Role of the Pulmonologist in the Diagnosis and Treatment Selection for Lung Cancer

In a Multidisciplinary Thoracic Oncology Program

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Disclosures

- None
Integration Into a Multidisciplinary Thoracic Oncology Program

- Present and available in clinic
- Present at Tumor Board
- Clinical expertise becomes focused on thoracic oncology
- Thoracic program begins to have a focus on the pulmonologist
Diagnosis

- Risk stratifying and sampling pulmonary nodules
  - Watch and wait
  - Bronchoscopy
  - CT-guided biopsy
  - Surgical resection
- Optimizing tissue diagnosis
  - Diagnosis and staging
  - Sufficient tissue
Evaluating Pulmonary Nodules

- Determining probability of malignancy
  - Evaluate patient characteristics of risk
  - Evaluate pulmonary nodule characteristics
  - Assess patient preference
  - Determine course of action
Guidelines for Management of Small Pulmonary Nodules Detected on CT Scans: A Statement from the Fleischner Society

Lung nodules are detected very commonly on computed tomographic (CT) scans of
## Recommendations for Follow-up and Management of Nodules Smaller than 8 mm Detected Incidentally at Nonscreening CT

<table>
<thead>
<tr>
<th>Nodule Size (mm)*</th>
<th>Low-Risk Patient†</th>
<th>High-Risk Patient‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤4</td>
<td>No follow-up needed§</td>
<td>Follow-up CT at 12 mo; if unchanged, no further follow-up‖</td>
</tr>
<tr>
<td>&gt;4–6</td>
<td>Follow-up CT at 12 mo; if unchanged, no further follow-up‖</td>
<td>Initial follow-up CT at 6–12 mo then at 18–24 mo if no change‖</td>
</tr>
<tr>
<td>&gt;6–8</td>
<td>Initial follow-up CT at 6–12 mo then at 18–24 mo if no change</td>
<td>Initial follow-up CT at 3–6 mo then at 9–12 and 24 mo if no change</td>
</tr>
<tr>
<td>&gt;8</td>
<td>Follow-up CT at around 3, 9, and 24 mo, dynamic contrast-enhanced CT, PET, and/or biopsy</td>
<td>Same as for low-risk patient</td>
</tr>
</tbody>
</table>

Note.—Newly detected indeterminate nodule in persons 35 years of age or older.

* Average of length and width.
† Minimal or absent history of smoking and of other known risk factors.
‡ History of smoking or of other known risk factors.
§ The risk of malignancy in this category (<1%) is substantially less than that in a baseline CT scan of an asymptomatic smoker.
‖ Nonsolid (ground-glass) or partly solid nodules may require longer follow-up to exclude indolent adenocarcinoma.
Bronchoscopy vs CT Guided Biopsy

- More central rather than peripheral
- Larger rather than smaller (2 cm)
- Air bronchus sign
- Mediastinal and/or hilar adenopathy
- Associated pleural effusion
Pulmonary Nodule

- Bronchoscopy
  - Traditional endobronchial or transbronchial biopsy w/ or w/o fluoroscopy
  - Electromagnetic navigation
  - Virtual CT guided: Broncus Lung Point
  - Endobronchial ultrasound
Fluoroscopic Guided
Electromagnetic Navigation Bronchoscopy

- SuperDimension In Reach System
- A virtual “GPS” navigation system that improves the bronchoscopic yield of pulmonary nodules

SuperDimension System
SuperDimension In Reach System
Virtual Bronchoscopy Guided Navigation

- Broncus Lung Point
- CT imaged based virtual bronchoscopy navigation system that improves the bronchoscopic yield of pulmonary nodules

Broncus Lung Point™ Navigation System
SPiN Drive™ Electromagnetic Navigation System

- 4D respiratory gating
- Navigated instrument:
  - Navigated 1 mm guidewire
  - 3 mm steerable virtual bronchoscope
  - Navigated sheath w/ steerable curette
  - Tip-tracked aspiration needle and brush

Veran Medical Technologies, Inc.
System Overview

- Navigation Screen
- vPAD Patient 4D Tracker
- EM Field Generator
- Multiple Pathway Views
- Always-On Working Channel
Radial Probe Endobronchial Ultrasound (EBUS)
Lymph Nodes: Diagnosis and Staging

- Traditional bronchoscopy and landmark guided transbronchial needle aspiration
- Linear EBUS
Linear Endobronchial Ultrasound (EBUS)

- Ultrasound permanently attached to the distal end of a dedicated flexible bronchoscope
- Scans linearly, parallel to insertion direction
- Needle aspiration performed under real time ultrasound guidance
Linear Convex Probe
Pleural Effusions: Diagnosis and Staging

- Thoracentesis: Approximately 50-60% yield with incremental increase on repeat
- Pleural biopsy
Treatment Selection

- Assist thoracic surgeon in assessing suitability for resection
- Help optimize pulmonary function
- Obtain adequate tissue
Assess Suitability for Resection

- Pulmonary function testing
  - FEV1 > 80% predicted or > 2 L – Pneumonectomy
  - FEV1 > 1.5 L – Lobectomy
  - DLCO > 80%
  - %ppo FEV1 and DLCO (by perfusion) > 40%
  - %ppo FEV1 and DLCO (by segments) > 40%
- Cardiopulmonary exercise testing (CPET)
  - > 20 mL/kg/min – No increased risk for pneumonectomy
  - > 15 – No increased risk for lobectomy
  - < 10 mL/kg/min – High risk

Assess Suitability for Resection

- Heterogeneous emphysema with upper lobe predominance and upper lobe tumors
- Patients with %ppo FEV1 and DLCO < 40% may benefit from a lung volume reduction effect and have in effect improved function post resection

Optimize Pulmonary Function

- Treatment of underlying pulmonary disease
  - COPD
  - Asthma
  - Acute and chronic infection
- Pulmonary Rehabilitation
Adequate Tissue Sampling

- Diagnosis
- Staging
- Immunohistochemistry
- Molecular markers and mutational analysis
- Research