What Every Primary Care Provider Should Know About Lung Cancer: New Guidelines for Lung Cancer Screening

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On behalf of the Improving Access to Treatment for Lung Cancer Patients (AccessTLC) project
Presenters

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Disclosures:
• Nothing to disclose

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Member, Education Outreach Committee

Disclosures:
• Nothing to disclose

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Objectives

As a result of participation in this session, you will improve your competencies as related to:

- Discuss the NCCN’s new guidelines for lung cancer screening for high risk patients
- Examine current evidence-based practices in diagnosing lung cancer
- Recognize symptoms and risk factors for lung cancer
- Describe advances being made in new targeted therapies and treatments for lung cancer
Part 1

Meredith Lundy
Case

• 49 year old female, who quit smoking 19 years ago (10-pack year history)
• She presents with the following symptoms:
  – Fatigue
  – Cough
  – Wheezing
  – Difficulty breathing
Which of the following would you be more likely to order?

a. Chest x-ray  
b. Chest CT scan  
c. Spirometry  
d. Exhaled nitric oxide test  
e. None of the above
If there is a suspicion of lung cancer

b. Chest CT scan
Case Continued

• The primary physician ordered an x-ray of the chest, and a large mass in her right lung was seen.

• The primary physician then ordered a CT scan of the chest – no lymph nodes appeared to be involved, nor were other organs affected.
• The patient was referred to pulmonology, where bronchoscopy and biopsy were performed.

• Biopsy indicated non-small cell lung cancer (NSCLC), and the patient was staged at 1B.
Is stage 1B NSCLC curable?

a. Yes
b. No
c. Uncertain
a. Yes
Case Continued

- The patient indicates interest in learning about what clinical trials may be available to her.
You would tell her:

a. Clinical trials are a viable treatment option for lung cancer.
b. Clinical trials have more risks than standard therapy.
c. I don’t know where to find out what clinical trials are available.
d. It is her decision and I can’t give her advice.
a. Clinical trials are a viable treatment option for lung cancer.
How likely is it that this patient will be alive in 5 years?

a. Unlikely
b. Uncertain
c. Likely
b. Uncertain

With earlier diagnoses made possible through lung cancer screening, new targeted therapies and personalized treatment options, patients who have been diagnosed with lung cancer are slowly surpassing odds that were once against them.
Case Continued

I am that case.
Leading Causes of Death in the US

- Heart Disease: 25%
- Cancer: 23%
- Stroke: 5%
- Resp. Disease: 6%
- Accidents: 5%
- Alzheimer's: 3%
- Diabetes: 3%
- Flu & Pneumonia: 2%
- Kidney Disease: 2%
- Suicide: 1%

Other: 25%

Leading Causes of Cancer Death in the US

Leading Causes of Death in the US

- Cancer is the leading cause of death in people under the age of 75.

- Lung cancer kills approximately 160,000 people in the United States each year – more people than breast, colon, and prostate cancers combined.
Lung Cancer: The Facts

Lung Cancer is one of the most deadly cancers

5-yr. Cancer Survival Rates, 2012

Prostate: 99%
Breast: 90%
Colorectal: 64%
Lung: 16%

Lung Cancer: Risk

1 in 13 men and 1 in 16 women will be diagnosed with lung cancer

Lung Cancer can affect **ANYONE**

Raleigh Free to Breathe event 2012, courtesy NCLCP.
Lung Cancer: Risk

Lung cancer can affect anyone

- **44%** People who currently smoke
- **43%** People who used to smoke
- **10-15%** People who have never smoked

*As population of people who have quit expands, this % is growing.*

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## Lung Cancer Can Affect Anyone

### Age @ diagnosis

<table>
<thead>
<tr>
<th></th>
<th>20-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65-74</th>
<th>75-84</th>
<th>85+</th>
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</thead>
<tbody>
<tr>
<td>Female</td>
<td>0.3%</td>
<td>1.9%</td>
<td>8.8%</td>
<td>19.9%</td>
<td>30.6%</td>
<td>29.5%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Male</td>
<td>0.2%</td>
<td>1.5%</td>
<td>8.8%</td>
<td>21.8%</td>
<td>31.9%</td>
<td>28.7%</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

Other Causes of Lung Cancer

- Radon
- Second hand smoke
- Diesel fumes
- Genetic susceptibility
- Radiation therapy
- Cooking fumes (developing countries)
- Asbestos, cadmium, arsenic
Radon exposure in homes and businesses can be mitigated.

Easy prevention message for family physicians.

See [www.epa.gov.radon](http://www.epa.gov.radon) for information on reputable radon detection and mitigation options.

Radon test kits available for small fee from NC DHHS: (919) 571-4141 or [http://www.ncradon.org/purchasetestkit.htm](http://www.ncradon.org/purchasetestkit.htm)
GENERALIZED GEOLOGIC RADON POTENTIAL OF THE UNITED STATES
by the U.S. Geological Survey

Geologic Radon Potential
(Predicted Average Screening Measurement)

- LOW (< 2 pCi/L)
- MODERATE/VARIABLE (2 - 4 pCi/L)
- HIGH (> 4 pCi/L)

Lung Cancer Screening: Where Are We?

- **National Lung Screening Trial**: Largest lung cancer screening trial ever (over 50,000 enrolled)
- Compared annual CXR to low dose CT scan
- Screened: >age 55 w/30-year pack history w/in 15 years of quitting
- Results released November 2010; published June, 2011
- 40% of cancers detected in CT-screening group were stage IA
- 20% risk reduction in lung cancer deaths

Lung Cancer Screening: Guidelines

Consensus on evidence for highest-risk individuals: ASCO, ACCP, AATS, ALA, NCCN
Consensus Guidelines for Lung Cancer Screening

Consensus
Highest-Risk Individuals

- Age 55-74 years
- ≥ 30-pack year history
- Current or former smoker w/in 15 years of quitting
- If initial scan negative, annual screening recommended until 74 years of age

JAMA. 2012;307(22):2418-2429
Protocol for CT screening

Patient must meet guidelines for screening or have PCP referral

- Appointment made with appropriate screening center, e.g., NLST or I-ELCAP center, major academic medical center includes:
  - Medical records review
  - Physical exam
  - Pre-scan counseling on risks and benefits of screening
  - CT scan interpreted (including comparisons to any prior)
  - Patient contacted with results – in person if suspicious finding
  - PCP notified of results
  - Patient follow-up, including counseling on indeterminate nodules
LDCT screening:
What are the health risks?

• False positives (NLST: 23% of “positives” benign)

• Anxiety
  - What will be found?
  - What does a nodule mean?
  - Why would we watch and wait?

• Effects of repeated exposure to low dose radiation at regular intervals not known
  - Exposure from LDCT scan (1.5mSv) much less than regular CT scan (7 mSv).
### Medically-induced radiation compared to background radiation

<table>
<thead>
<tr>
<th>TYPE</th>
<th>EFFECTIVE DOSE</th>
<th>NATURAL BACKGROUND</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-Ray</td>
<td>0.1 mSv</td>
<td>10 days</td>
<td>Minimal</td>
</tr>
<tr>
<td>Mammogram</td>
<td>0.4 mSv</td>
<td>7 weeks</td>
<td>Very Low</td>
</tr>
<tr>
<td><strong>LOW DOSE Chest CT</strong></td>
<td>1.5 mSv</td>
<td>6 months</td>
<td>Very low</td>
</tr>
<tr>
<td>Spine CT</td>
<td>6 mSv</td>
<td>2 years</td>
<td>Low</td>
</tr>
<tr>
<td>Diagnostic Chest CT</td>
<td>7 mSv</td>
<td>2 years</td>
<td>Low</td>
</tr>
<tr>
<td>CT abdomen/pelvis repeated with/without contrast material</td>
<td>20 mSv</td>
<td>7 years</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

• Natural background radiation = 3 mSv/year

CT screening locations in NC

Central NC
Duke Raleigh Cancer Center, 3404 Wake Forest Road, Raleigh, NC 27609
(919) 954-3877 / Cost: $400

Duke Cancer Institute, 20 Medicine Circle, Durham, NC 27710
(919) 613-4318 / Toll free: 1-855-623-8135 / Cost: $400

Rex Lung Cancer Screening Program | Rex Thoracic and Pulmonary Specialists | Rex Healthcare Radiology
2800 Blue Ridge Road, Raleigh, NC 27607
(919) 784-5650 / Cost: $299

Wake Forest Baptist Medical Center, Medical Center Boulevard, Winston-Salem, NC 27157
Toll free: 1-877-243-0563 / Cost: $300

UNC Lineberger Comprehensive Cancer Center, Campus Box 7295, Chapel Hill, NC 27599
*Program getting started / (919) 966-1669

Cone Health Cancer Center, 1200 N. Elm Street, Greensboro, NC 27401
*Program getting started / (336) 832-7000 / Toll free: 1-866-391-2734

South Central NC
Presbyterian Cancer Center, 200 Hawthorne Lane, Charlotte, NC 28204
(704) 348-8980 / Cost: $150

Levine Cancer Institute, 1025 Morehead Medical Dr., Charlotte, NC 28204
*Program getting started / (704) 355-2884

South Eastern NC
New Hanover Regional Medical Center | Zimmer Cancer Center, 2131 S. 17th Street, Wilmington, NC 28401
*Program getting started / (910) 342-3000

Western NC
Mission Health Cancer Center | Asheville Radiology Associates
21 Hospital Dr., Asheville, NC 28801
(828) 213-2504 / Cost: $195
Lung Cancer Screening: What’s Next?

In exploration:
- Blood
- Breath
- Sputum
- Urine

Encourage clinical trial enrollment!
Lung Cancer Risk Factors

- Current/past history of smoking
- Prolonged exposure to second-hand smoke
- Previous radiation therapy to the chest
- Occupational exposure – arsenic, chromium, asbestos, nickel, cadmium, beryllium, silica, diesel fumes
- Exposure to radon gas – plus smoking at greater risk
- Lung disease, e.g., COPD, pulmonary fibrosis
- Prior lung cancer diagnosis
- Family history of lung cancer
Recognizing symptoms: Local/Regional Disease

- Bronchial obstruction:
  - Cough, shortness of breath, hemoptysis

- Chest wall involvement:
  - Pain

- Laryngeal nerve involvement:
  - Hoarseness

- Vena cava involvement:
  - Facial swelling, flush
Recognizing Symptoms: Metastatic Disease

- **Bone:** Pain

- **Brain:**
  - Nausea
  - Headache
  - Other central nervous system symptoms

- **Liver:**
  - Anorexia
  - Painful right upper quadrant

- **Adrenal:** often asymptomatic
Recognizing Symptoms: Paraneoplastic

- Anorexia, weight loss
  - Most common presenting symptoms of ANY cancer

- Hormonal
  - SIADH (low sodium - nausea, vomiting, headache, confusion)
  - Hypercalcemia (high calcium – confusion, abdominal pain, polyuria)

- Deep venous thrombosis
Histological Types of Lung Cancer

- Non-Small Cell Lung Cancer
  - Adenocarcinoma
    - Adenocarcinoma in situ (previously Bronchioloalveolar)
  - Squamous cell carcinoma
  - Large cell

- Small Cell Lung Cancer
Histological Types of Lung Cancer

- Non-Small Cell Lung Cancer
  - Can occur in people with or without smoking history

- Small Cell Lung Cancer
  - Rare, but not impossible, in people without smoking history
Staging: NSCLC

**Stage I:**
- \( \leq 5\text{cm}; \) no lymph nodes involved

**Stage II:**
- \( \leq 7\text{cm}, \) if ipsilateral lymph nodes involved
- \( >7\text{cm}, \) or local invasion, or multiple nodules in same lobe if no lymph nodes involved

Goldstraw et al., J. Thorac Oncol, 2007
Stage III:
- Has not spread beyond lymph nodes in chest
- May have metastases within ipsilateral lung
- May have local invasion of major structures

Stage IV:
- Metastatic disease or disease with pleural effusion
Small Cell Lung Cancer: Staging

- **Limited stage:**
  - Treated with chemotherapy & radiation from a single field.
  - Potentially curable!

- **Extensive stage:**
  - Has spread to a larger region of the chest and/or other parts the body.
  - Treated with chemotherapy only.
Lung Cancer Treatments

- Local disease = local treatment
  - Surgery
  - Radiation therapy

- Systemic disease = systemic treatment
  - Chemotherapy
  - Targeted therapy
  - Radiation therapy (for palliative purposes)
  - Surgery for brain metastases (sometimes)
Lung Cancer Surgery: Not What it Used to Be

Open Thoracotomy → Thoracoscopic Lung Resection
VATS Lobectomy

Advantages

- Lower morbidity
- Less pain
  - No rib spreading
- Improved pulmonary function
- Equivalent cancer control

Improved quality of life

Paul et al JTCVS Feb 2010
## SBRT vs. Conventional Radiotherapy

<table>
<thead>
<tr>
<th>SBRT</th>
<th>Conventional Radiotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many beams/arc(s)</td>
<td>2-4 beams</td>
</tr>
<tr>
<td>Small beam apertures</td>
<td>“Swaths” of radiation</td>
</tr>
<tr>
<td>Daily Image guidance</td>
<td>Weekly image guidance</td>
</tr>
<tr>
<td>Strict motion control</td>
<td>Limited motion control</td>
</tr>
<tr>
<td>Large “ablative” daily dose</td>
<td>Small “forgiving” daily dose</td>
</tr>
<tr>
<td>1-5 treatments (1-2 weeks)</td>
<td>30-45 treatments (6-9 weeks)</td>
</tr>
</tbody>
</table>
Dose Distribution
The Age of Personalized Therapy

- Treatment based on:
  - Stage
  - Histology
  - Gene mutations
    - EGFR/ EML4-ALK – commercial options
    - MET/HER2/PI3KCA/KRAS/BRAF/MEK – clinical trial options

- Targeted therapy
  - Tyrosine kinase inhibitors (TKI’s)
  - Monoclonal antibodies
Advances in Targeted Therapies

- Target proteins primarily on cancer cells
- Have fewer side effects
- Used primarily for stage 3 and 4 lung cancer

- erlotinib (Tarceva) - EGFR inhibitor
- bevacizumab (Avastin) - angiogenesis inhibitor
- crizotinib (Xalkori) - ALK inhibitor
Response to erlotinib

Day 0

Day 5
Response to crizotinib

Response: 3 months
Clinical Trials: 
The Road to New Therapeutic Advances

- With the advances being made in lung cancer research, clinical trials are an attractive therapy option.

- The primary care provider is often the most trusted – your advice carries a lot of weight.

- You don’t need to know that a trial is available – just plant the seed!
Referral: Fast and Appropriate

**Medical oncologists**
- appropriate for *every* lung cancer patient
- most early-stage lung cancer patients will still need to see a medical oncologist

**Radiation oncologists**
- appropriate for some lung cancer patients
- best to coordinate with medical oncologists

**Thoracic surgeons**
- role in diagnosis for most patients
- treatment for early-stage patients
- best results from centers that do higher number of thoracic surgeries
Palliative Care: Offer Early

Temel et al., NEJM, 2010
Smoking Cessation: Always Beneficial

(even with lung cancer!)

- Less stress on heart & lungs
- Helps treatments work better
- Helps patients live longer
- Comprehensive quit plan often needed
Despite the relatively low funding for lung cancer research, significant progress has been made in treating lung cancer. There is more hope for lung cancer patients than ever before!
Managing Lung Cancer

Image Guidance

Earlier Detection

Less invasive

Targeted Therapy

Better Outcomes

HOPE

Access TLC
Improving Access to Treatment for Lung Cancer Patients
A Promising Hypothesis

With early detection, early referral, more personalized therapy, and more research dollars, the statistics will change!
Thank You!

Access TLC

Improving Access to Treatment for Lung Cancer Patients
References


