
  - Not everything in lung is lung cancer (lymphoma, TB, sarcoid)
  - Treatment different based on type of lung cancer
  - Treatment guided by molecular testing performed on biopsy
- MRI Head
- PFTs with DLCO and possibly pulmonary perfusion scan and pulmonary exercise testing for localized tumors

Non-Small Cell Lung Cancer

- Majority of lung cancer (85%)
- Different subtypes based on morphology
  - Squamous cell carcinoma
  - Adenocarcinoma
  - Adenosquamous
  - Large cell carcinoma
  - Poorly differentiated / undifferentiated
- Treatment has now become tailored to morphologic subtype and molecular profile of lung cancer
  - EGFR
  - ALK
  - PDL1
  - ROS1, BRAF

National Comprehensive Cancer Network®

NCCN Guidelines Version 3.2020
Non-Small Cell Lung Cancer

NCCN Guidelines Index
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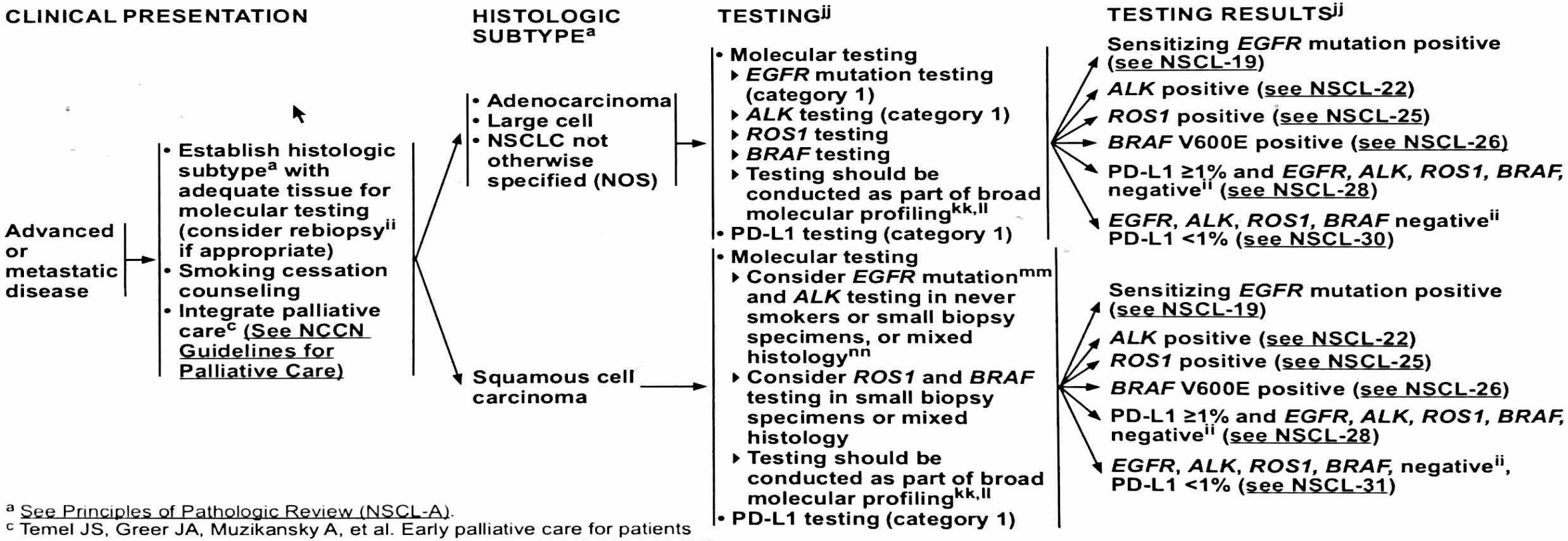
Discussion



[a] See Principles of Pathologic Review (NSCL-A).

[c] Temel JS, Greer JA, Muzikansky A, et al. Early palliative care for patients with metastatic non-small-cell lung cancer. N Engl J Med 2010;363:733-742.

[ii] If there is insufficient tissue to allow testing for all of *EGFR*, *ALK*, *ROS1*, and *BRAF*, repeat biopsy and/or plasma testing should be done. If these are not feasible, treatment is guided by available results and, if unknown, these patients are treated as though they do not have driver oncogenes.

[jj] See Principles of Molecular and Biomarker Analysis (NSCL-G).

[kk] The NCCN NSCLC Guidelines Panel strongly advises broader molecular profiling with the goal of identifying rare driver mutations for which effective drugs may already be available, or to appropriately counsel patients regarding the availability of clinical trials. Broad molecular profiling is a key component of the improvement of care of patients with NSCLC. See Emerging Biomarkers to Identify Patients for Therapies (NSCL-H).

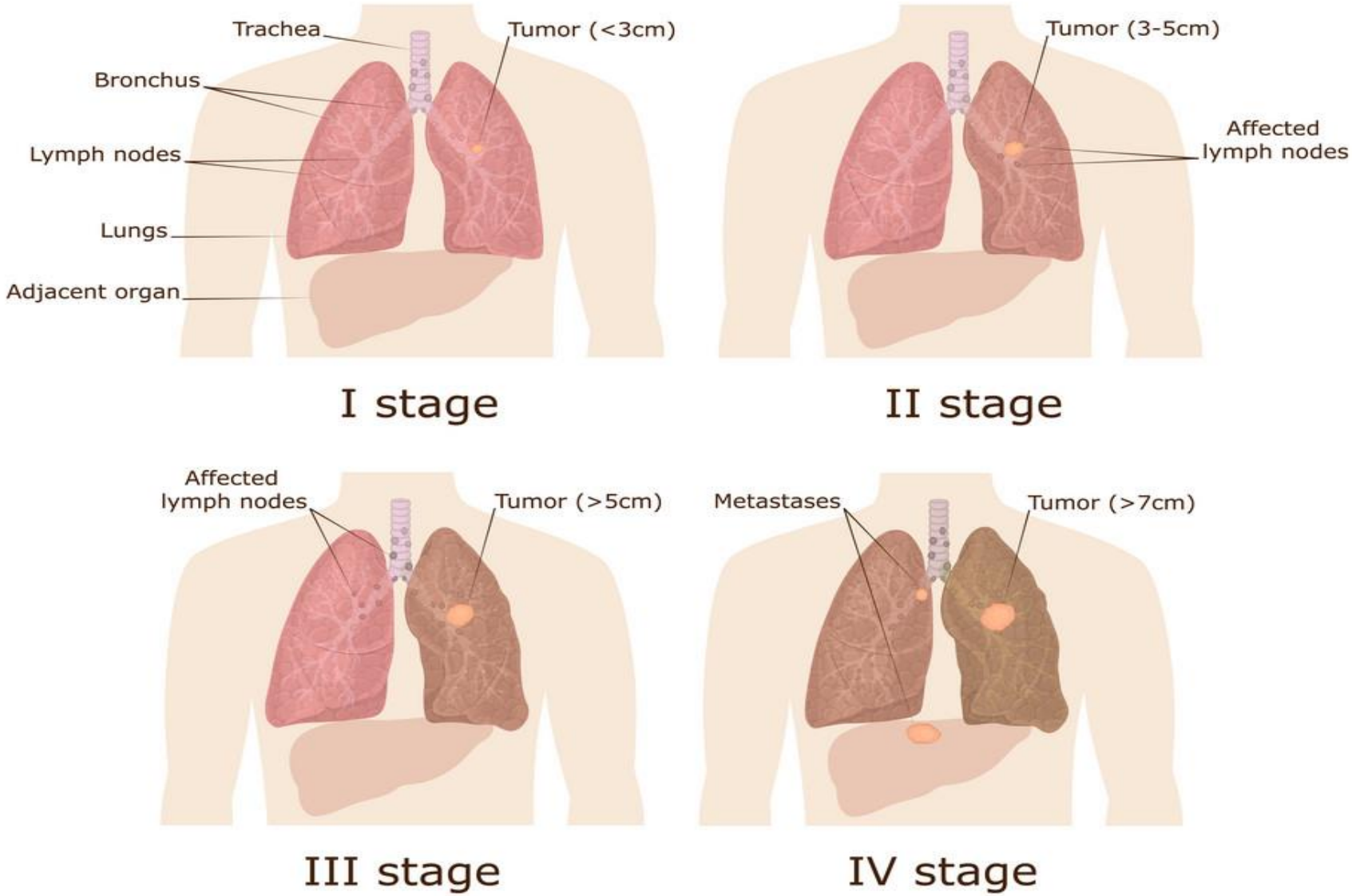
[ll] Testing should include the neurotrophic tyrosine receptor kinase (*NTRK*) gene fusion; if positive, see NSCL-27.

[mm] In patients with squamous cell carcinoma, the observed incidence of *EGFR* mutations is 2.7% with a confidence that the true incidence of mutations is less than 3.6%. This frequency of *EGFR* mutations does not justify routine testing of all tumor specimens. Forbes SA, Bharma G, Bamford S, et al. The catalogue of somatic mutations in cancer (COSMIC). Curr Protoc Hum Genet 2008;chapter 10:unit 10.11.

[nn] Paik PK, Varghese AM, Sima CS, et al. Response to erlotinib in patients with EGFR mutant advanced non-small cell lung cancers with a squamous or squamous-like component. Mol Cancer Ther 2012;11:2535-2540.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any patient with cancer is in a clinical trial. Participation in clinical trials is especially encouraged.

Four stages of lung cancer



Treatment of NSCLC

- **Stage I, II = Surgery**
  - Goal of treatment is cure (50-70%)
  - Surgical resection is gold standard
  - Stereotactic radiation with similar cure rates
- **Stage III = Concurrent chemotherapy and radiation (followed by immunotherapy)**
  - Curative in ~15% of patients
  - Median survival on order of 30 months
- **Stage IV = Systemic Therapy (Immunotherapy or Cytotoxic chemotherapy + Immunotherapy or Targeted Oral Therapy)**
  - Palliative
  - Median survival on order of 14-16 months

Surgery for Stage I and II NSCLC

- Pre-operative pulmonary evaluation
  - If FEV < 2.0 liters then generally not candidate for pneumonectomy
  - If FEV < 1.5 liters then generally not candidate for lobectomy
  - DLCO < 60% generally poor surgical candidates as well
- Lung cancer is curable if diagnosed at early stage
  - Stage I = ~ 70% cure rate
  - Stage II = ~50% cure rate
- **Stage II, III lung cancers that are resected should receive adjuvant cisplatin based chemotherapy**
  - Receive four cycles of cisplatin "doublet" (ex. Cisplatin + Taxotere, Cisplatin + Alimta)
  - LACE meta-analysis with ~5% reduction in risk of death

Concurrent chemoradiation for Stage III NSCLC

- Stage III = lymph node involvement with no distant mets
- Standard coarse of radiation is 60Gy in 30 fractions (6 week course) along with chemotherapy
  - Either two cycles of cisplatin + etoposide or
  - Weekly paclitaxel + carboplatin
- More toxic and some patients may not be candidates if too frail
- Significantly longer median survival ~ 30 months
- 15% of patients cured
- Standard of care in U.S. is to administer maintenance immunotherapy with PDL1 inhibitor (durvalumab) following treatment

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Durvalumab after Chemoradiotherapy in Stage III Non–Small-Cell Lung Cancer

S.J. Antonia, A. Villegas, D. Daniel, D. Vicente, S. Murakami, R. Hui, T. Yokoi, A. Chiappori, K.H. Lee, M. de Wit, B.C. Cho, M. Bourhaba, X. Quantin, T. Tokito, T. Mekhail, D. Planchard, Y.-C. Kim, C.S. Karapetis, S. Hiret, G. Ostoros, K. Kubota, J.E. Gray, L. Paz-Ares, J. de Castro Carpeño, C. Wadsworth, G. Melillo, H. Jiang, Y. Huang, P.A. Dennis, and M. Özgüroğlu, for the PACIFIC Investigators*

ABSTRACT

BACKGROUND

Most patients with locally advanced, unresectable, non–small-cell lung cancer (NSCLC) have disease progression despite definitive chemoradiotherapy (chemotherapy plus concurrent radiation therapy). This phase 3 study compared the anti–programmed death ligand 1 antibody durvalumab as consolidation therapy with placebo in patients with stage III NSCLC who did not have disease progression after two or more cycles

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Address reprint requests to Dr. Antonia at the H. Lee Moffitt Cancer Center and Research Institute, 12902 Magnolia Dr., MRC 3-E, Tampa, FL 33612, or at scott.antonia@moffitt.org

Question # 3

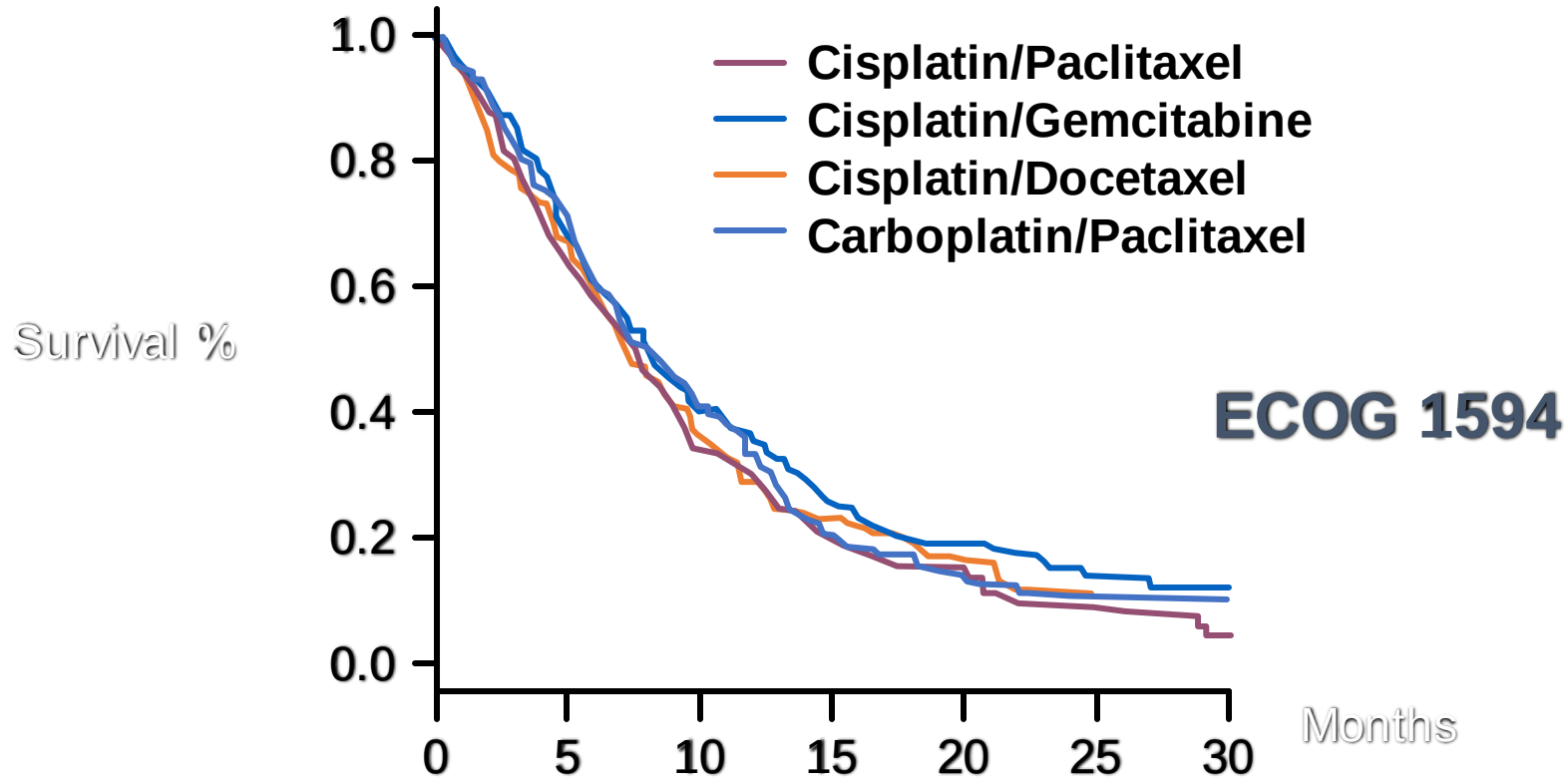
- 56 year old gentleman, never smoker, presents with progressive dyspnea and 20lb weight loss. Remains active and working full time.
- CT Chest reveals multiple lung masses up to 4cm
- PET/CT, MRI reveal multiple bone and liver masses, no brain mets.
- CT guided bx of liver mass reveals adenocarcinoma, TTF1+
- Testing reveals EGFR mutation, no ALK mutation, PDL1 testing 25%

- What is your next step in treatment of this patient?
  - A. Chemoimmunotherapy (Pemetrexed + Carbo + Pembrolizumab)
  - B. Surgical evaluation
  - C. Osimertinib
  - D. Chemoradiotherapy to largest lung mets
  - E. Hospice

Systemic Therapy for Stage IV NSCLC

- Things just got complicated….
- Treatment Differs depending on multiple factors: histology, gene mutations, PDL1 expression
  - Squamous Cell
    - PDL1 expression
    - If poor biopsy or mixed histology then check EGFR, etc
  - Non-squamous cell (Adenocarcinoma, Large cell)
    - PDL1 expression
    - EGFR expression?
    - ALK expression?
    - ROS1, BRAF expression?

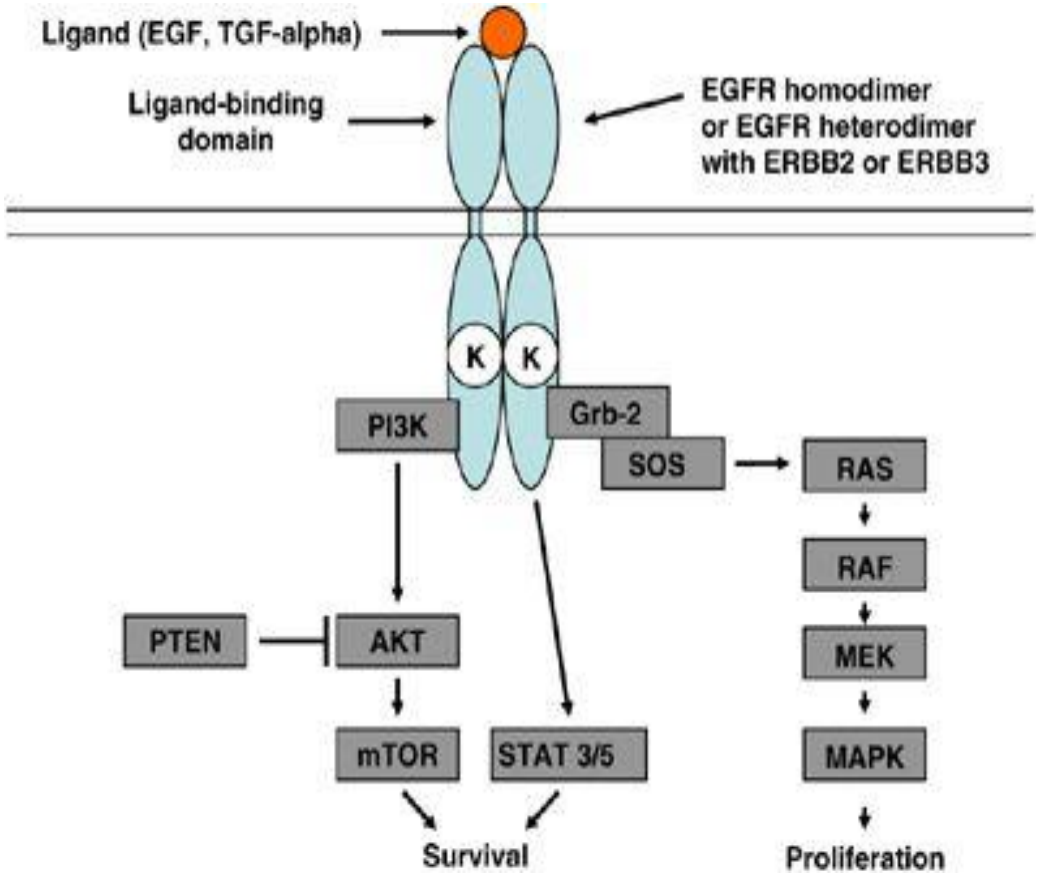
Two Drug Combination in Stage IIIB/IV NSCLC



Schiller JH et al. *N Engl J Med.* 2002;346:92-98.

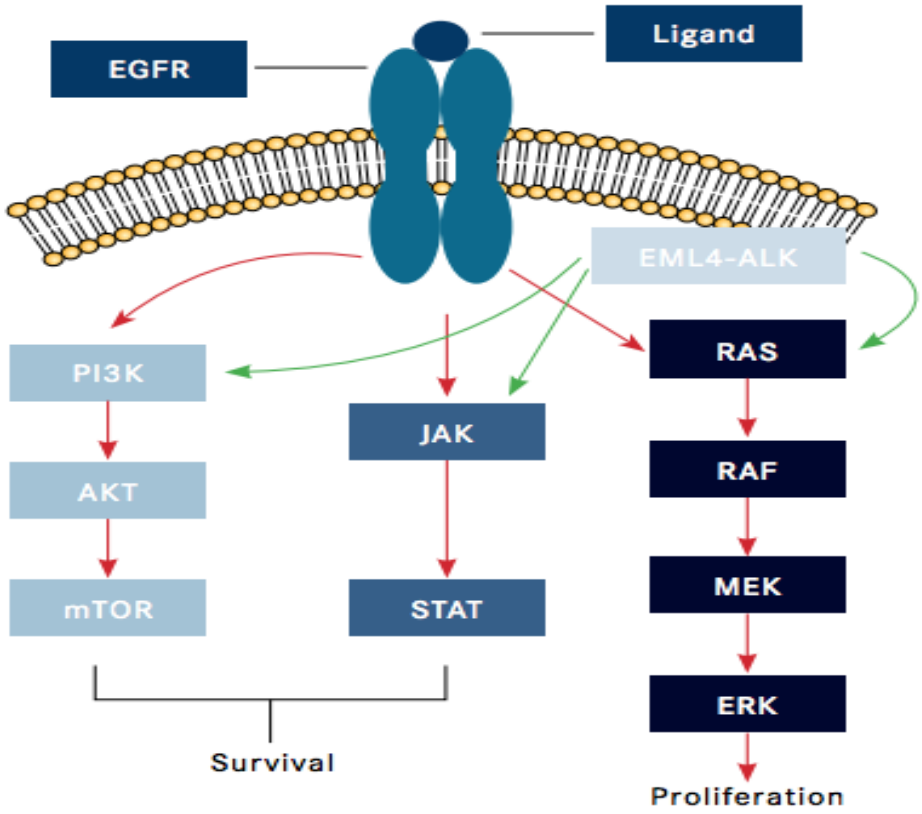
Systemic Tx for EGFR Positive Lung Cancer

- Treated with EGFR targeted drugs (oral agents): **Osimertinib**, **Erlotinib**
- Molecularly distinct subtype of lung cancer more common in younger, non-smoking, Asian patients
- Most common to find in adenocarcinoma
- ~15% of lung cancers in U.S.
- Much better prognosis (especially with treatment) with median survival 30-36 months
- Response rates 60-70% with tx



Systemic Tx for ALK Positive Lung Cancer

- Treated with ALK targeted drugs (oral agents): **Alectinib, Brigatinib, Ceritinib, Crizotinib**
- At time of progression will switch to different agent
- ~5% of lung cancers in U.S.
- Median survival with treatment on the order of 5-6 years
- Response rates > 70%



Fusions involving the echinoderm microtubule-associated protein-like 4 (*EML4*) and the anaplastic lymphoma kinase (*ALK*) genes activate multiple signaling networks implicated in cell survival and proliferation.

Adapted from Wu K et al. Personalized targeted therapy for lung cancer. *Int J Mol Sci.* 2012;13(9):11471-11496. doi: 10.3390/ijms130911471.

Systemic Tx for Stage IV Squamous Cell Carcinoma of the Lung

- **If PDL1 > 50% then immunotherapy (PDL1) alone vs chemotherapy + immunotherapy (PDL1 Inhibitors)**
  - Pembrolizumab
  - Pembrolizumab + Carboplatin + Paclitaxel
- **If PDL1 1-49% then chemotherapy + immunotherapy**
  - Pembrolizumab + Carboplatin + Paclitaxel
- **If PDL1 0 then chemotherapy (maybe chemotherapy + immunotherapy)**
  - Carboplatin + Paclitaxel
- Nivolumab + Ipilimumab (Immunotherapy)

Systemic Tx for Stage IV Non-Squamous Cell Carcinoma of the Lung (Adenocarcinoma, Large Cell)

- **If PDL1 > 50% then immunotherapy or immunotherapy + chemotherapy**
  - Pembrolizumab
  - Pemetrexed + Carboplatin + Pembrolizumab
  - Paclitaxel + Carboplatin + Bevacizumab + Atezolizumab
- **If PDL1 1-49% then immunotherapy + chemotherapy**
  - Pemetrexed + Carboplatin + Pembrolizumab
  - Paclitaxel + Carboplatin + Bevacizumab + Atezolizumab
- **If PDL1 0 then chemotherapy**
  - Pemetrexed + Carboplatin, other chemo doublets
- Nivolumab + Ipilimumab

Oncology leading the pack in terms of "Precision Medicine"

- ROS1 rearrangement positive NSCLC = Crizotinib, Entrectanib, Lorlatinib
- BRAF V600E Mutation NSCLC = Dabrafenib + Trametinib or Vemurafenib + Dabrafenib
- Therapy increasingly guided by gene testing of tumor with array of mutations and signaling pathways evaluated
- Non-smokers tend to have fewer mutations and distinct signaling pathways mutated (EGFR, ALK)
- Smokers tend to have wide array of mutations and multiple abnormal signaling pathways: more likely to respond to immunotherapy where many antigens represented on cell surface
- Immunotherapy (PDL1 inhibitors) have largely replaced chemotherapy as backbone of treatment

General Notes Regarding Oncologist Management of Advanced Lung Cancer

- Maintenance therapy standard of care
  - Immunotherapy (PDL1 Inhibitors) given for 1-2 years
  - Pemetrexed or bevacizumab given as maintenance until progression
  - Platinum chemotherapies given for 4-6 cycles (cisplatin or carboplatin not given beyond 6 cycles)
- Treatment of advanced lung cancer is palliative
- With new therapies and combination immunotherapies there are increasing number of long term survivors
- “Playing for the tail of the curve”
  - 20-25% of individuals with metastatic kidney cancer and melanoma are cured with immunotherapies

Small Cell Lung Cancer

- Represents ~15% of lung cancer in the U.S.
- Associated with history of heavy smoking (be suspicious of diagnosis without heavy smoking history)
- Neuroendocrine tumor associated with rapid growth and early metastasis (cell doubling time of ~30-60 days)

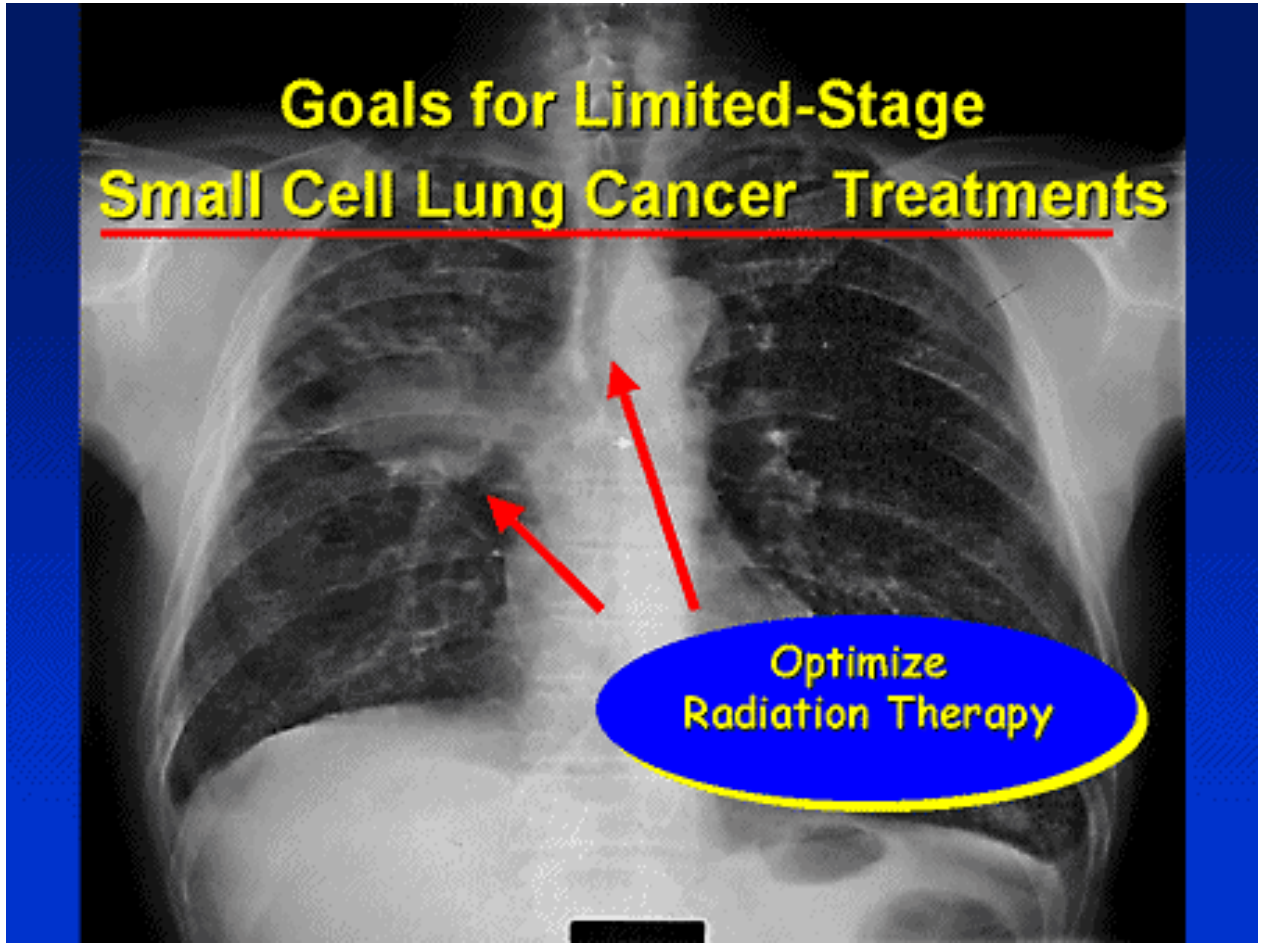
Question # 4

- 64 year old veteran with 60 pack year history of smoking presents after having abnormal CXR prior to elective knee replacement surgery
- CT C/A/P reveals 5cm RLL lung mass with hilar and mediastinal lad
- MRI Head, Bone scan without distant mets
- PFTs reveal mild emphysema with FEV1 of 3 liters, DLCO 80%
- Bronchoscopy and bx of subcarinal lymph node with small cell carcinoma

- What is the most appropriate next step in the management of this patient?
  - A. Surgical resection of lung tumor with lymph node dissection
  - B. Concurrent chemoradiation
  - C. Prophylactic cranial radiation
  - D. Immunotherapy (Pembrolizumab)
  - E. Chemoimmunotherapy (Cisplatin + Etoposide + Pembrolizumab)

Small Cell Lung Cancer Staging

- Limited Stage or Extensive Stage
  - Limited Stage = Primary tumor and lymph node mets fit in a single radiotherapy port
  - Extensive Stage = Spread outside chest and tumor cannot be contained in radiotherapy port
- May use TNM for research / data collection
- Generally stage I-III are limited stage

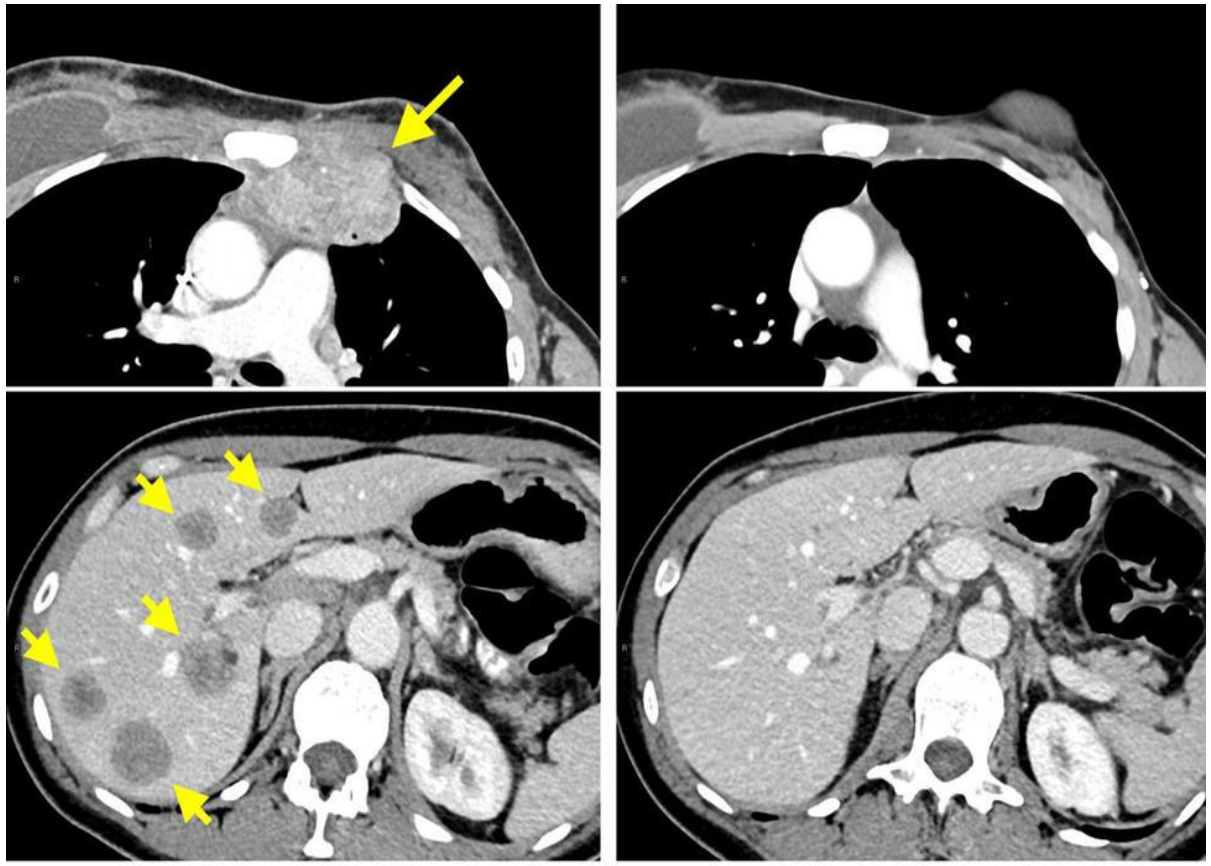


Limited Stage Small Cell Lung Cancer

- Generally do not attempt to surgically remove small cell lung cancer (sometimes discovered after surgical resection)
- **Treat with concurrent chemotherapy and radiation**
  - Treated with cisplatin + etoposide for 4 cycles
  - Concurrent radiation (either 3 weeks bid or 5 weeks once daily)
- With chemoradiation ~ 30-35% of patients can be cured
- After treatment they receive prophylactic cranial radiation (25Gy in ~ 10 fractions to whole brain)
- Small cell lung cancer has high propensity to spread to brain ~40%

Extensive Stage Small Cell Lung Cancer

- Small cell cancer usually presents with metastatic disease
- Common sites of metastasis: bone, brain, liver, lung, adrenal
- Tends to respond quickly to initial therapy and often with dramatic improvement
- Response rates to initial chemotherapy ~ 65-70%



Treatment for Extensive Stage Small Cell Lung Cancer

- **Platinum based chemotherapy + immunotherapy**
- Carboplatin + Etoposide for 4-6 cycles and then maintenance immunotherapy
  - Carboplatin + Etoposide + Atezolizumab (PDL1 inhibitor)
  - Carboplatin + Etoposide + Durvalumab
- If good response to therapy then may benefit from prophylactic cranial irradiation (some experts prefer close surveillance with serial brain MRIs)

Addition of Atezolizumab to Chemotherapy First Breakthrough in Systemic Treatment for Small Cell Carcinoma in > 20 years

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

First-Line Atezolizumab plus Chemotherapy in Extensive-Stage Small-Cell Lung Cancer

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ABSTRACT

BACKGROUND

Enhancing tumor-specific T-cell immunity by inhibiting programmed death ligand 1 (PD-L1)–programmed death 1 (PD-1) signaling has shown promise in the treatment of extensive-stage small-cell lung cancer. Combining checkpoint inhibition with cytotoxic chemotherapy may have a synergistic effect and improve efficacy.

METHODS

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Address reprint requests to Dr. Horn at Vanderbilt University Medical Center, 2220 Pierce Ave., 777 PRB, Nashville, TN 37232, or at leora.horn@vumc.org.

*A complete list of investigators in the

Question # 5

- 73 year old woman presents with 30 lb weight loss, severe dyspnea and hypercalcemia
- On exam P105, RR22, 02 sat 90%, BMI 22, temporal wasting, diminished lung sounds on left, clubbing, no focal neurologic deficit
- Staging CT C/A/P, MRI Head, bone scan with 9cm left lung mass, multiple bone and liver masses
- CT guided biopsy of liver with squamous cell carcinoma
- Patient using wheelchair because family states she is too weak to walk. Spends majority of day sleeping. Family reports she does not like coming to doctors.

- What is the most appropriate next step in the care of this patient?
  - A. Give oxygen and referral to hospice
  - B. Chemoimmunotherapy (Carbo + Taxol + Pembrolizumab)
  - C. Immunotherapy (Ipilimumab + Pembrolizumab)
  - D. Give oxygen and send for EGFR testing
  - E. Give oxygen and referral to radiation oncology to treat bulky lung tumor

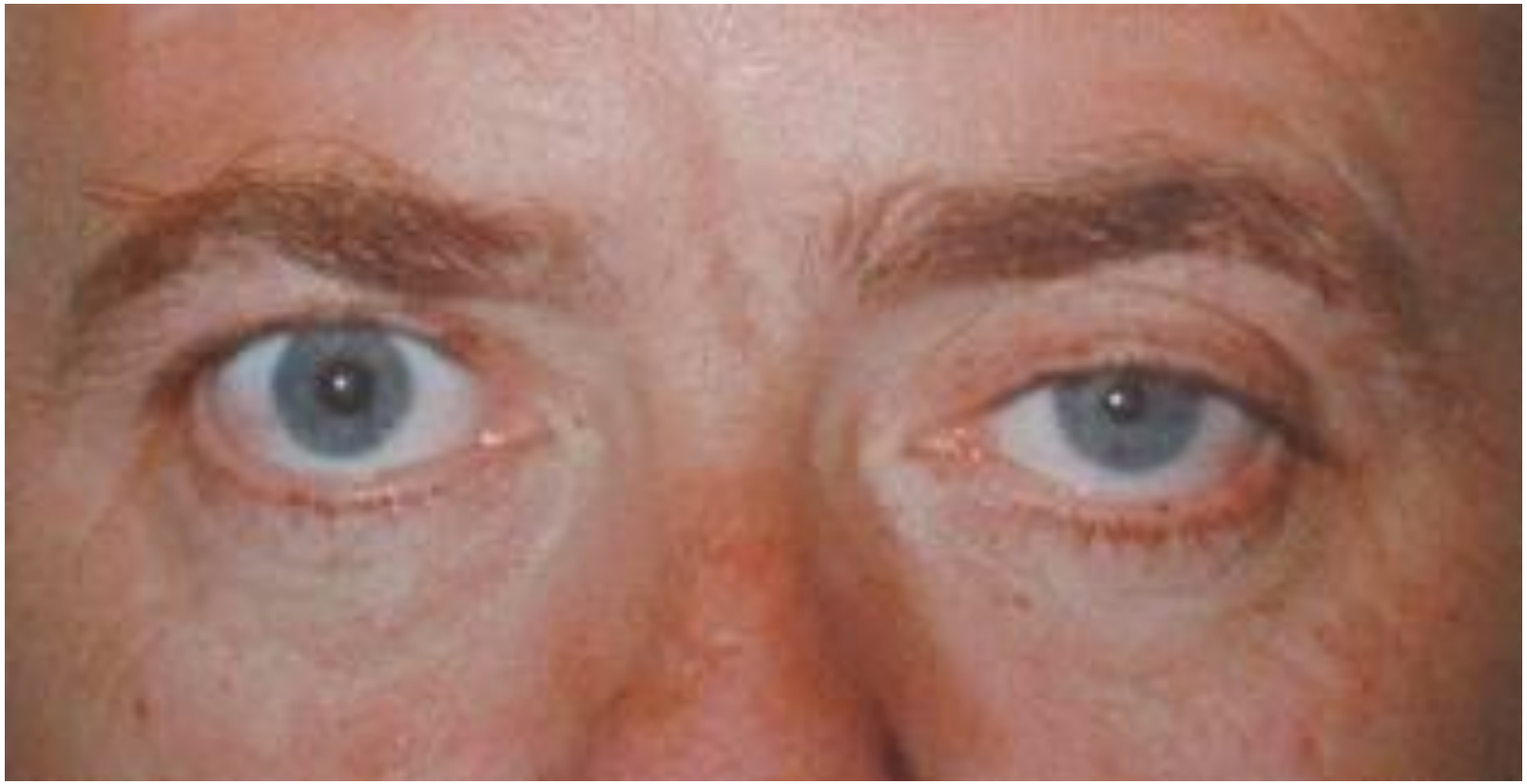
Giving Chemotherapy is Not Always the Right Choice

Grade	ECOG
0	Fully active, able to carry on all predisease performance without restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature—for example, light house work, office work
2	Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair
5	Dead

ECOG, Eastern Cooperative Oncology Group.

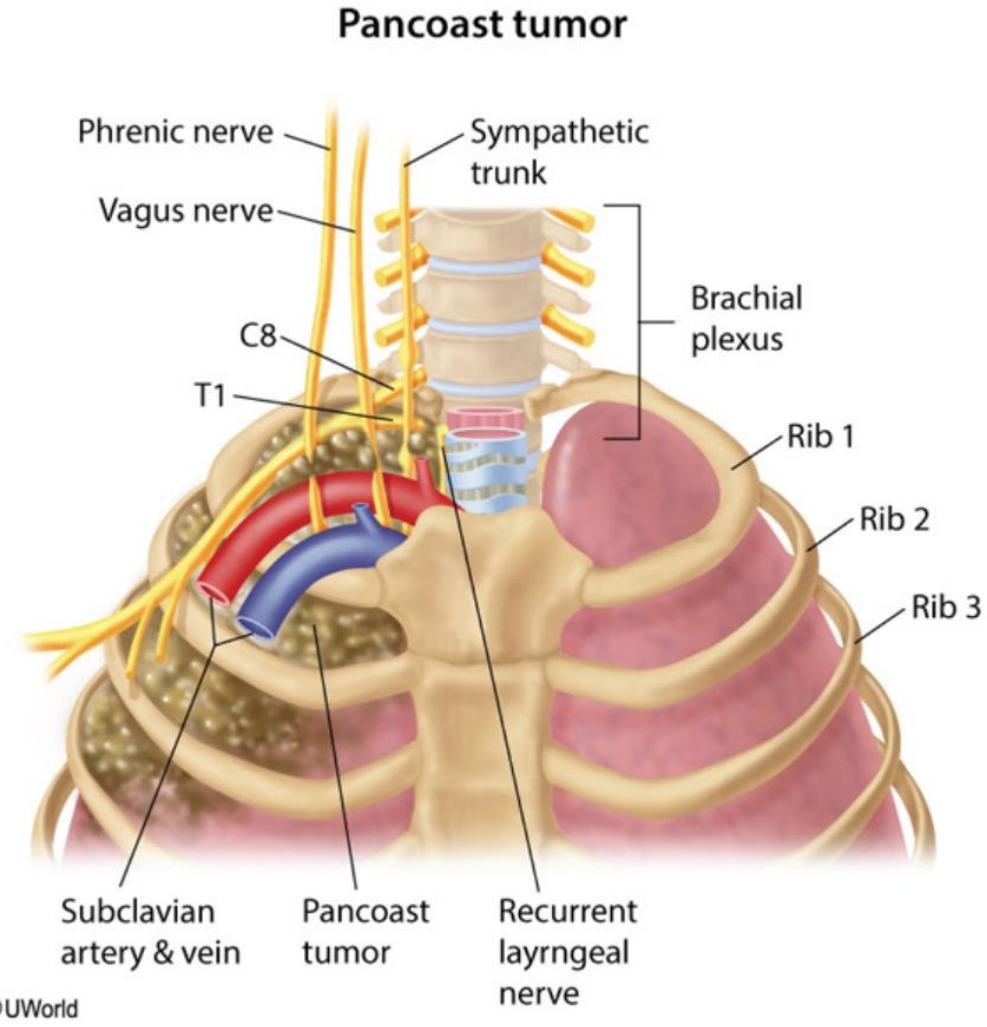
- Multiple studies in lung cancer demonstrating poor survival in patients with performance status of 3 or 4 (<3 months)
- Chemotherapy in general takes 1-2 months to work
- Chemotherapy in patients that are too weak or frail may cause harm and lead to earlier death
- Standard of care is best supportive care and palliative care/hospice

What is the diagnosis?

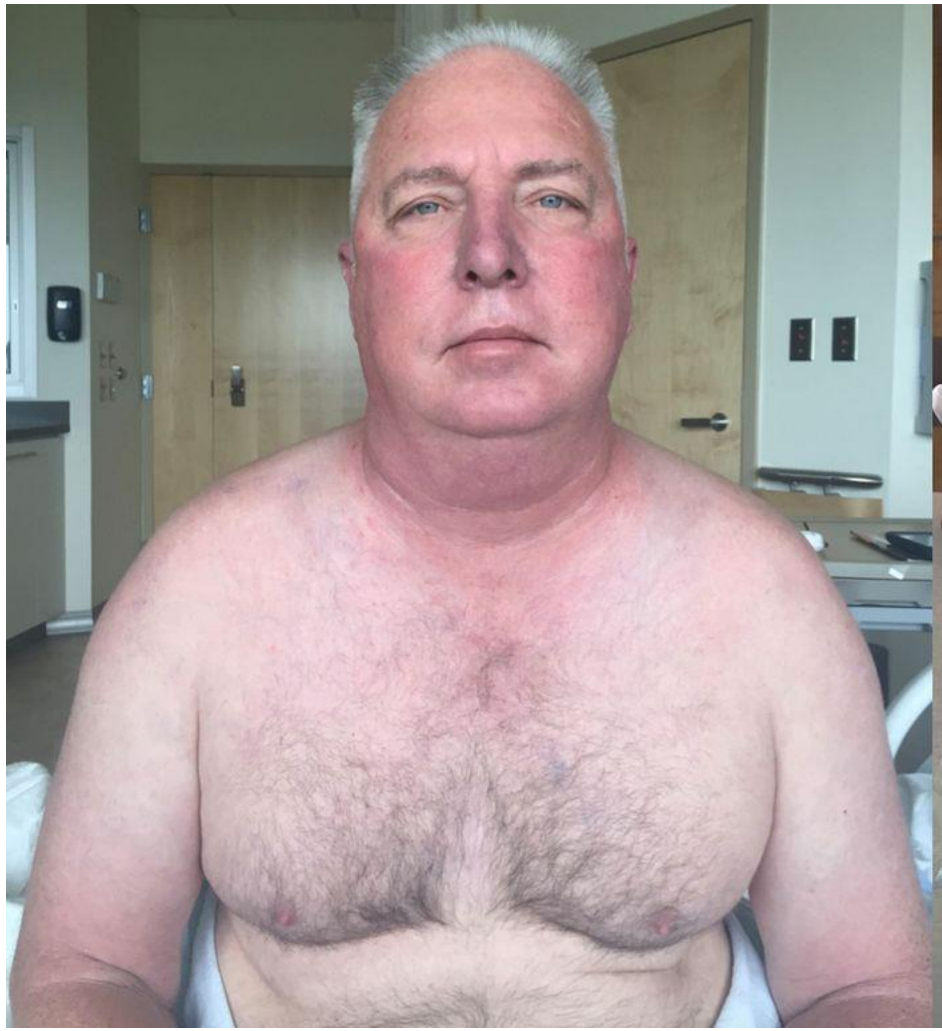


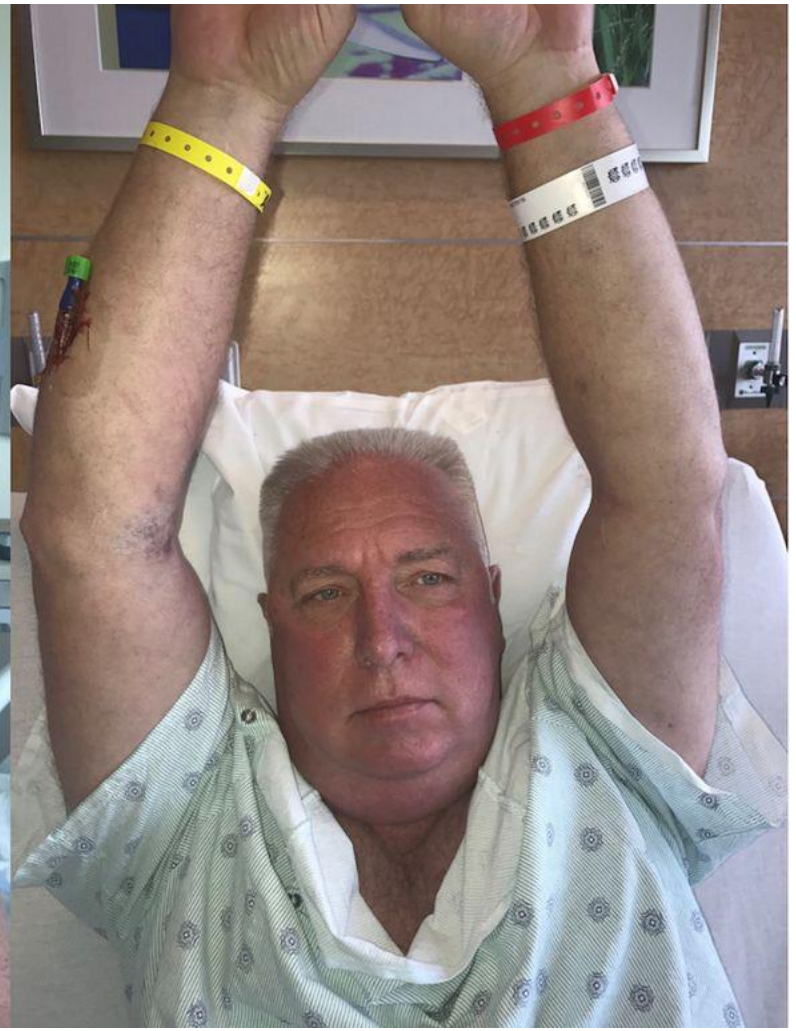
Horner Syndrome

- Clinical triad = miosis, ptosis, anhidrosis
- Multiple possible etiologies but may be caused by apical lung cancer compressing sympathetic nerve roots (Pancoast Tumor)



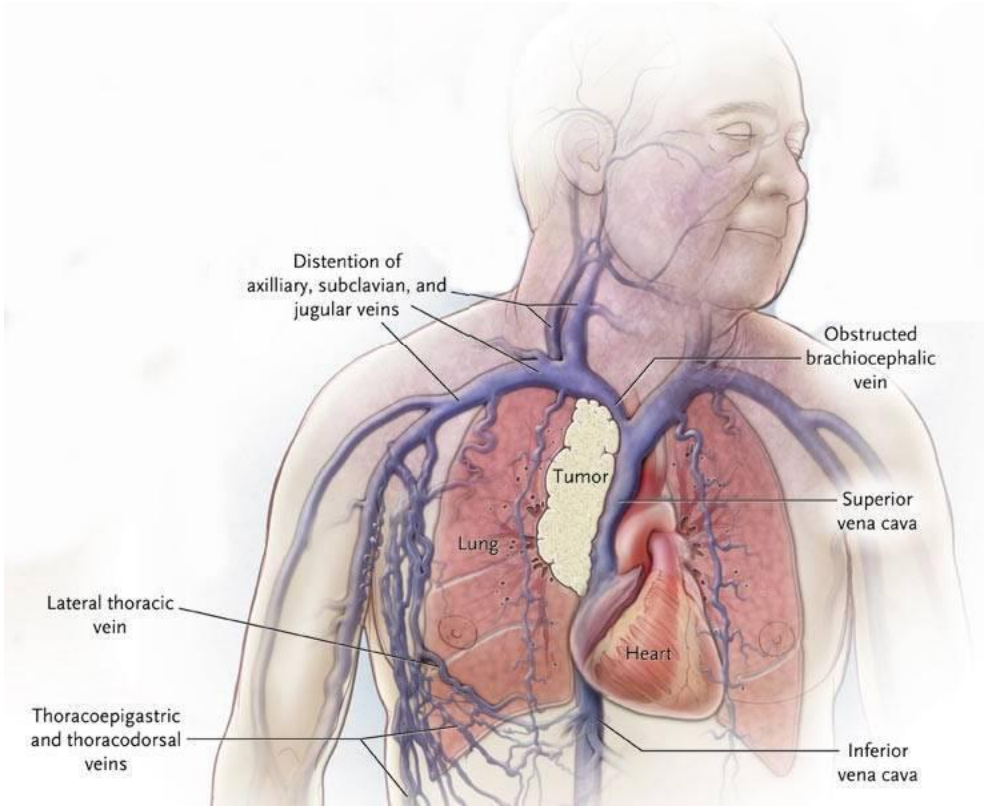
What is the Diagnosis?



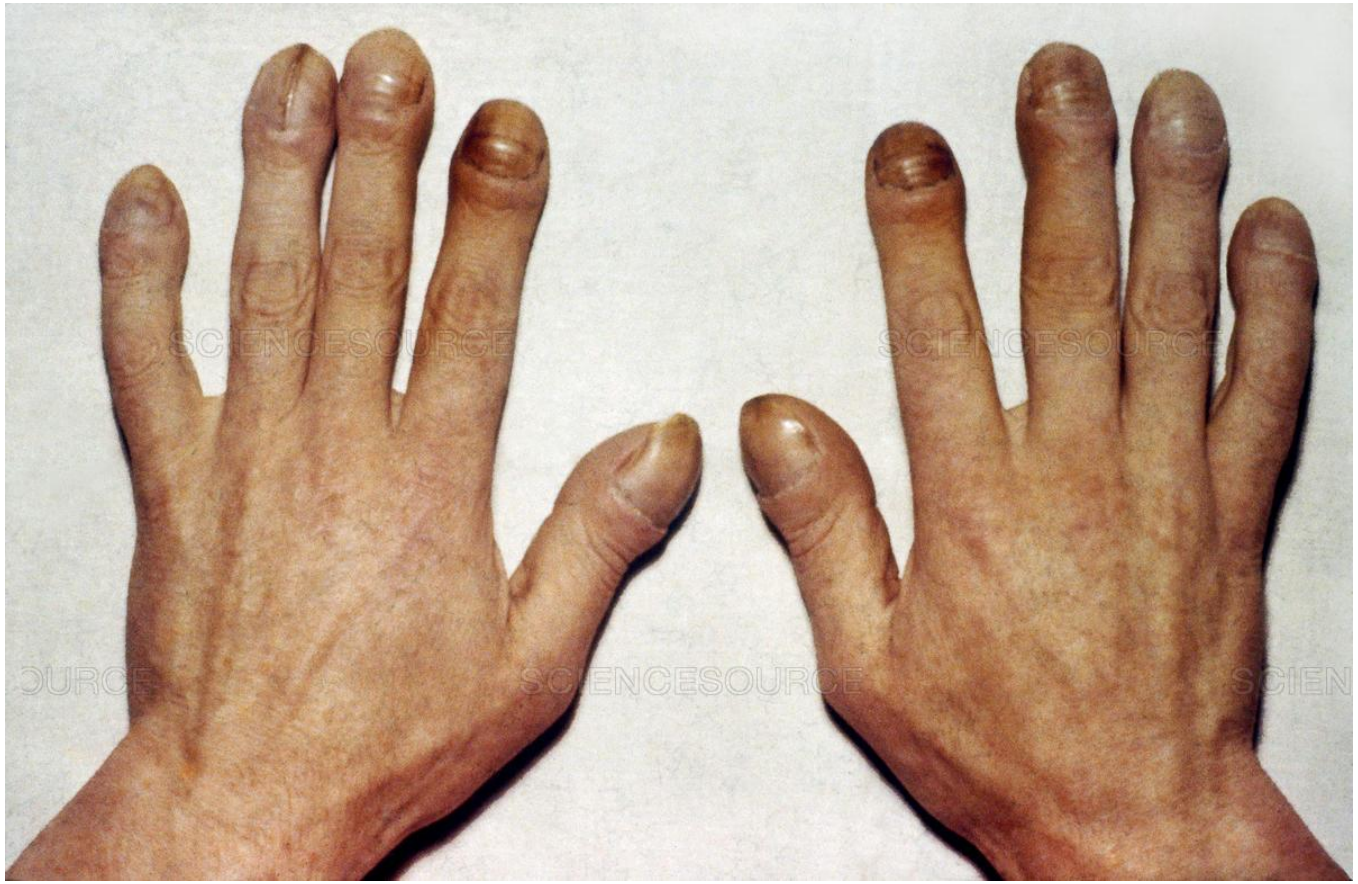


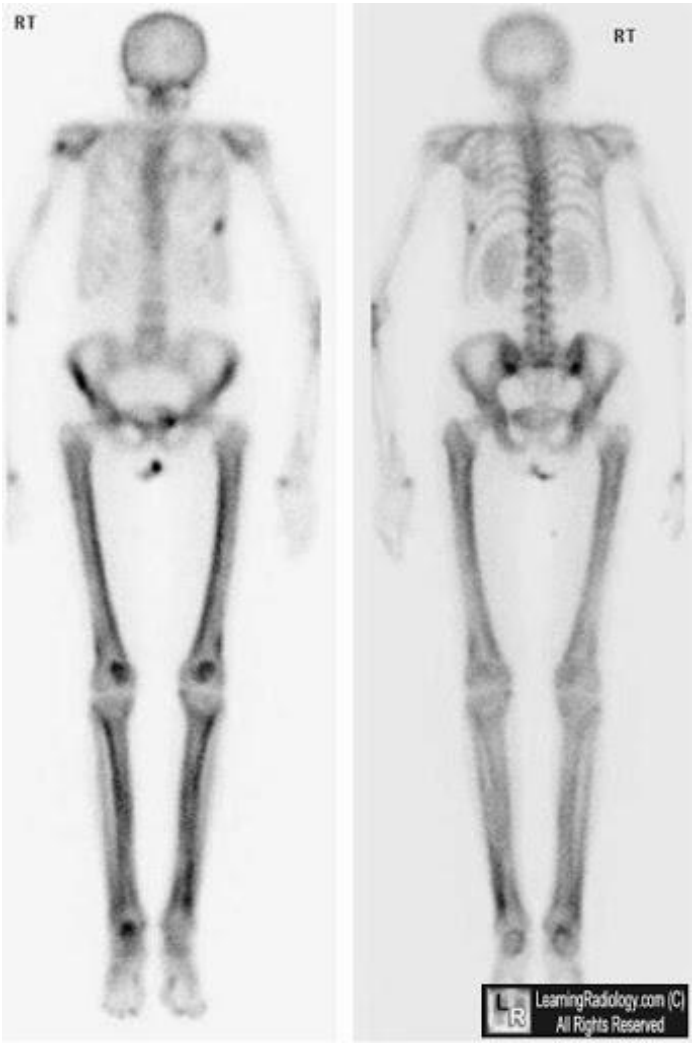
SVC Syndrome

- Tumor compressing SVC causing increased venous pressure in head and upper extremities
- Most common in small cell lung cancer and squamous cell carcinoma
- Pembertons sign = raise arms and head becomes more plethoric and swollen



What is the diagnosis?





Hypertrophic Osteoarthropathy

- Syndrome characterized by abnormal proliferation of bone and skin at distal extremities
- Dramatic clubbing and periostosis of tubular bones (classically along tibia)
- Often have severe pain along affected bony area
- Lung cancer is the most common cause

Answers to Questions

- Question # 1 = E. (Patient does not meet criteria low dose CT screening)
- Question # 2 = E. (Stereotactic radiation potentially curative, PFTs too bad for surgery)
- Question # 3 = C. (Treat with EGFR targeted therapy which in this case is osimertinib)
- Question # 4 = B. (Treat limited stage small cell lung cancer with chemoradiation)
- Question # 5 = A. (Referral to hospice, ECOG 4 and too frail for chemotherapy)

Thank you!

- MD Anderson Phoenix Team
  - David Paul MD
  - Larry Kasper MD
  - Sucai Bi MD
  - Todd Erickson MD
  - Melissa Yap NP