Solitary lung nodule: to B(iopsy) or not to B(iopsy): that is the question

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Disclosures

- Nothing to disclose
The solitary pulmonary nodule
It always starts like this....
Followed by this….

Sure shot
Ending like this…

Now, we have a problem.
Solitary lung nodules (SLNs)

- The prevalence in the general population is unknown
- An estimated 150,000 new SLNs are discovered yearly
- Screening CT has had a major impact in the increase in detection
Screening CT

- Increases the number of patients detected with SLNs
- Even in the groups most at risk, the majority of lesions are benign
- The costs associated with further surveillance and eventual management could be staggering
LUNG RADS

- Quality assurance tool to standardize lung cancer screening CT reporting
- Implemented by the American College of Radiology
- Based on the Fleischner Society guidelines
# LUNG RADS classification

<table>
<thead>
<tr>
<th>Lung-RADS Category</th>
<th>Baseline Screening</th>
<th>Subsequent Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>No nodules; nodules with calcification</td>
<td>No nodules; nodules with calcification</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Solid/part solid: &lt;6 mm</td>
<td>Solid/part solid: &lt;6 mm</td>
</tr>
<tr>
<td></td>
<td>GGN: &lt;20 mm</td>
<td>GGN: &lt;20 mm or unchanged/slowly growing</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Category 3-4 nodules unchanged at ≥3 mo</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Solid: ≥6 to &lt;8 mm</td>
<td>Solid: New ≥4 to &lt;6 mm</td>
</tr>
<tr>
<td></td>
<td>Part solid: ≥6 mm with solid component &lt;6 mm</td>
<td>Part solid: New &lt;6 mm</td>
</tr>
<tr>
<td></td>
<td>GGN: ≥20 mm</td>
<td>GGN: New ≥20 mm</td>
</tr>
<tr>
<td><strong>4A</strong></td>
<td>Solid: ≥8 to &lt;15 mm</td>
<td>Solid: Growing &lt;8 mm or new ≥6 and &lt;8 mm</td>
</tr>
<tr>
<td></td>
<td>Part solid: ≥8 mm with solid component ≥6 and &lt;8 mm</td>
<td>Part solid: ≥6 mm with new or growing solid component &lt;4 mm</td>
</tr>
<tr>
<td><strong>4B</strong></td>
<td>Solid: ≥15 mm</td>
<td>Solid: New or growing and ≥8 mm</td>
</tr>
<tr>
<td></td>
<td>Part solid: Solid component ≥8 mm</td>
<td>Part solid: ≥6 mm with new or growing solid component ≥4 mm</td>
</tr>
<tr>
<td><strong>4X</strong></td>
<td>Category 3 or 4 nodules with additional features; imaging findings that increase suspicion of cancer</td>
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</tr>
</tbody>
</table>

GGN = ground-glass nodule.

* Size is the average diameter rounded to the nearest whole number. Growth is a size increase >1.5 mm.
Fleischner Society guidelines

- Published in 2005 (2013 for subsolid nodules)
- The guidelines for both types of nodules have been combined since
- The minimum threshold size to recommend follow up is based on a cancer risk on the order of 1% or greater
### Fleischner guidelines:

#### A: Solid Nodules

<table>
<thead>
<tr>
<th>Nodule Type</th>
<th>Size</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk?</td>
<td>&lt;6 mm (&lt;100 mm³)</td>
<td>No routine follow-up. CT at 6–12 months, then consider CT at 18–24 months, or tissue sampling. Nodules &lt;6 mm do not require routine follow-up in low-risk patients (recommendation 1A).</td>
</tr>
<tr>
<td>High risk?</td>
<td>6–8 mm (100–250 mm³)</td>
<td>Optional CT at 12 months. CT at 6–12 months, then CT at 18–24 months. Consider CT at 3 months, PET/CT, or tissue sampling. Certain patients at high risk with suspicious nodule morphology, upper lobe location, or both may warrant 12-month follow-up (recommendation 1A).</td>
</tr>
<tr>
<td>Multiple</td>
<td>&gt;8 mm (&gt;250 mm³)</td>
<td></td>
</tr>
<tr>
<td>Low risk?</td>
<td>CT at 3–6 months, then CT at 18–24 months</td>
<td>No routine follow-up. CT at 3–6 months, then consider CT at 18–24 months. Use most suspicious nodule as guide to management. Follow-up intervals may vary according to size and risk (recommendation 2A).</td>
</tr>
<tr>
<td>High risk?</td>
<td>Optional CT at 12 months</td>
<td>CT at 3–6 months, then CT at 18–24 months. Use most suspicious nodule as guide to management. Follow-up intervals may vary according to size and risk (recommendation 2A).</td>
</tr>
</tbody>
</table>

#### B: Subsolid Nodules

<table>
<thead>
<tr>
<th>Nodule Type</th>
<th>Size</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground glass</td>
<td>&lt;6 mm (&lt;100 mm³)</td>
<td>No routine follow-up. CT at 6–12 months to confirm persistence, then CT every 2 years until 5 years. In certain suspicious nodules &lt; 6 mm, consider follow-up at 2 and 4 years. If solid component(s) or growth develops, consider resection. (Recommendations 3A and 4A).</td>
</tr>
<tr>
<td>Part solid</td>
<td>≥6 mm (&gt;100 mm³)</td>
<td>No routine follow-up. CT at 3–6 months to confirm persistence. If unchanged and solid component remains &lt;6 mm, annual CT should be performed for 5 years. In practice, part solid nodules cannot be defined as such until ≥6 mm, and nodules &lt;6 mm do not usually require follow-up. Persistent part-solid nodules with solid components ≥6 mm should be considered highly suspicious (recommendations 4A-4C).</td>
</tr>
<tr>
<td>Multiple</td>
<td>CT at 3–6 months. If stable, consider CT at 2 and 4 years.</td>
<td>CT at 3–6 months. Subsequent management based on the most suspicious nodule(s). Multiple &lt;6 mm pure ground-glass nodules are usually benign, but consider follow-up in selected patients at high risk at 2 and 4 years (recommendation 5A).</td>
</tr>
</tbody>
</table>
What to do now that you have decided that a nodule is clinically significant?
First: review the History and PE

- Smoking history
- History of previous infectious exposure
- Previous malignancy
- Previous radiological history

This is also the time to estimate what diagnostic options (if any needed) the patient can have
Additional testing

- Pulmonary function testing (complete)
- TB test, Quantiferon
- Fungal titers
- PET CT
- Perfusion scan
Infectious work up

- Many patients will come with a suspicious situation that is simply infectious
- TB testing generally helpful only on people that have been aware of the previous status
- Many of these conditions will have acute onset and would be commonly symptomatic (cough, malaise, etc)
Case

- 40 years old female
- 27 years history of smoking, 1.5 packs per day
- Healthcare worker
- 4-6 week history of malaise and cough, non productive
Radiologic surveys
Radiologic surveys

RLL

PET
Case

- All fungal testing negative
- Quantiferon negative
- HIV negative
Treated with 21 days of antibiotics
What would be next?
To B or not to B?
How to decide on whether it is practical to biopsy or to resect?
Level of suspicion

- Young patient, incidental finding, no risk factors, no symptoms: observation reasonable
- Older patient, acute symptoms, risk factors present: treatment and surveillance reasonable
- Older patient, no symptoms, high risk factors: more complex situation.
Risk vs Benefit
Diagnostic modalities

- Bronchoscopy
- EBUS
- Navigational bronchoscopy
- Percutaneous biopsy
- Thoracoscopy with diagnostic/therapeutic resection
Thank you!