Perifissural Nodules Seen at CT Screening for Lung Cancer


JSLee
Perifissural Nodules (PFN)

- Benign appearing non-calcified nodules
- next to or within 5 mm of the major or minor fissure.

Ahn M I et al. Radiology 2010;254:949-956
Perifissual Nodules

- Triangular, Oval, Round, Rectangular, Dumbbell

<table>
<thead>
<tr>
<th>Shape</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular</td>
<td>102 (44)</td>
</tr>
<tr>
<td>Oval*</td>
<td>98 (42)</td>
</tr>
<tr>
<td>Round</td>
<td>18 (8)</td>
</tr>
<tr>
<td>Rectangular</td>
<td>13 (6)</td>
</tr>
<tr>
<td>Dumbbell shaped</td>
<td>3 (1)</td>
</tr>
</tbody>
</table>

Ahn M I et al. Radiology 2010;254:949-956
Triangular PFN (44%)
Oval PFN (42%)
Round PFN (8%)
Rectangular PFN (6%)
Dumbbell PFN (1%)
Clustered PFN (within 10mm)

Ahn M I et al. Radiology 2010;254:949-956
### Location PFN

<table>
<thead>
<tr>
<th>PFN Location</th>
<th>No. of PFNs (n = 234)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fissures</strong></td>
<td></td>
</tr>
<tr>
<td>Left major</td>
<td>111 (47)</td>
</tr>
<tr>
<td>Right major</td>
<td>74 (32)</td>
</tr>
<tr>
<td>Right minor</td>
<td>47 (20)</td>
</tr>
<tr>
<td>Left minor accessory</td>
<td>2 (1)</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td></td>
</tr>
<tr>
<td>Above carina</td>
<td>23 (10)</td>
</tr>
<tr>
<td>At level of carina</td>
<td>15 (6)</td>
</tr>
<tr>
<td>Below carina</td>
<td>196 (84)</td>
</tr>
</tbody>
</table>

Ahn M I et al. Radiology 2010;254:949-956
Septal Attachment (73%)

- Within 5 mm of fissure

Ahn M I et al. Radiology 2010;254:949-956
234 PFN in 128 Pts
(h/o 30+ pack years of smoking)

PFN:
3.2 mm, mean
13 mm, largest
6 decreased by 1.4 mm
7 increased by 1.1 mm.

Ahn M I et al. Radiology 2010;254:949-956
10 Lung cancers

- NONE from PFN

Five stable PFNs in two subjects were surgically resected as part of a lobectomy for lung cancer. None of these nodules was found to be malignant.

Ahn M I et al. Radiology 2010;254:949-956
Proved intrapulmonary Lymph node

Ahn M I et al. Radiology 2010;254:949-956
Perifissural nodules (PFNs) are well-circumscribed, smoothly marginated nodules in contact with or closely related to a fissure (within 5 mm, or 10 mm if clustered).

PFNs are most commonly triangular or oval (86%), often show a septal attachment (73%), and are usually located below the level of the carina (84%).

At 7½-year follow-up, no PFN had developed into a lung cancer; this led us to conclude that PFNs have a low likelihood of changing to malignancies.

Ahn M I et al. Radiology 2010;254:949-956
BONUS

MORE ABOUT SOLITARY PULMONARY NODULES.
subpleural nodules


- “Smooth or Attached Solid Indeterminate Nodules Detected at Baseline CT Screening in the NELSON Study: Cancer Risk during 1 Year of Follow-up”
subpleural nodules

**ADVANCES IN KNOWLEDGE**
In smooth solid indeterminate pulmonary nodules or nodules attached to a fissure, the pleura, or located juxtavascularly (volume between 50 and 500 mm$^3$), cancer risk is absent at 1 year of follow-up.

**IMPLICATION FOR PATIENT CARE**
Smooth or attached (to a fissure, the pleura, or a vessel) solid indeterminate pulmonary nodules require no shorter follow-up than 1 year.

Xu, et al, January 2009, Radiology
Guidelines from the Fleishner society

<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+ year old.* Average of length and width.
† Minimal or absent h/o 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 opacity-GGO) or partly solid nodules may require longer follow-up to exclude indolent adenocarcinoma.
More Guidelines from the Fleishner society

• **known or suspected metastases:** use appropriate protocol for tumor, short term follow-up often appropriate

• **young patients (< 35 years):** consider a single low dose scan at 6-12 months

• **elderly pts** or patients with other conditions: follow-up may not be needed

• **patients with fever:** short term follow-up to exclude infection

FOLLOWUP WITH LOW DOSE CT!
Size matters

- 4-7 mm: 2.7% cancer (screen)
- 8-30 mm: 18% cancer (something needs to be done)
- > 30 mm: 100% cancer

- Swensen et al, Radiology 235:259, 2005

From the lecture by W.Richard Webb
Persistent Ground Glass Opacity (GGO)

- 75% BAC or mixed invasive adenocarcinoma
- 19% inflammatory or scar
- 6% atypical adenomatous hyperplasia

Need to follow longer, due to slow growth rate
Lower attenuation, longer survival
Mixed or more solid attenuation, worse

Yang et al, AJR 2001; 176:1399

From the lecture by W.Richard Webb
Decrease in size

• 8 GGO nodules (cancers) detected by screening
• 5 increased in size on follow-up
• 1 was stable
• 2 decreased in size

Kakinuma et al, J Comput Assist Tomogr 2004; 28:17

From the lecture by W.Richard Webb
Decreased nodule

- usually indicative of benign lesion
- transient decrease in size of lung cancer can occur
  1. collapse of alveoli or fibrosis
  2. transient necrosis
- a single follow-up study showing decreased size not sufficient for calling a nodule benign

From the lecture by W. Richard Webb