Perifissural Nodules Seen at CT Screening for Lung Cancer

Ahn, et al. Radiology, March 2010; 254:949-956

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

Shape	
Triangular	102 (44)
Oval*	98 (42)
Round	18 (8)
Rectangular	13 (6)
Dumbbell shaped	3 (1)

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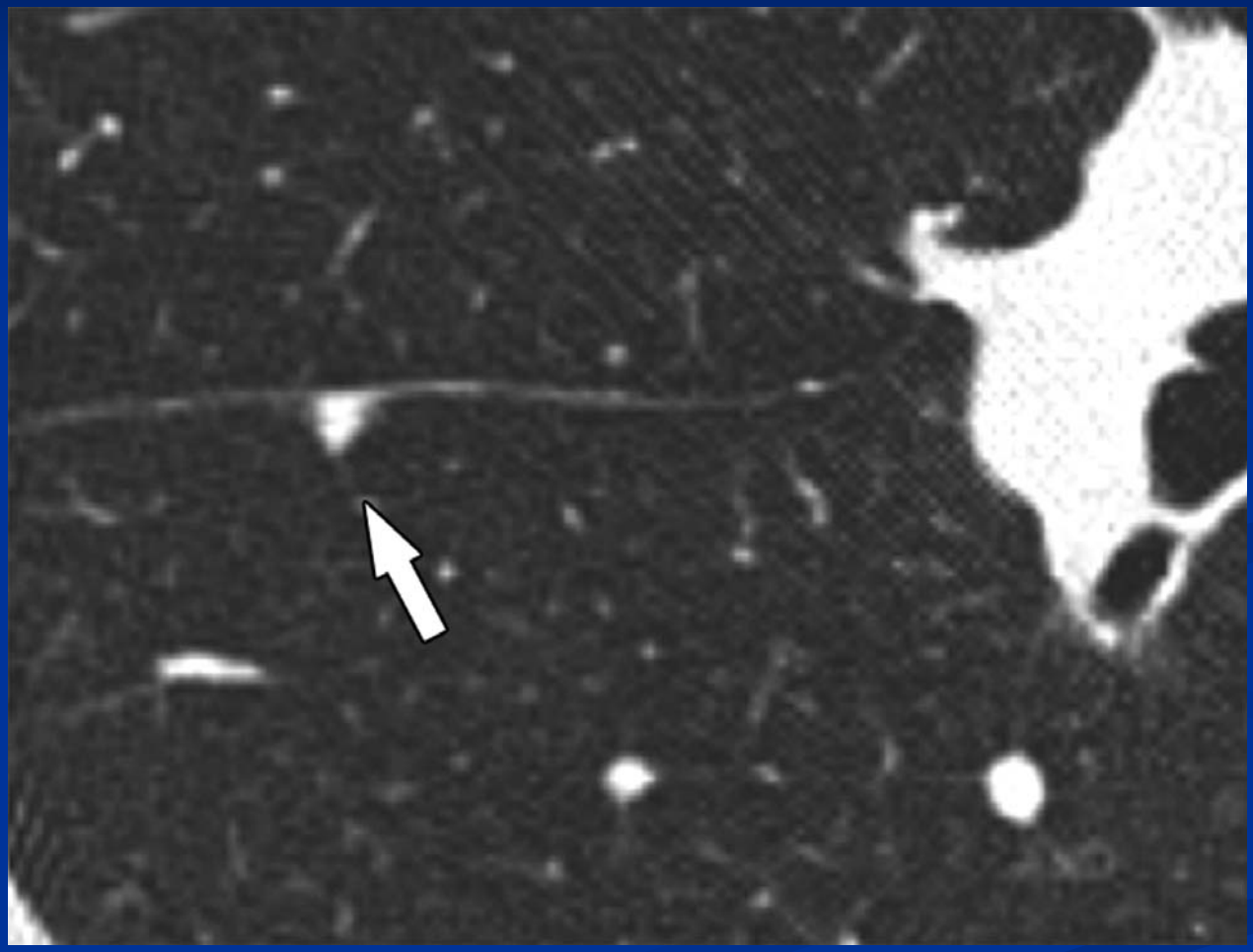
Triangular PFN (44%)



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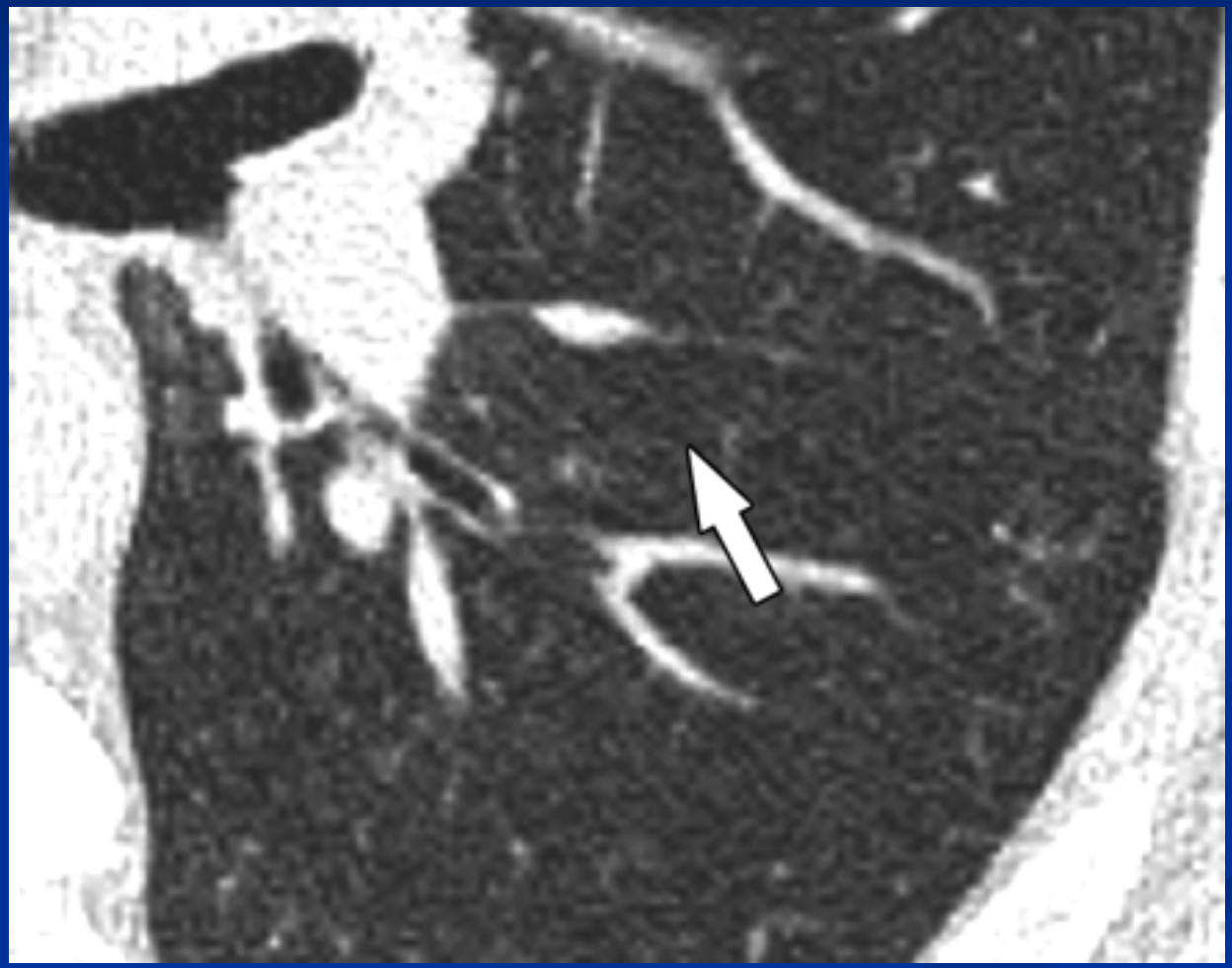
Oval PFN (42%)



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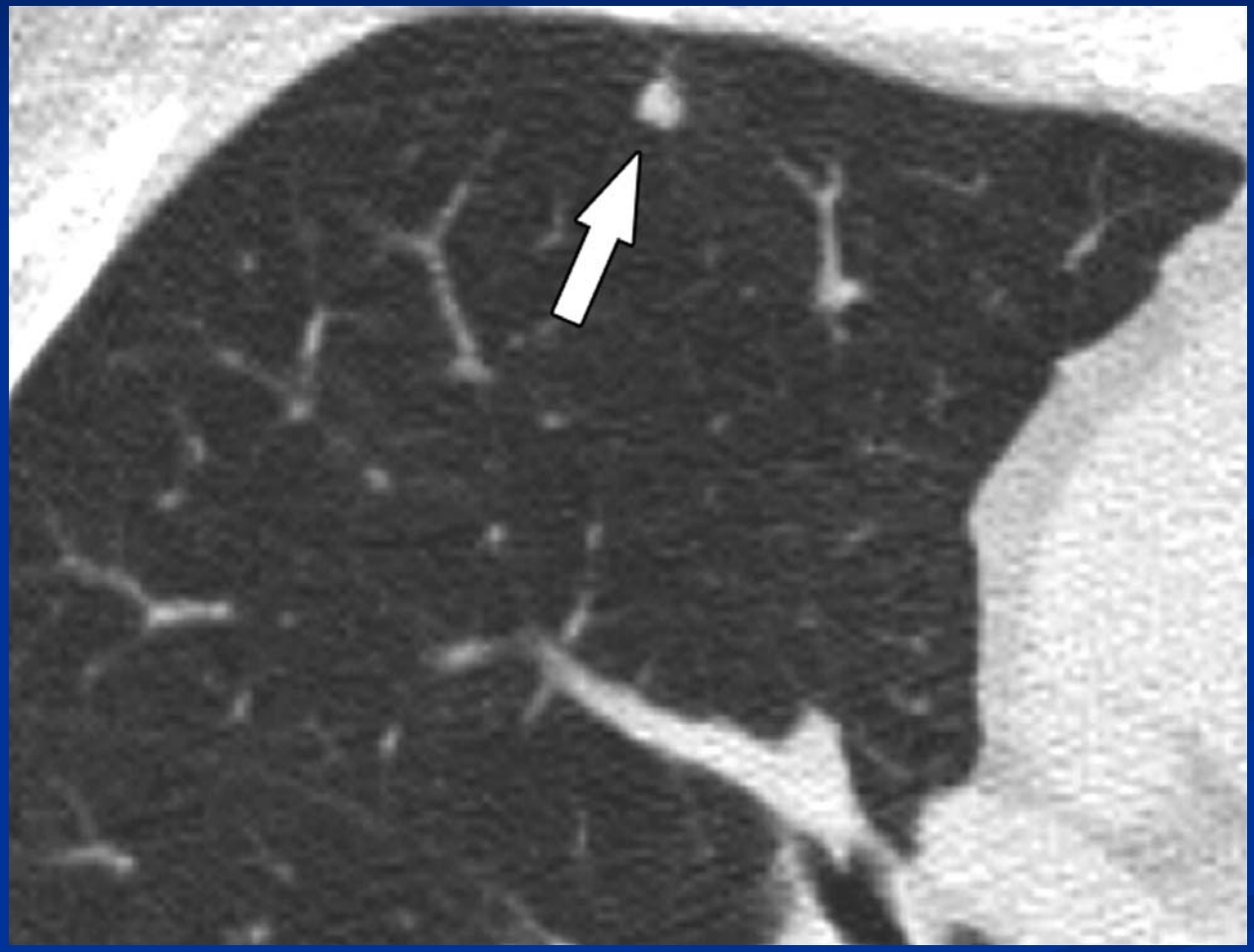
Round PFN (8%)



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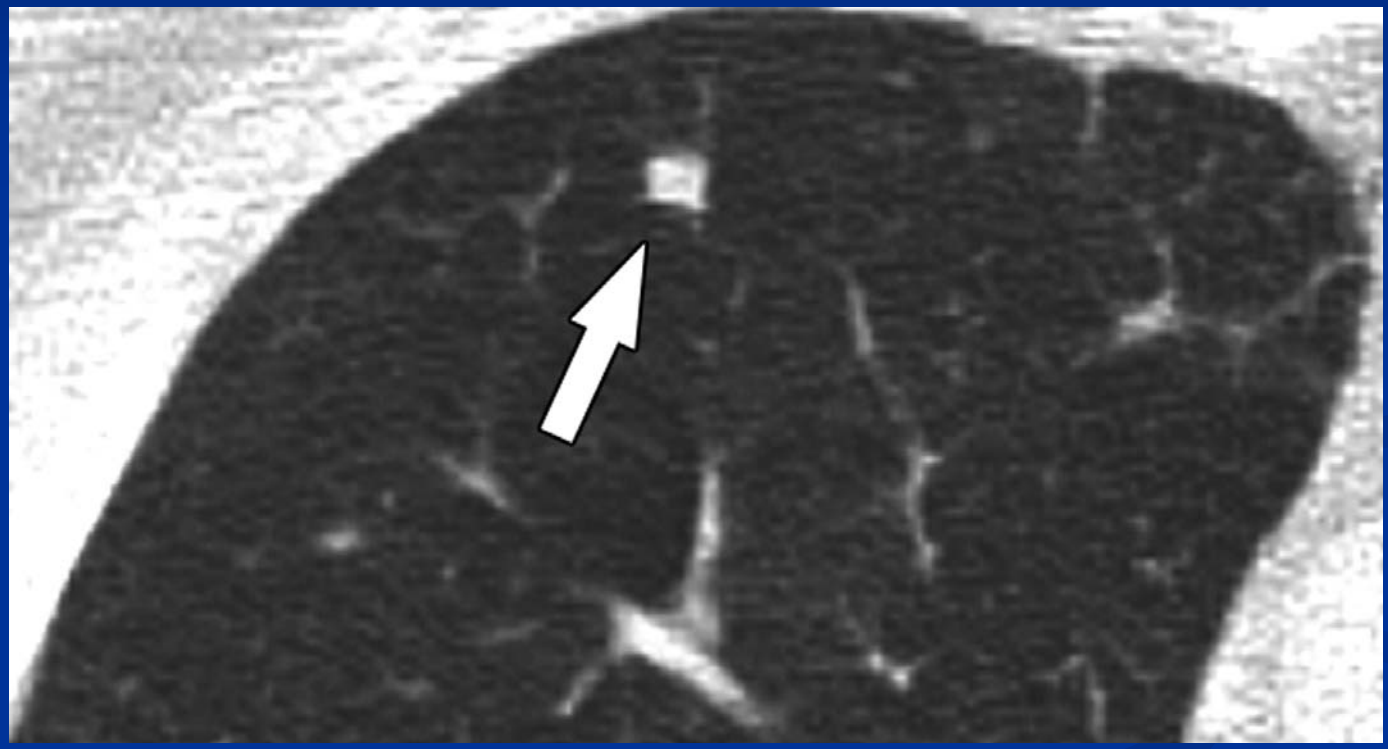
Rectangular PFN (6%)



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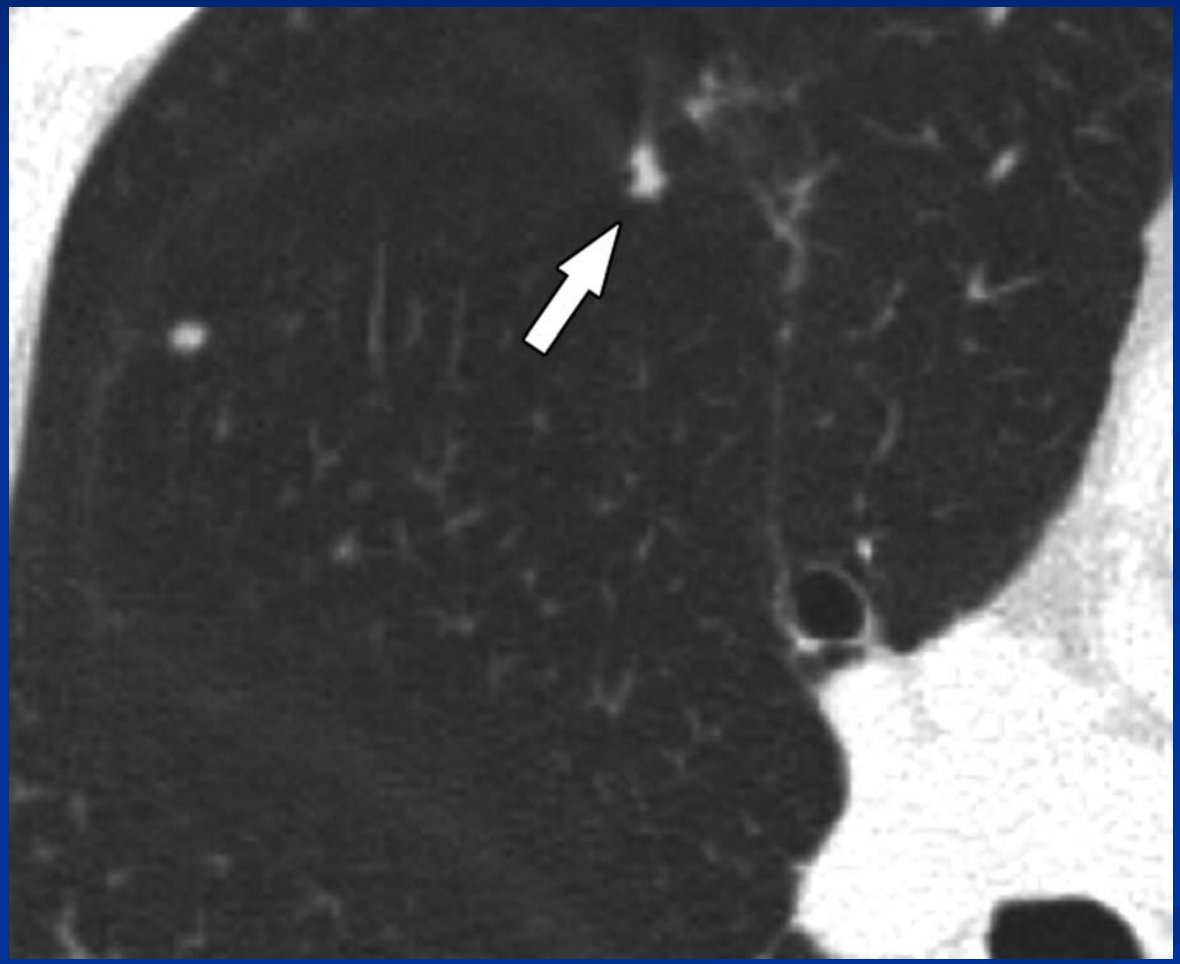
Dumbbell PFN (1%)



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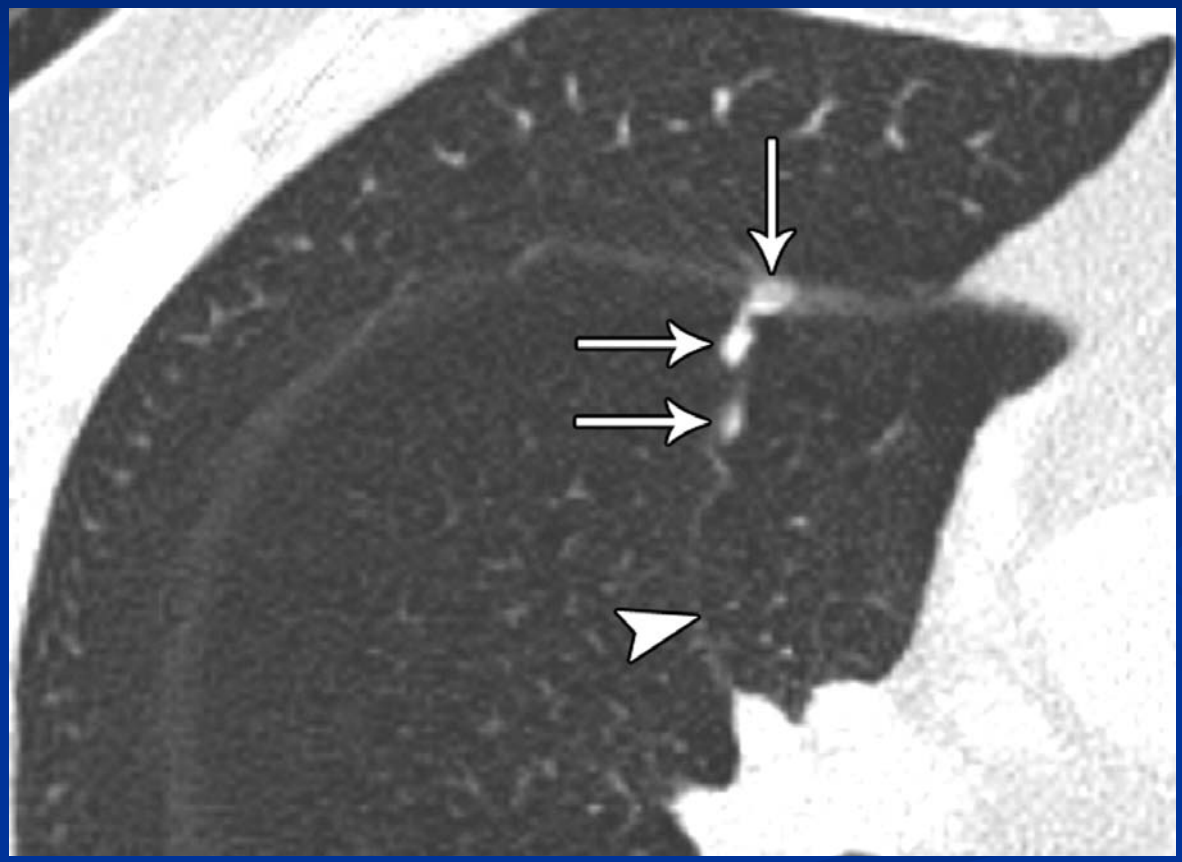
Clustered PFN (within 10mm)



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Location PFN

PFN Location	No. of PFNs (n = 234)
Fissures	
Left major	111 (47)
Right major	74 (32)
Right minor	47 (20)
Left minor accessory	2 (1)
Level	
Above carina	23 (10)
At level of carina	15 (6)
Below carina	196 (84)

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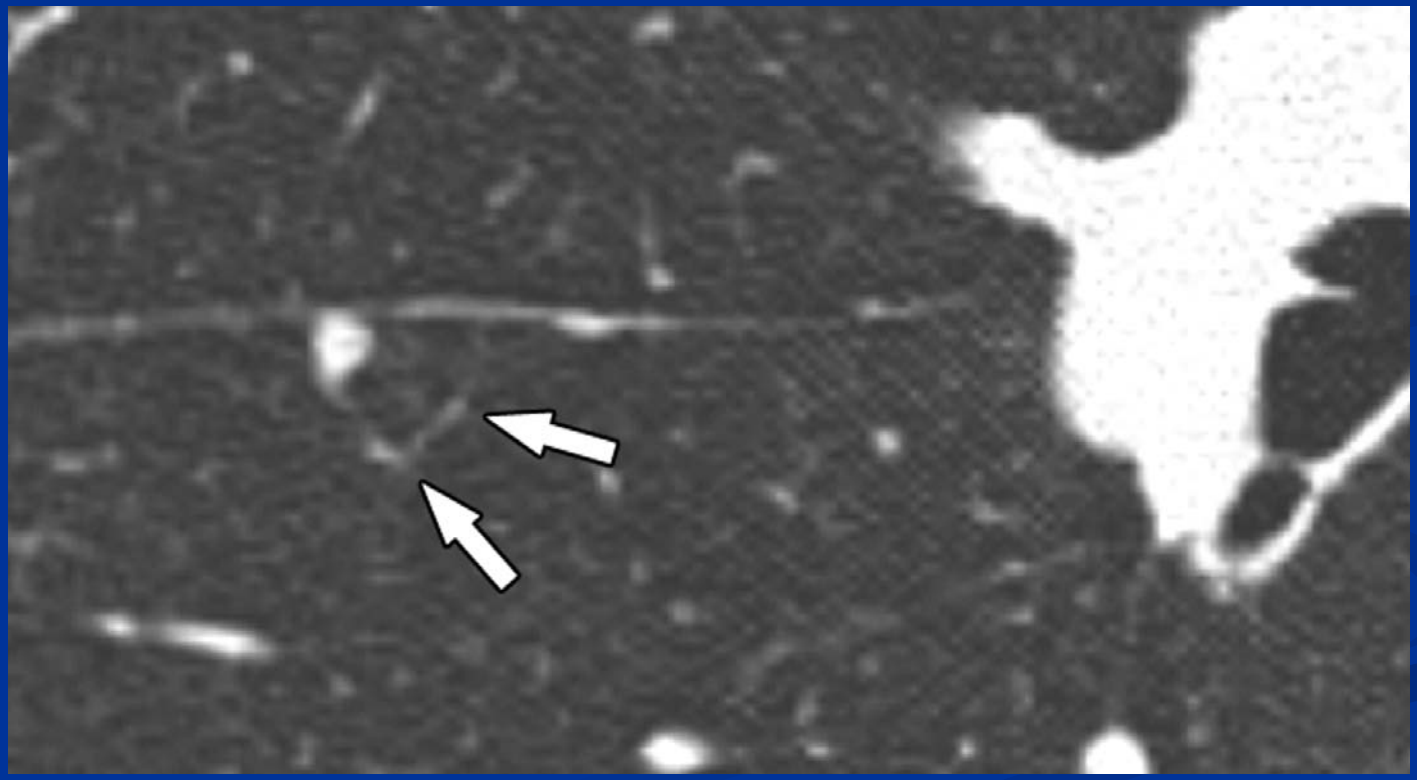
Septal Attachment (73%)

- Within 5 mm of fissure



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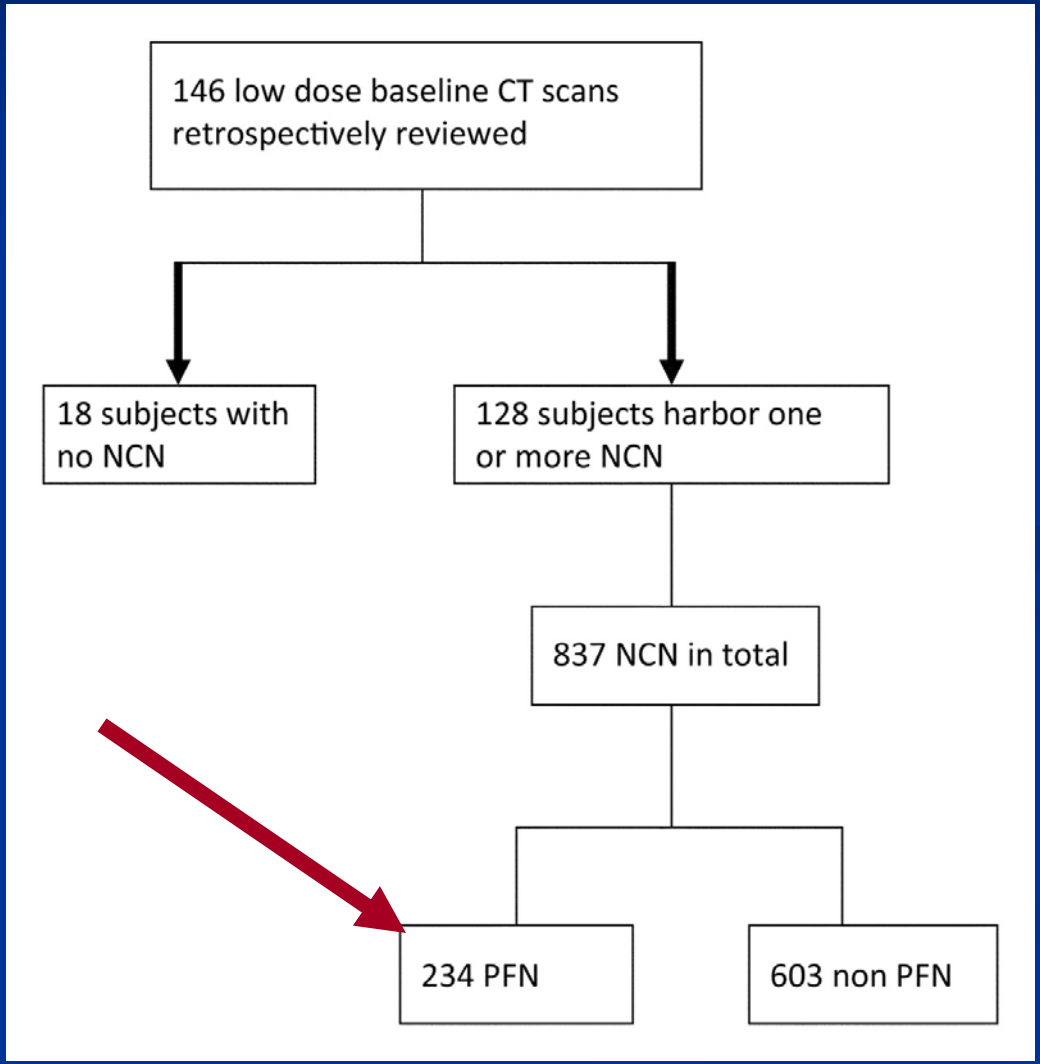
234 PFN in 128 Pts (h/o 30+ pack years of smoking)



PFN:

3.2 mm, mean

13 mm, largest

6 decreased by 1.4mm

7 increased by 1.1 mm.

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7 ½ Year Followup

10 Lung cancers

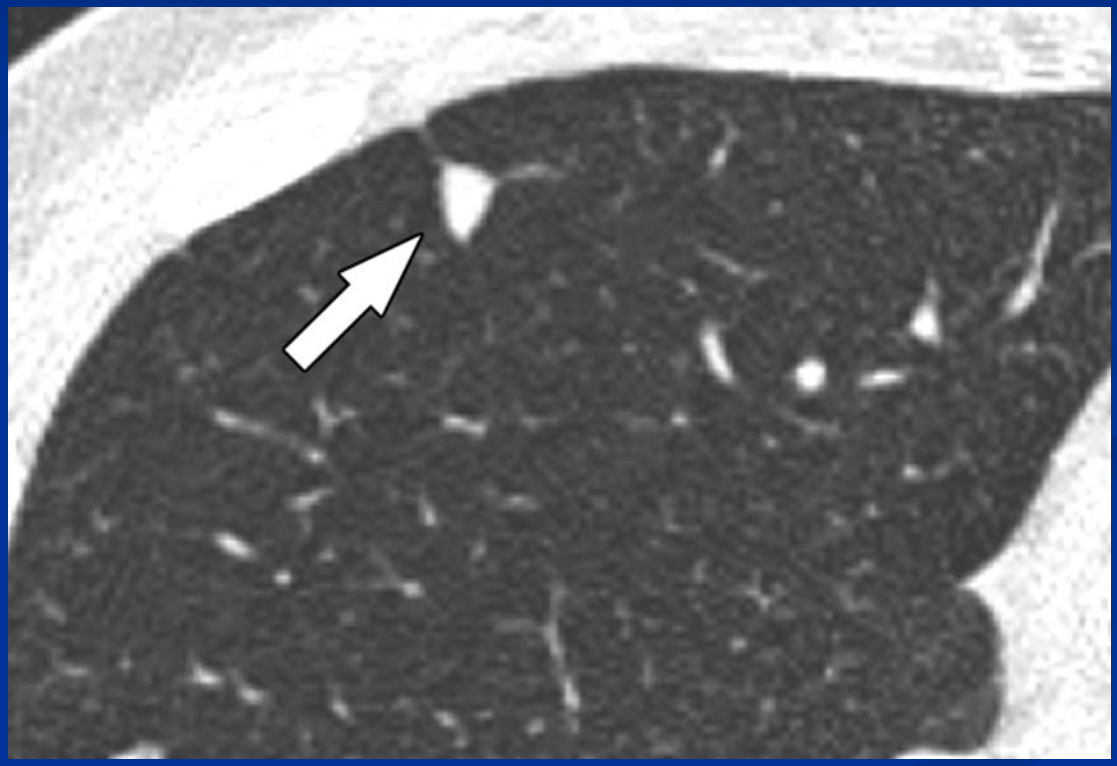
- **NONE from PFN**

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 intrapulmonay Lymph node



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

Advances in Knowledge

- Perifissural nodules (PFNs) are well-circumscribed, smoothly marginated nodules in contact with or closely related to a fissure (within 5 mm, or 10mm 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

- Xu, et al, January 2009, Radiology

- "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 mm3), 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

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

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***
- ***Swensen et al, Radiology 226:756, 2003***

From the lecture by W.Richard Webb

Persistent Ground Glass Opacity (GGO)

- • 75% BAC or mixed invasive adenoca
- • 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

Kim. Radiology 2007; 245:267
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