LUNG CANCER: LDCT

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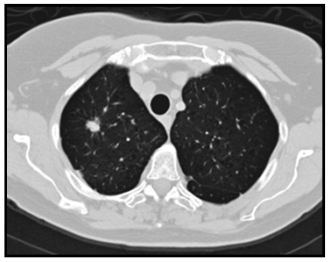
February 1, 2018



DISCLOSURES

2

- NONE

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OBJECTIVES

3

- Rationale and evidence for LDCT for lung cancer screening
- Review guidelines for when to order LDCT

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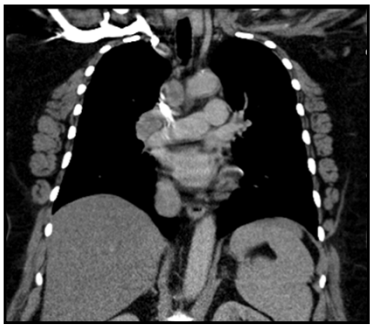
LUNG CANCER

4

- 75% present with Stage III/IV disease
- Only 10% are asymptomatic and early stage



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TREATMENT (in one slide!)

5

- Stage I/II
  - Operable: Surgery
  - Inoperable: SABR (stereotactic ablative radiotherapy) or standard fractionated EBRT +/- chemo for N1
  - Local failure rate 10%
- Stage III
  - Chemoradiotherapy → durvalumab x 12 months
  - Local failure rate >50%
- Stage IV
  - Palliative treatment (chemo/targeted therapy or radiation)
  - Best supportive care

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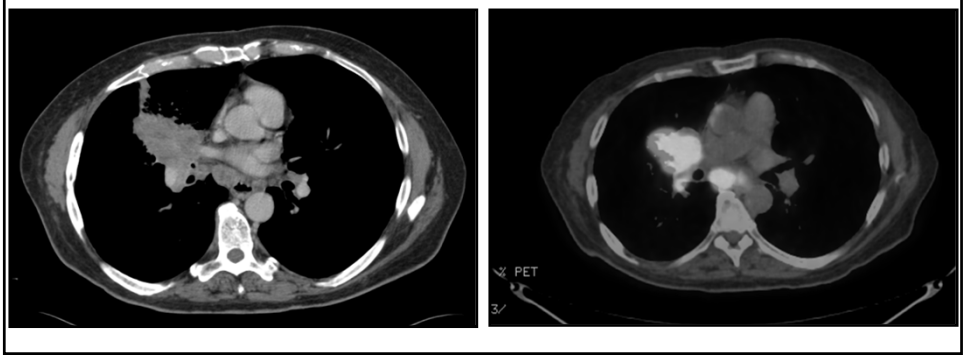
CASE 1

6

60 y/o male with 80 pack smoking history presents with 7 months of cough and increasing SOB

Noted a 30 pound weight loss in past 2 years



DEFINITIVE CHEMORADIATION

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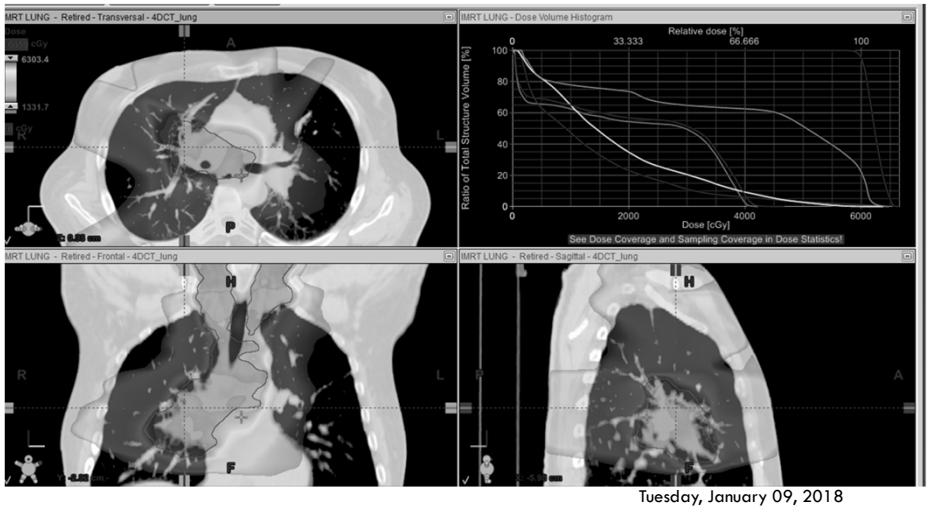

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6 MONTHS LATER…

8

Started having balance difficulties and frequent falls

CASE 2

9

- 53 year old female with 40 pack smoking history
- Felt a "popping" sensation in her rib → ED

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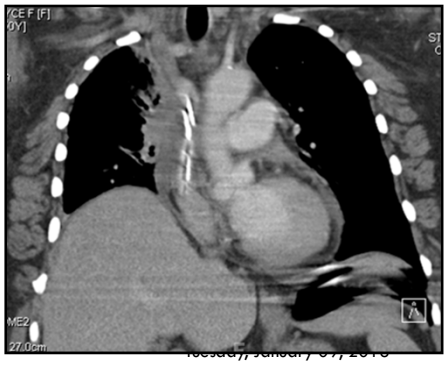
14 MONTHS LATER…

10

She noted increasing SOB and facial swelling



LUNG CANCER SCREENING: RATIONALE

11

- High morbidity and mortality
- Significant prevalence (2%)
- Identifiable risk factor allowing for targeted screening
- More effective treatment for early stage disease

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LUNG CANCER SCREENING

12

Potential benefit	Potential harm
Increase cure rate	Increase in invasive procedures
Increase local control	Radiation exposure
Limit extent of surgery	Anxiety with following nodules long term
	Overdiagnosis

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PLCO Cancer Screening Trial

13

- Prostate, Lung, Colorectal, and Ovarian Cancer screening trial
  - Men and women ages 55-74
    - Not specifically high risk (50% current or former smokers)
  - Screening group: Single PA CXR baseline and annually x 3 years
  - Control group: Routine care

Results

- No difference in lung cancer incidence rates after 13 years f/u
- No difference in lung cancer mortality

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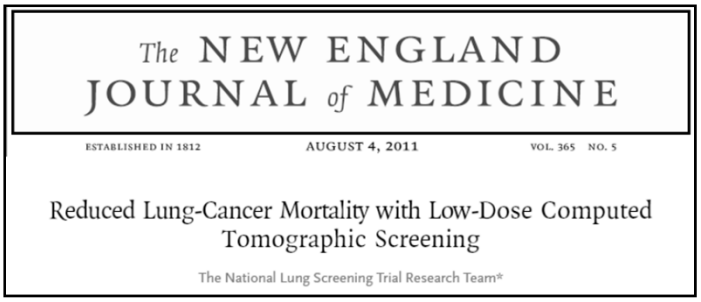
JAMA 2011

NATIONAL LUNG SCREENING TRIAL

14


The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 AUGUST 4, 2011 VOL. 365 NO. 5

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

The National Lung Screening Trial Research Team*

Primary Analysis: Comparison of lung cancer mortality

Secondary Analysis: Rate of death from any cause and the incidence of lung cancer in the two groups

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NLST

15

- High risk patients
  - 55-74 years old with at least 30 pack smoking history
  - If prior smoker, cessation within 15 years
  - Excluded
    - Prior lung cancer
    - Chest CT within 18 months
    - Hemoptysis
    - 15 pound weight loss in prior year

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LDCT

16

- Multidetector scanner
- Noncontrast study obtained during a single maximal inspiratory breath-hold (<25 seconds)
- Average effective dose of ~1.5 mSv (0.15 cGy)
  - Diagnostic Chest CT 7-8 mSv
  - Transatlantic flight 0.08 mSv

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RESULTS NLST: + SCREEN

17

- Higher rate of positive screening tests in LDCT group
  - T0: 27% vs 9%
  - T1: 28% vs 6%
  - T2: 17% vs 5%
- Diagnostic work up not part of trial and institutional dependent

LDCT: 96% were false positives for all three rounds

CXR: 94.5% were false positives for all three rounds

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RESULTS NLST: ADVERSE EVENTS

18

- Major complications
  - 0.06% in positive LDCT that did not result in cancer Dx
  - 11.2% in positive LDCT that resulted in cancer Dx
  - 0.02% in positive CXR that did not result in caner Dx
  - 8.2% in positive CXR that resulted in cancer Dx

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RESULTS NLST: INCIDENCE LUNG CA

19

LDCT	CXR
1060 lung cancers	941 lung cancers
50% Stage I	31% Stage I
8% Stage II	9% Stage II
20% Stage III	25% Stage III
22% Stage IV	35% Stage IV

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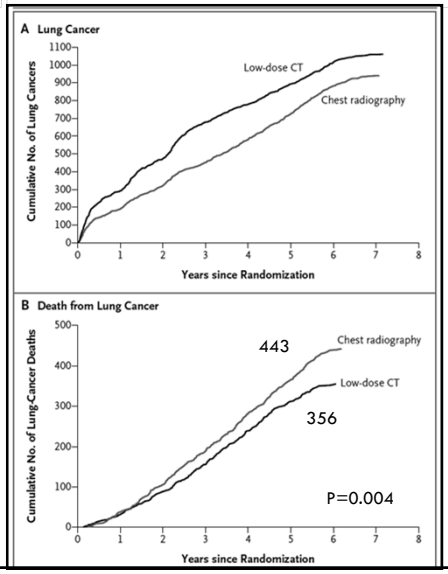
RESULTS NLST: LUNG CA MORTALITY

20



- 20% relative reduction in rate of death from lung cancer with LDCT
- Number needed to screen with LDCT to prevent one death: 320

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US PREVENTIVE TASK FORCE GUIDELINES

21

- High risk
  - Age 55-80 and > 30 pack smoking history and smoking cessation < 15 years ago

LDCT

- Annually for at least 2 years and suggest until 15 years out from smoking or limited life expectancy

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NCCN GUIDELINES

22

- High risk
  - Age 55-74 and > 30 pack smoking history and smoking cessation < 15 years ago
  - Age > 50 and >20 pack smoking history with one other risk factor
    - Radon, Occupational exposure, COPD, pulmonary fibrosis

LDCT

- Annually for at least 2 years and suggest until no longer eligible for definitive treatment

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CONCLUSIONS

23

- LDCT decreases lung cancer mortality by 20% compared with screening CXR
- CXR screening does not work
- LDCT detects lung cancers at an earlier stage
- LDCT has high rate of false positives
- USPTFS and NCCN recommend annual LDCT for high risk patients

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