Management of ILA : Radiologist's Perspectives

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영상의학과 진공용

Content

- **Background and definition of ILA**
- **Prevalence and prognosis of ILA**
- **Radiologic-pathologic correlation of ILA**
- **Management of ILA**

Background

- increasingly identified with the implementation of **lung cancer screening** and increased use of CT for other diagnostic purposes
- **not routinely recorded** on radiology reports, even at academic centres
- prevalence of ILAs in older individuals (>60 years) of **4–9% in smokers** and 2–7% in non-smokers


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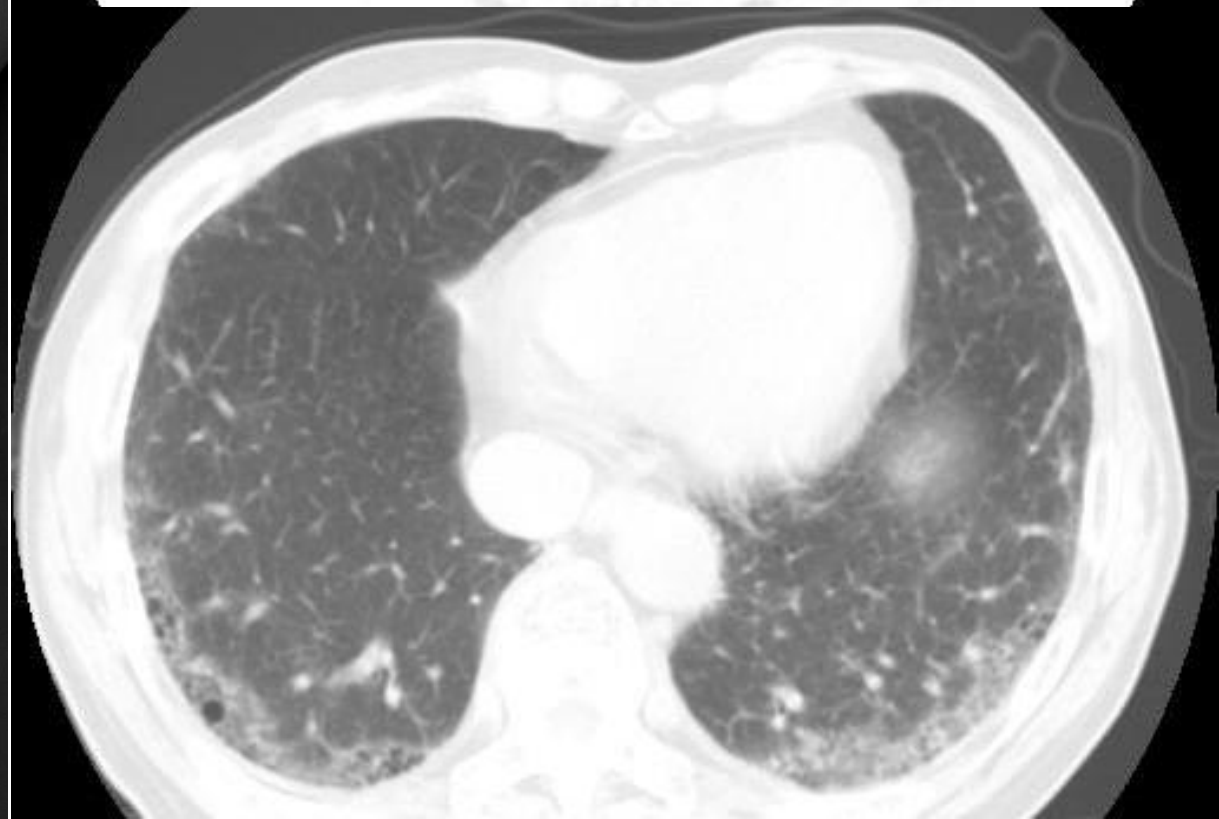


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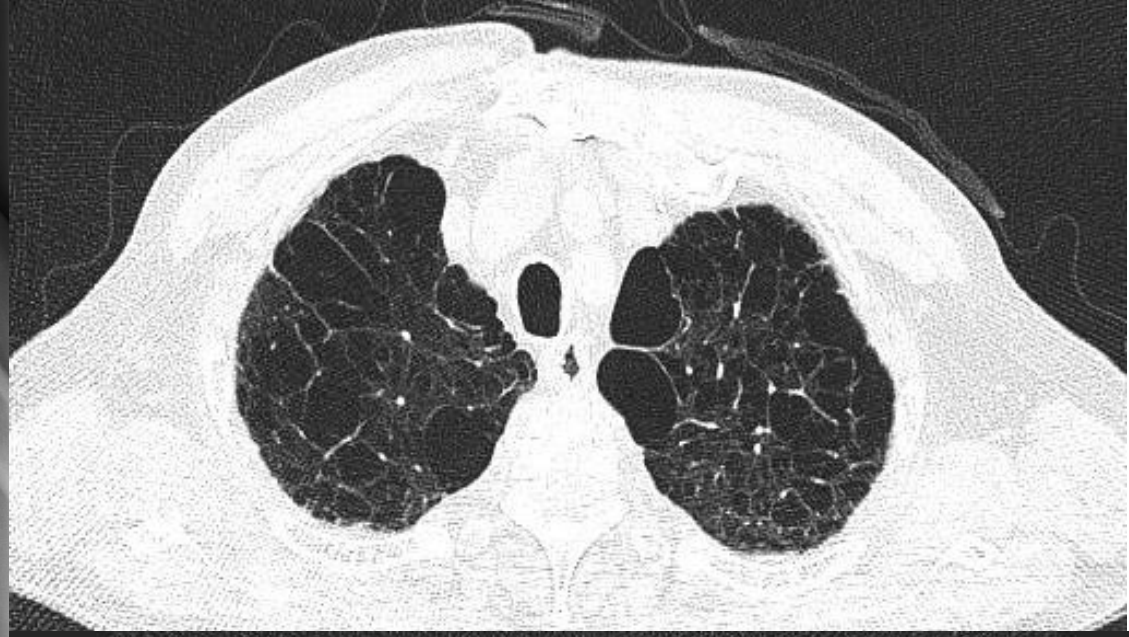
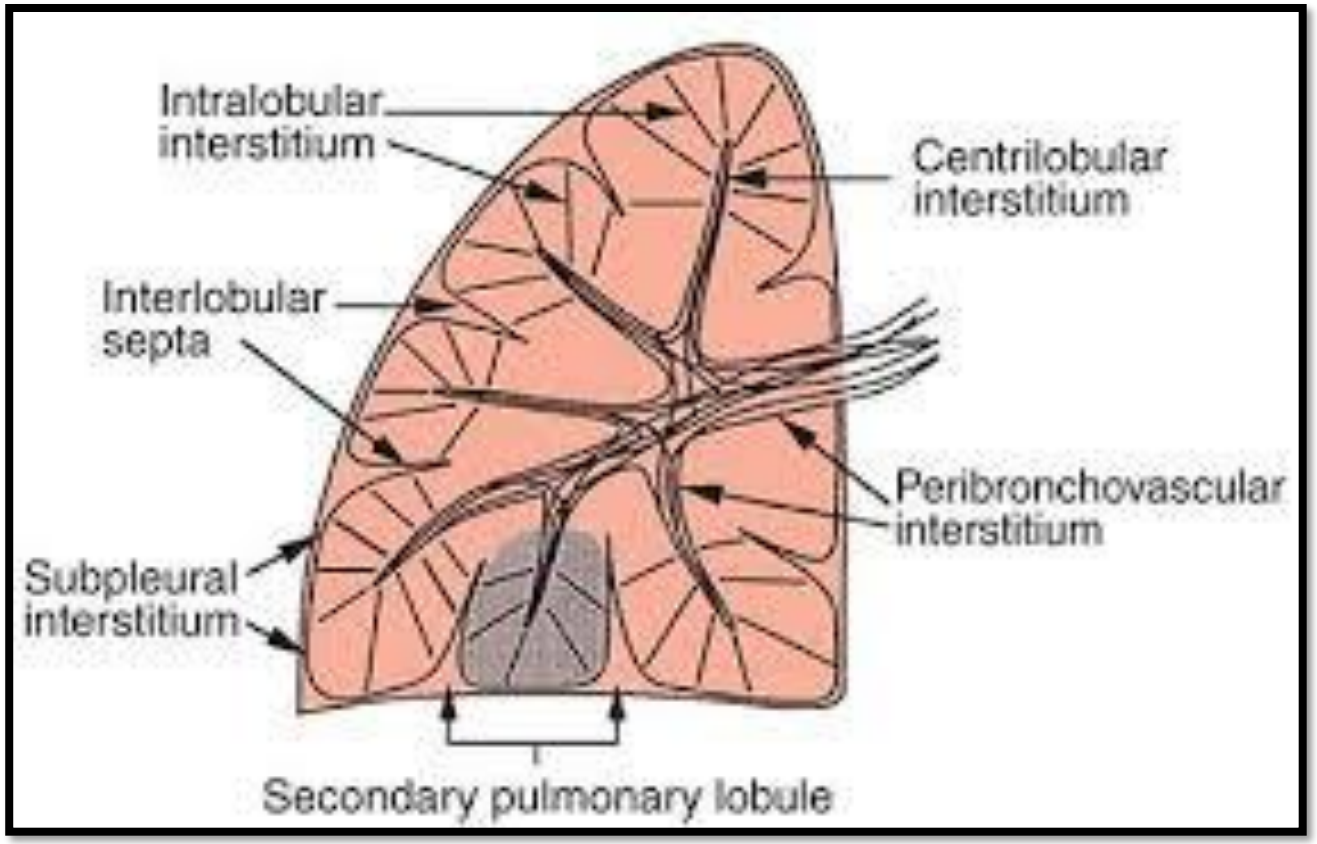


Anatomic location of interstitium



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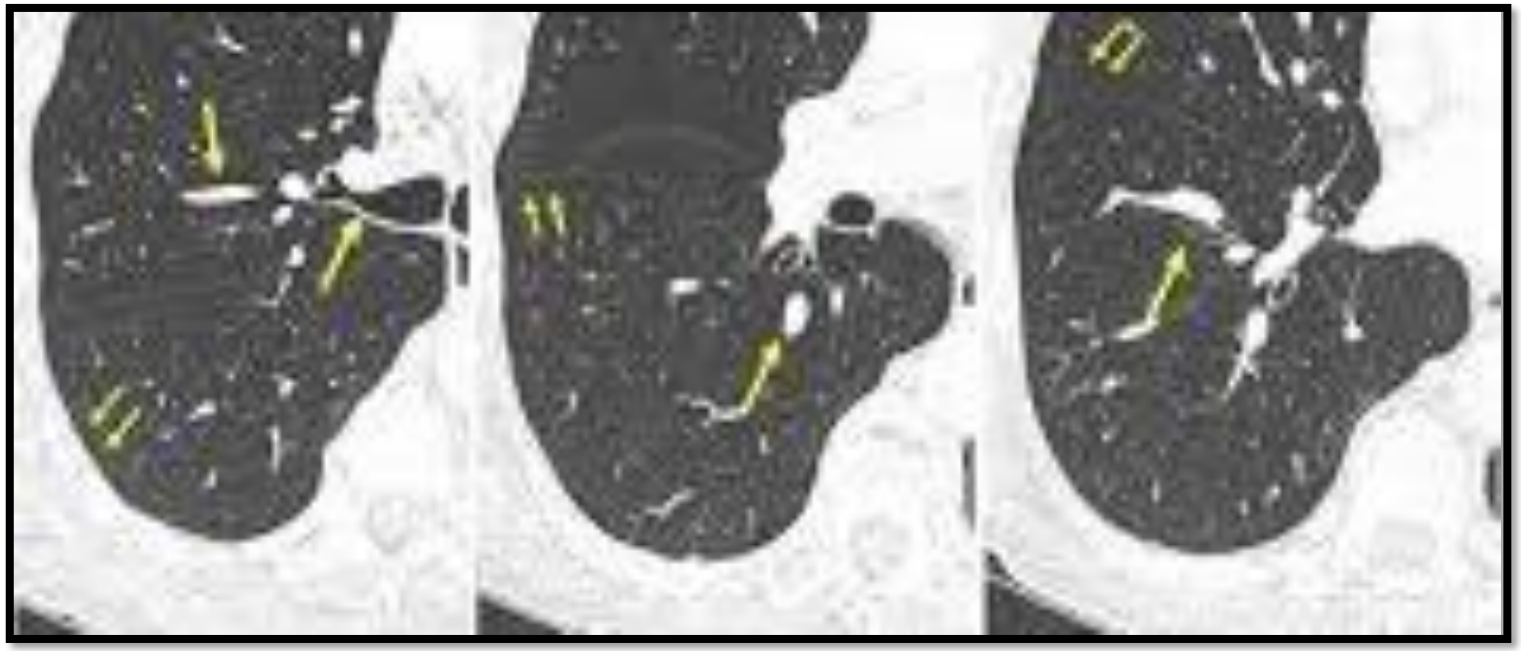
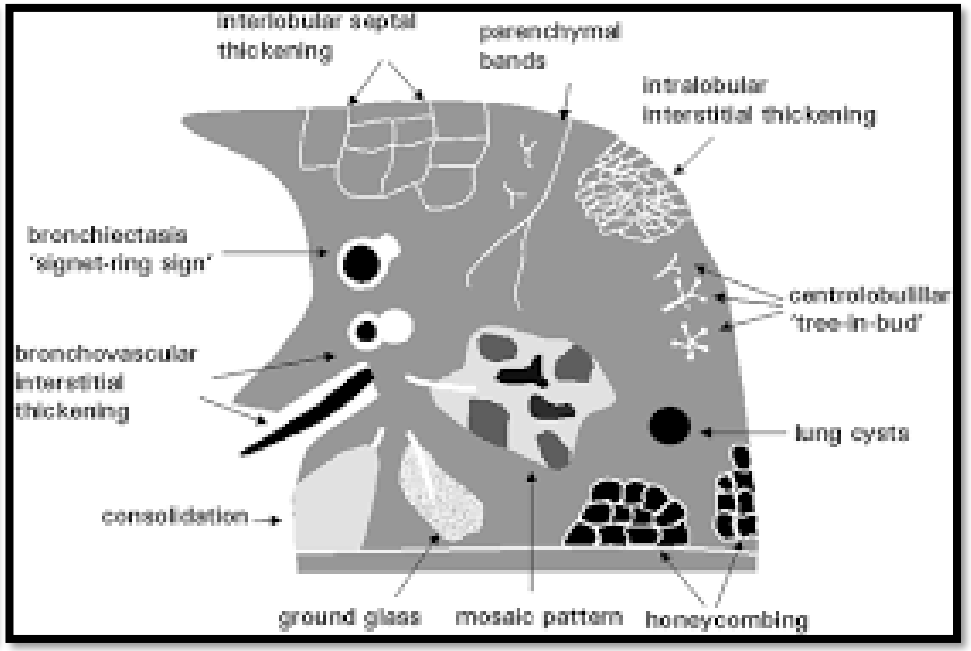
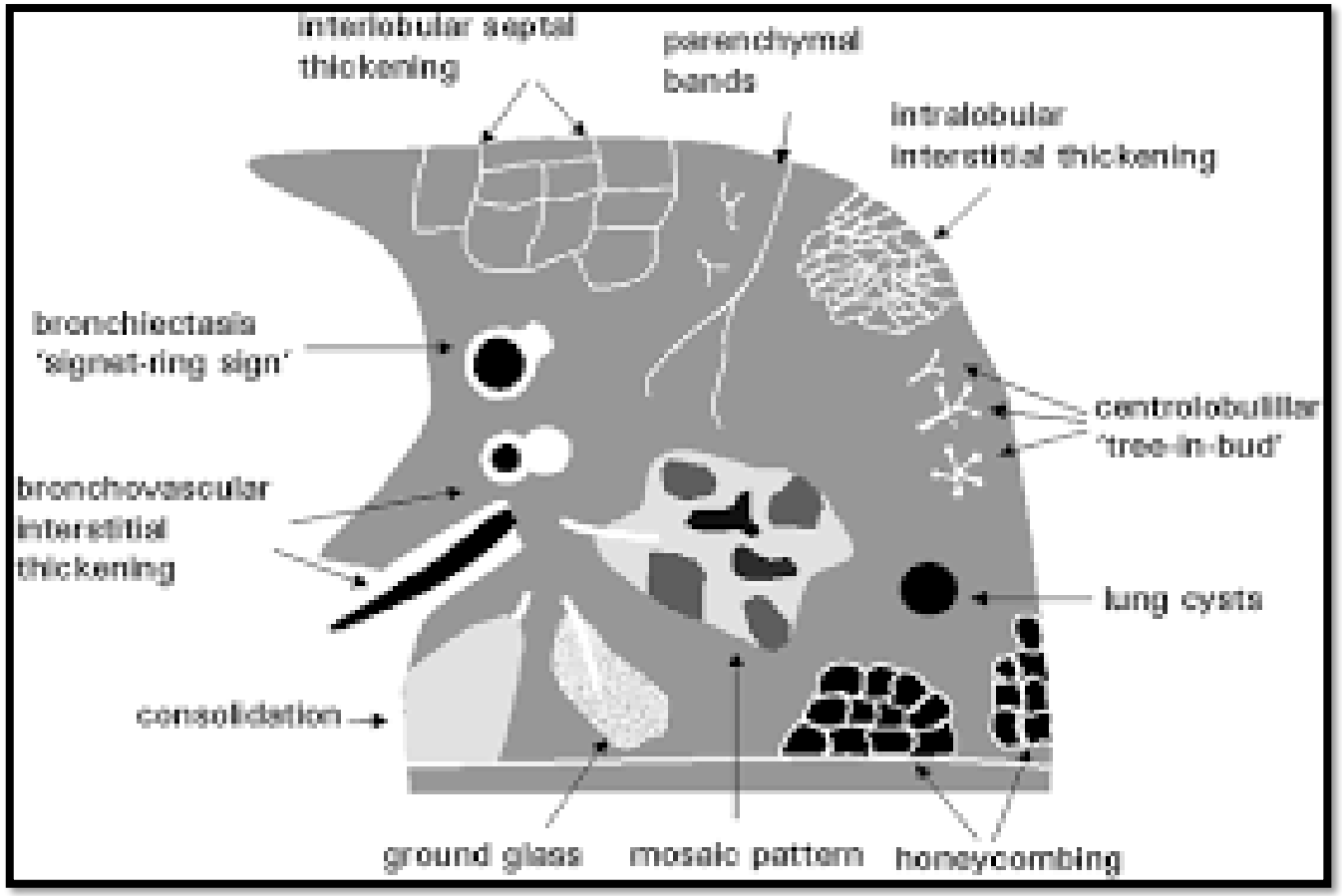
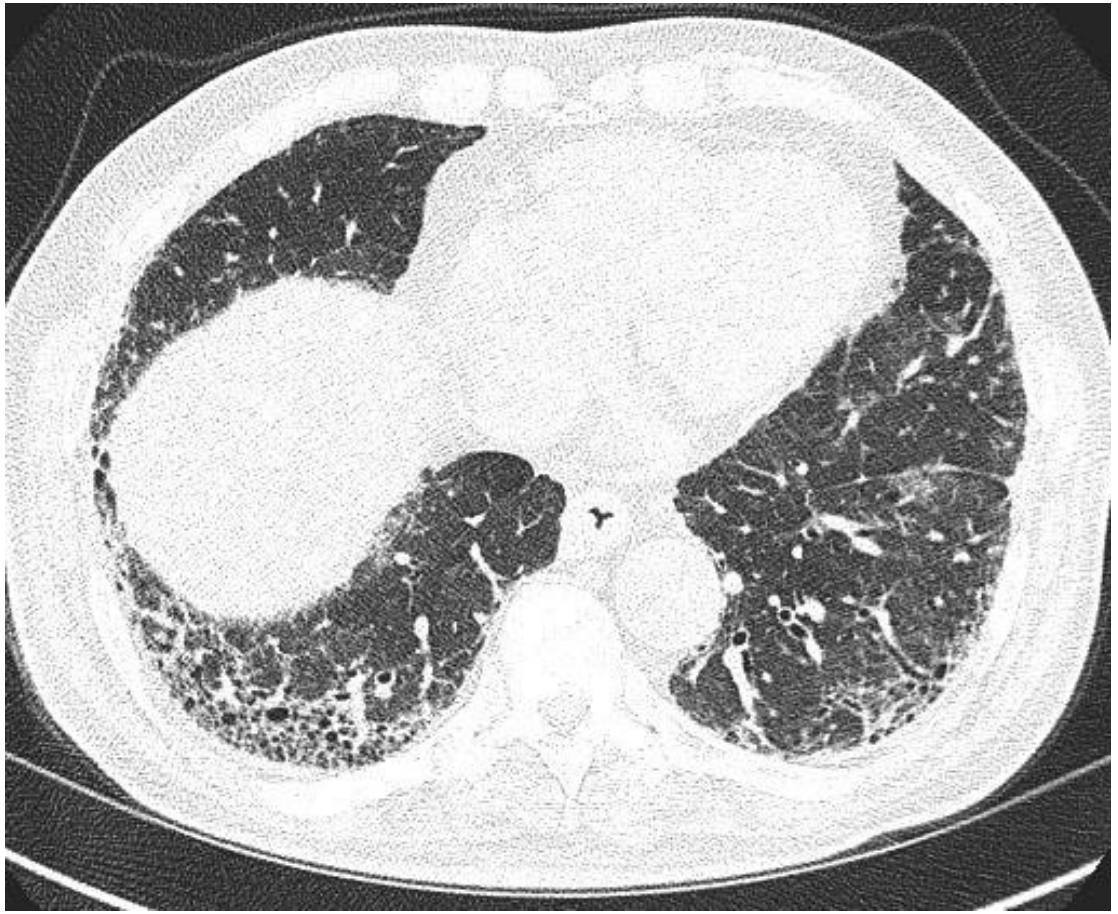
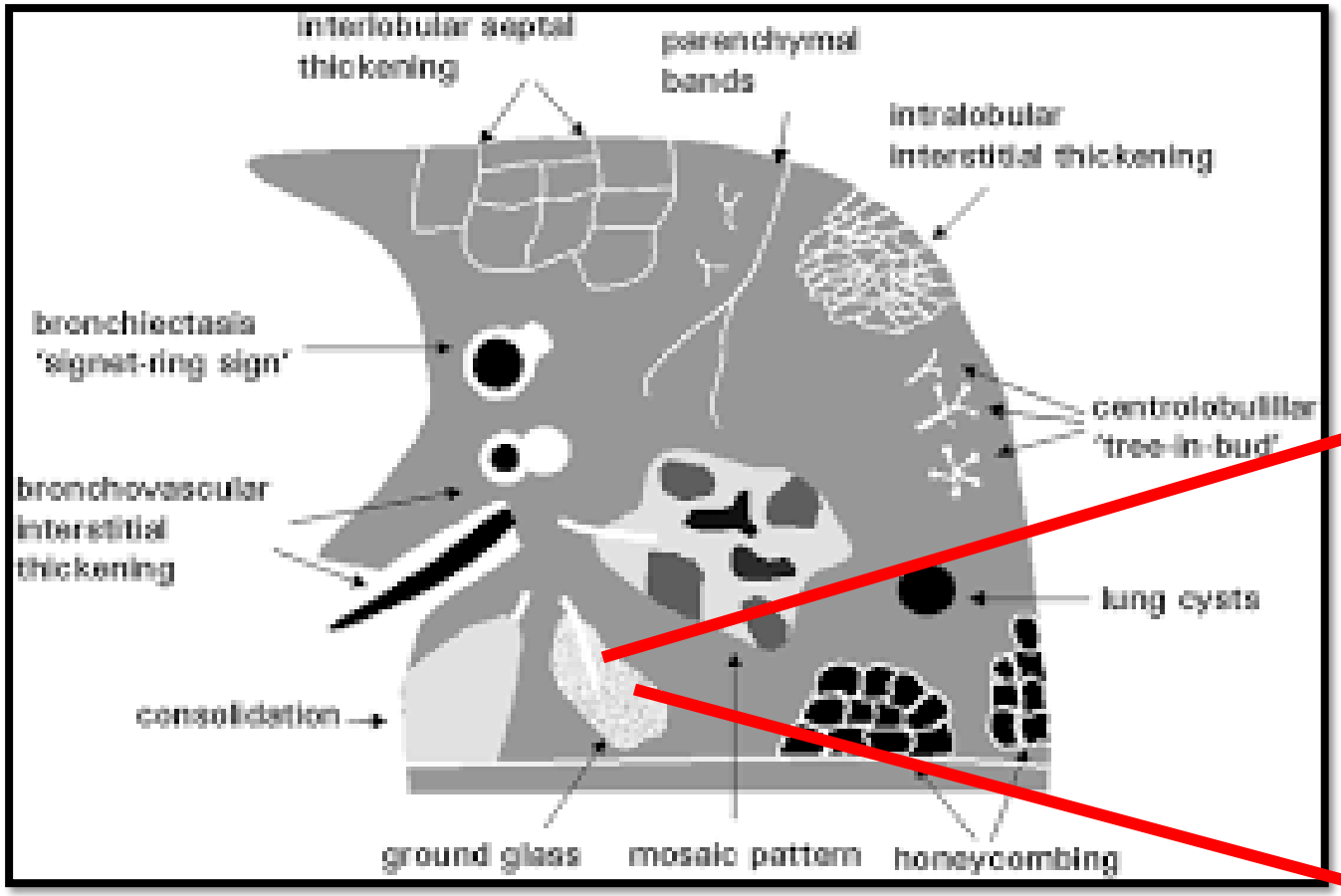





interlobular septal thickening
parenchymal bands
intralobular interstitial thickening
bronchiectasis 'signet-ring sign'
centrilobular 'tree-in-bud'
bronchovascular interstitial thickening
lung cysts
consolidation
ground glass
mosaic pattern
honeycombing

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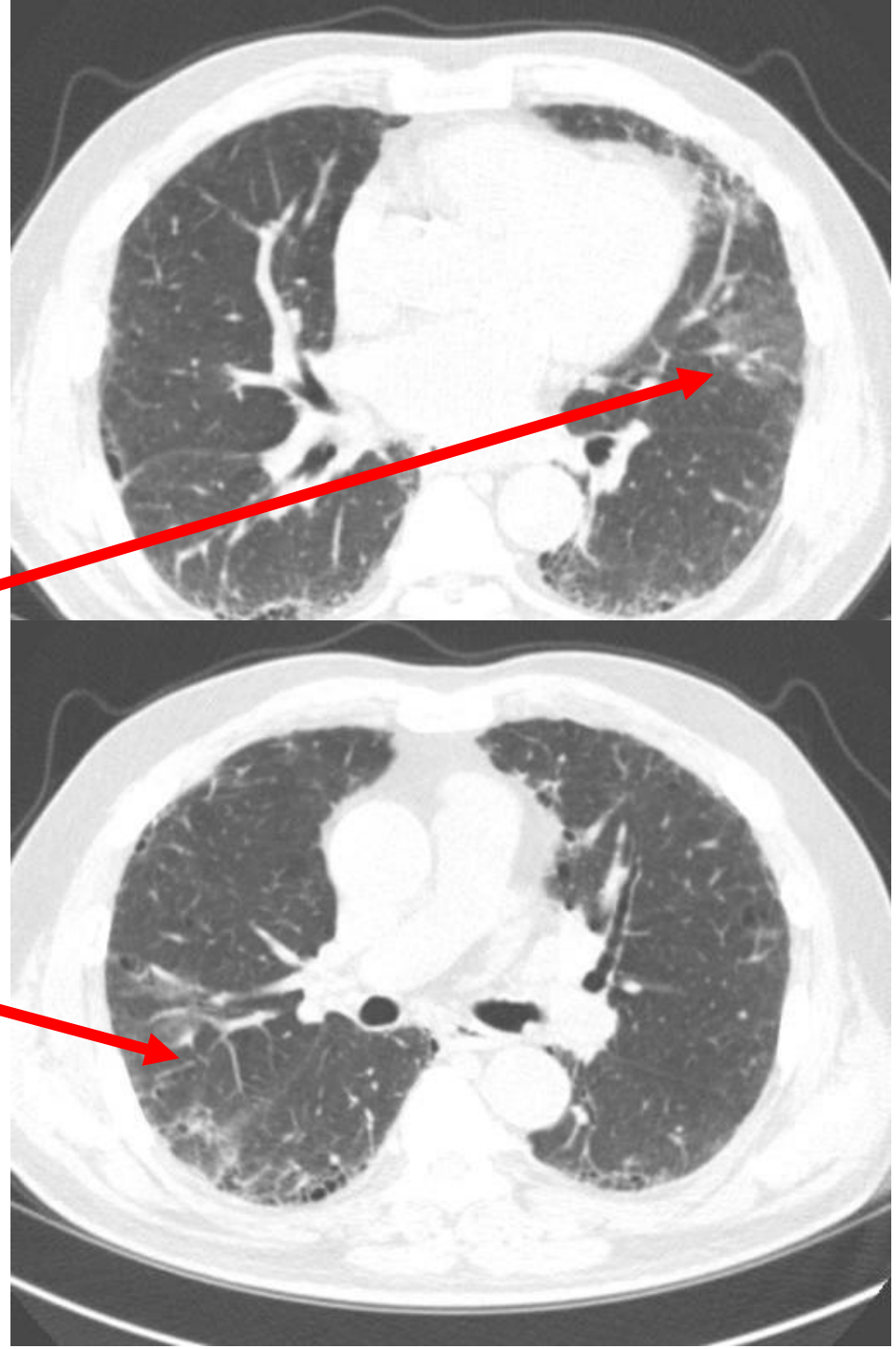
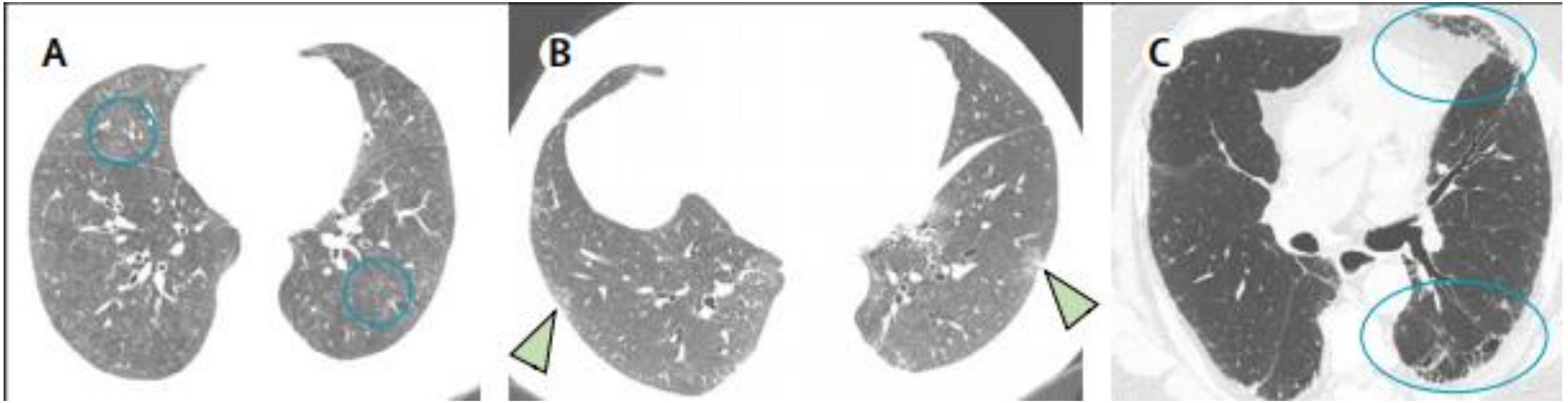


Background

- **a radiologic abnormality** on chest CT thought to be an early or mild form of pulmonary fibrosis

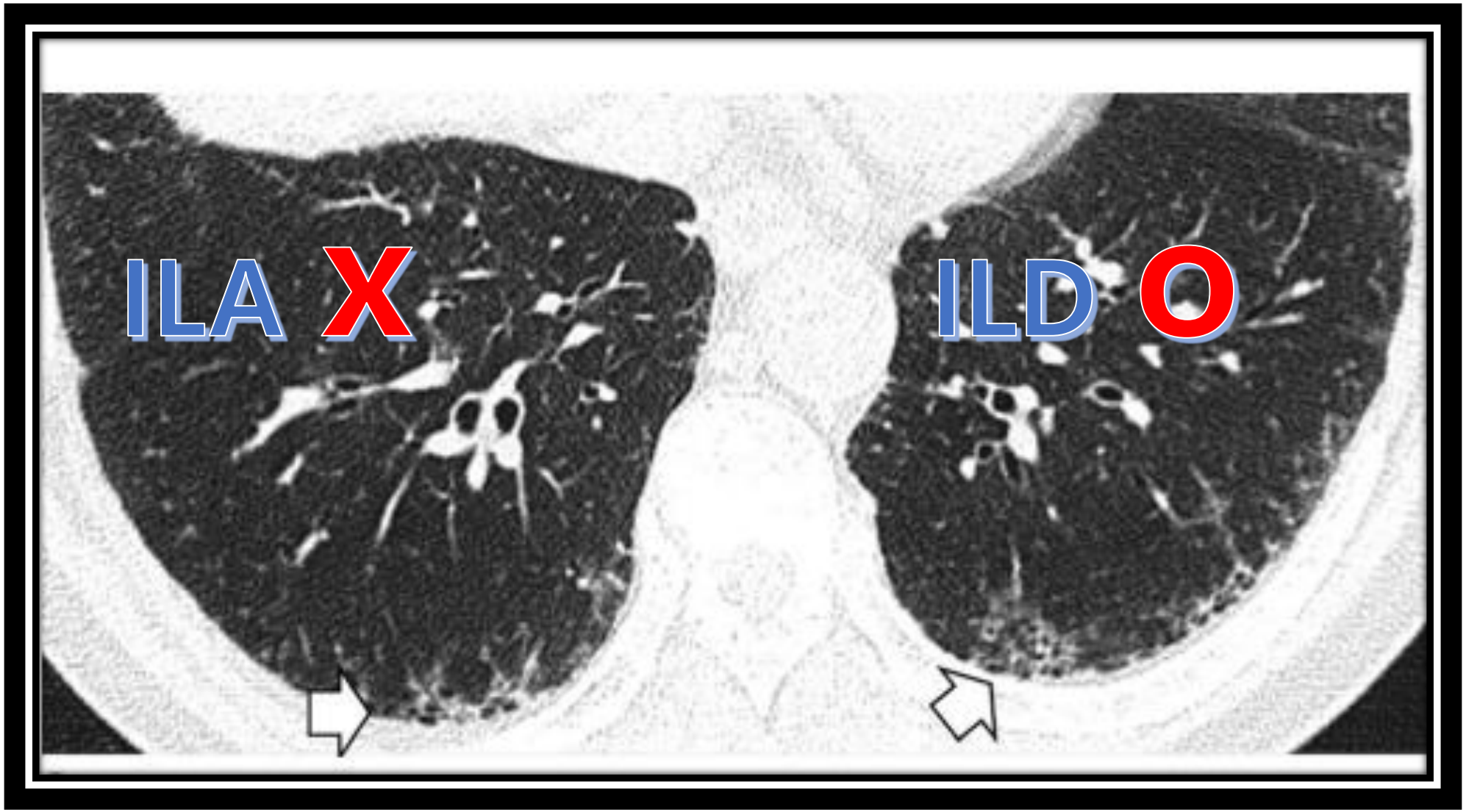


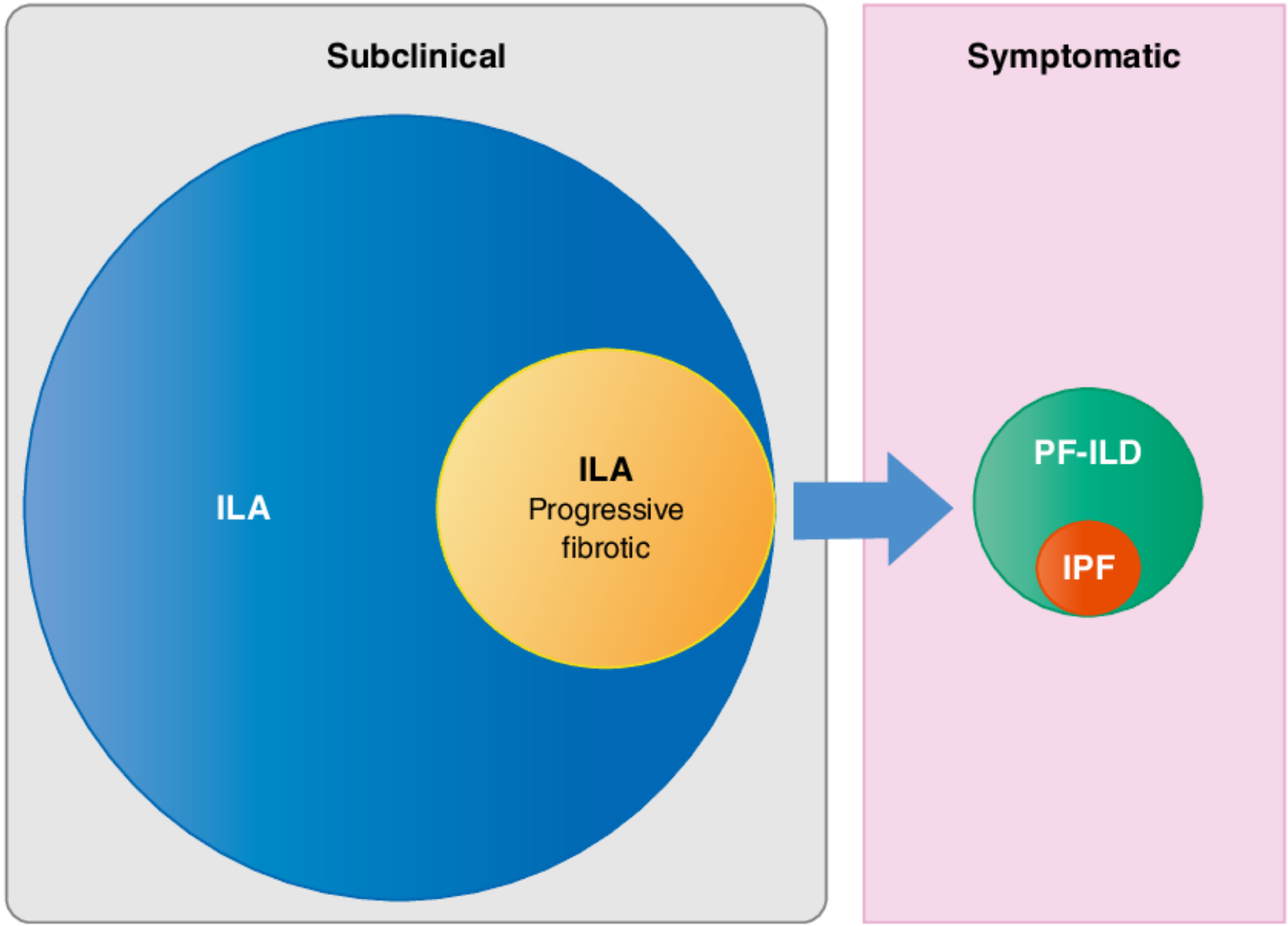
Interstitial lung abnormalities detected incidentally on CT:
a Position Paper from the Fleischner Society, Hiroto Hatabu* et al,

Background

- **Terms** applied : early ILD, subclinical ILD, preclinical ILD
- ILAs are **not synonymous** with subclinical ILD: **Incidental**
- **Abnormalities** identified during **screening for ILD in high-risk groups** (eg, those with rheumatoid arthritis, systemic sclerosis, or familial ILD) are **not considered**

50/M, 20 PY, 10년부터 RA
no respiratory Sx

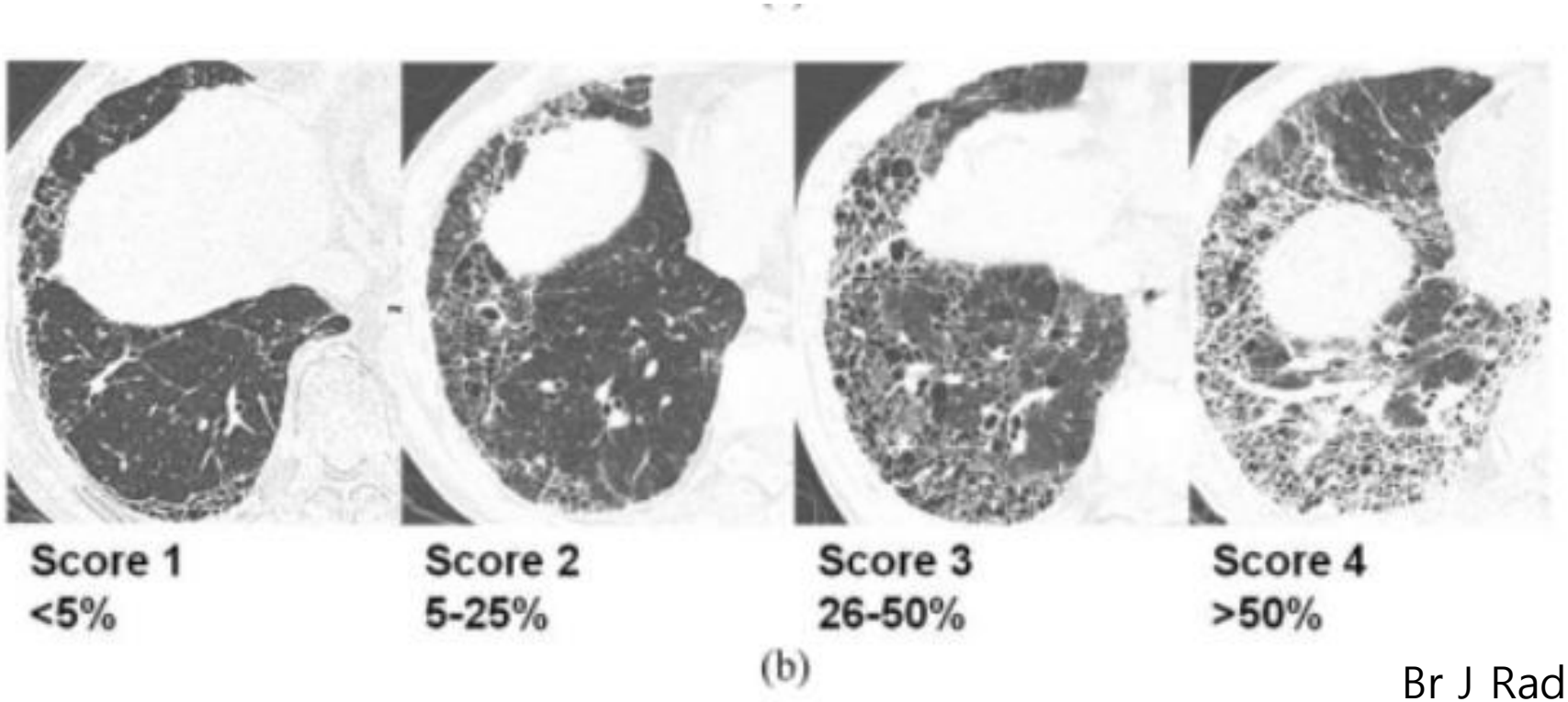




interstitial lung abnormalities (ILAs) represent a subtype of ILAs that progress to symptomatic

Definition of ILA

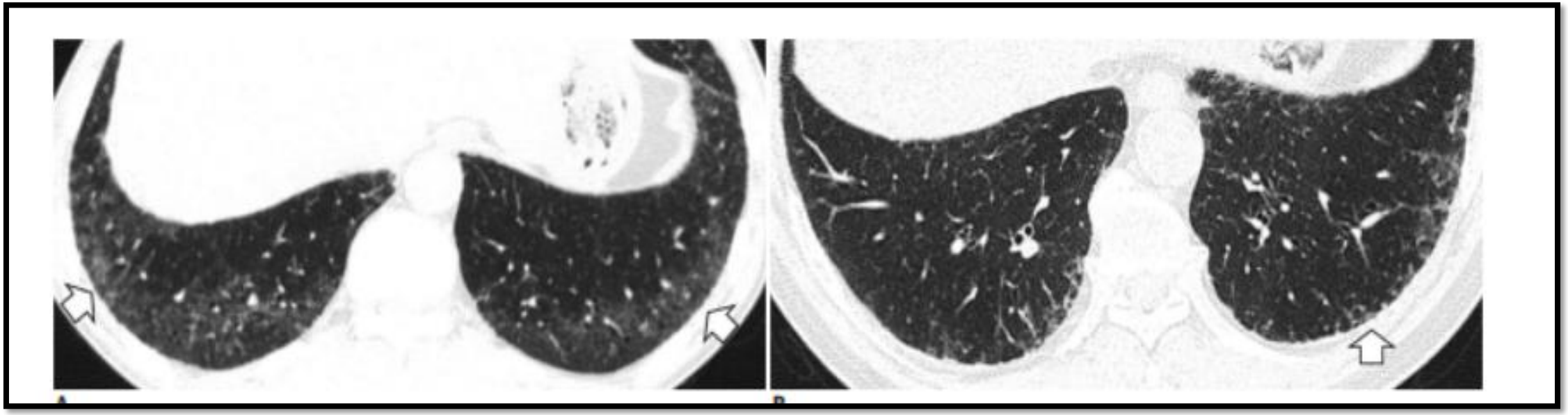
- non-dependent abnormalities affecting more than **5%** of any lung zone



Br J Radiol;88:20150545

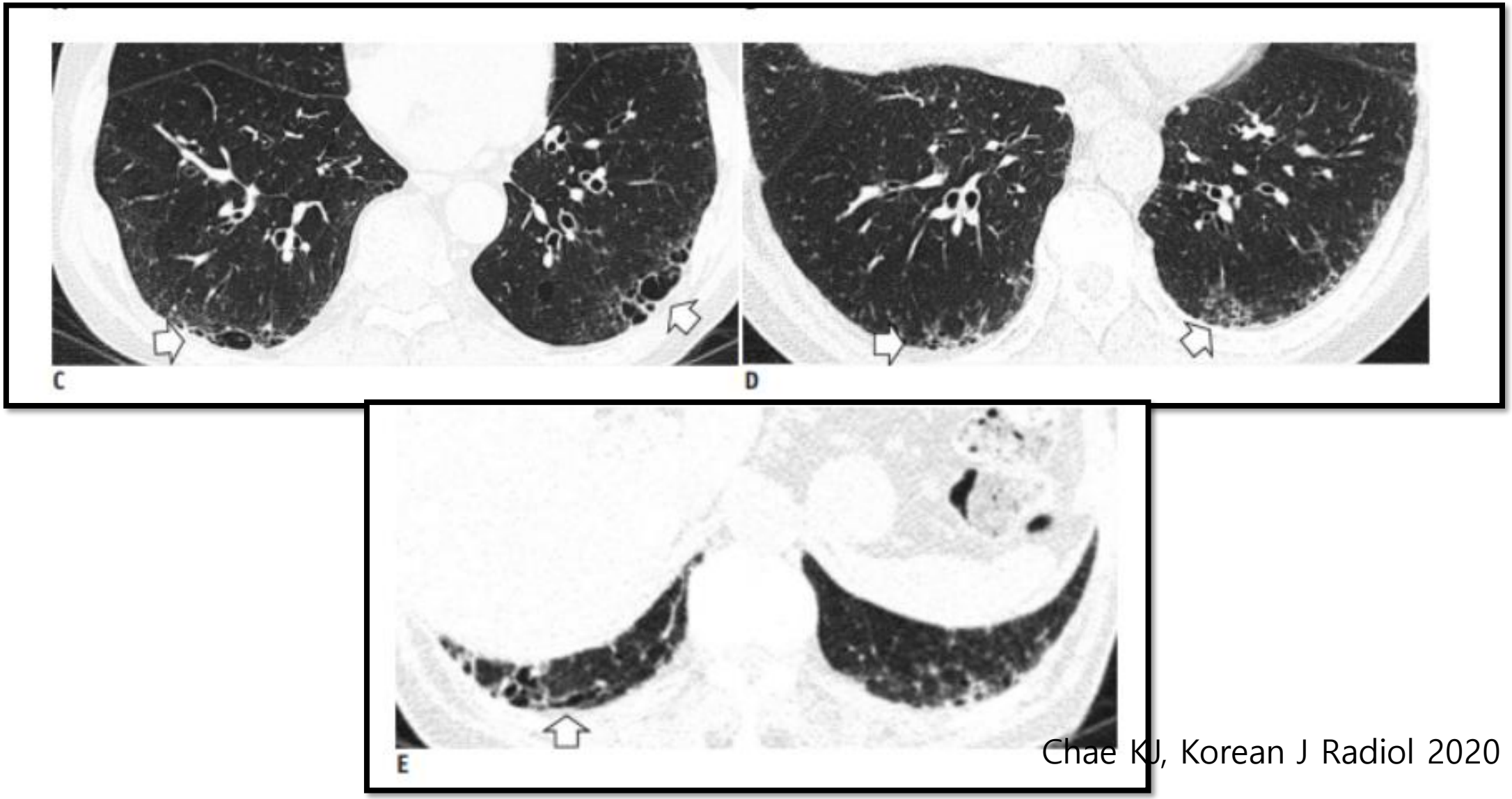
Definition of ILA

- ground-glass / reticular abnormalities



Chae KJ, Korean J Radiol 2020

traction bronchiectasis/honeycombing/ non-emphysematous cysts



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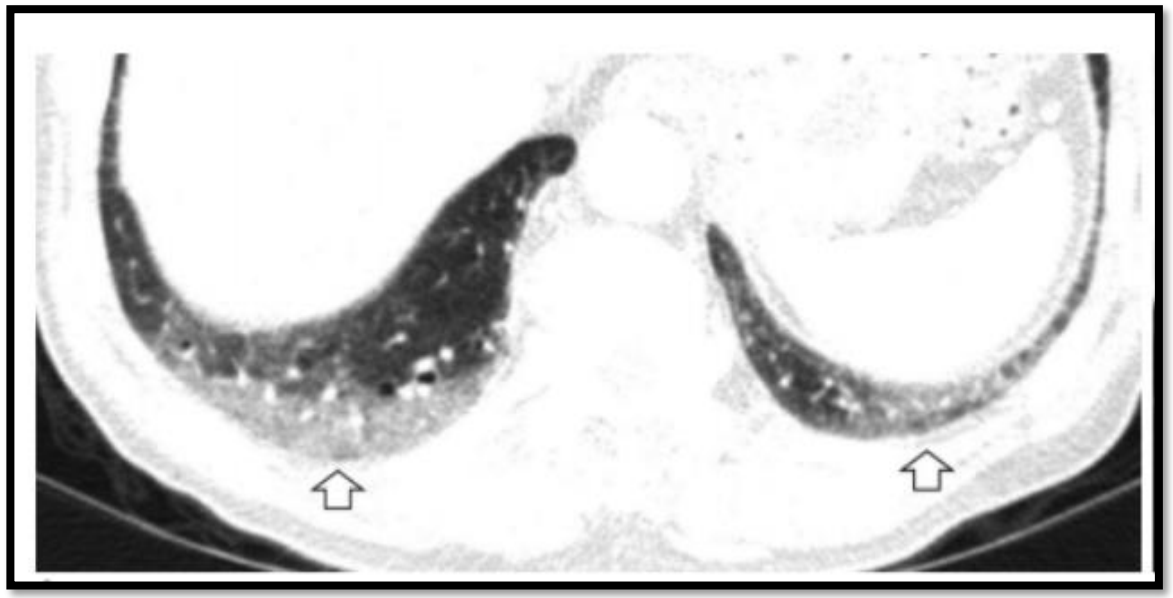
Findings not Suggesting ILAs

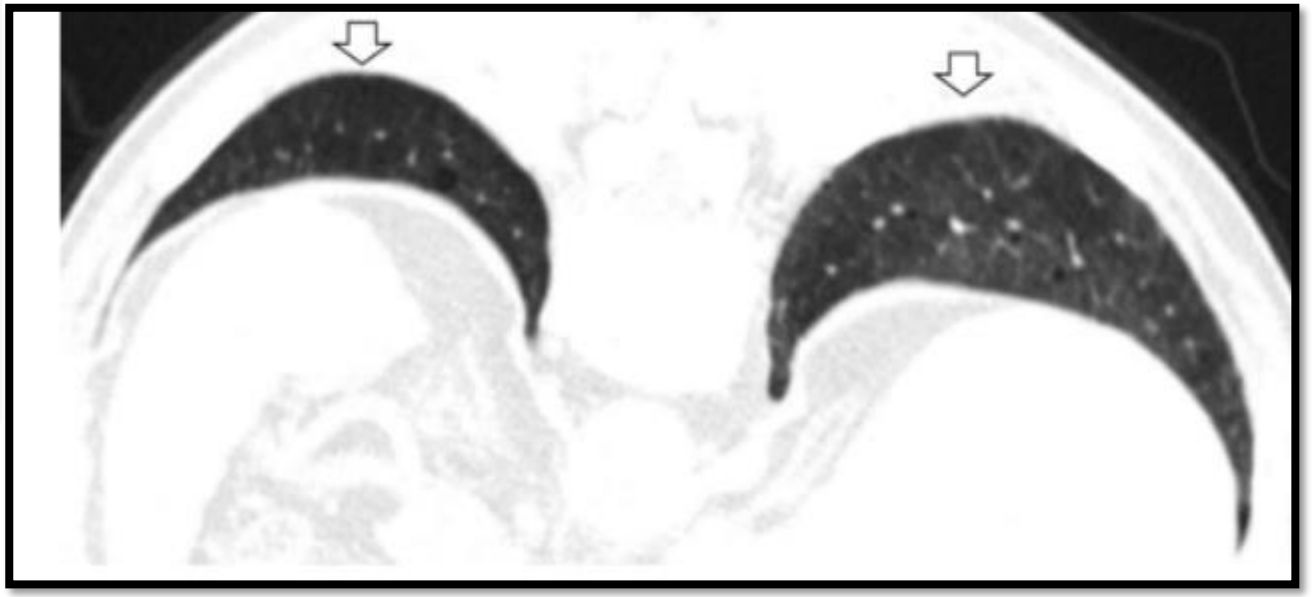
- Dependent opacity of the lung



Panel 4: Recommendations for the evaluation and reporting of interstitial lung abnormalities

CT protocol

- Thin sections (<1·5 mm) are essential
- Prone and expiratory scans might be necessary to confirm and characterise interstitial lung abnormalities (ILAs)



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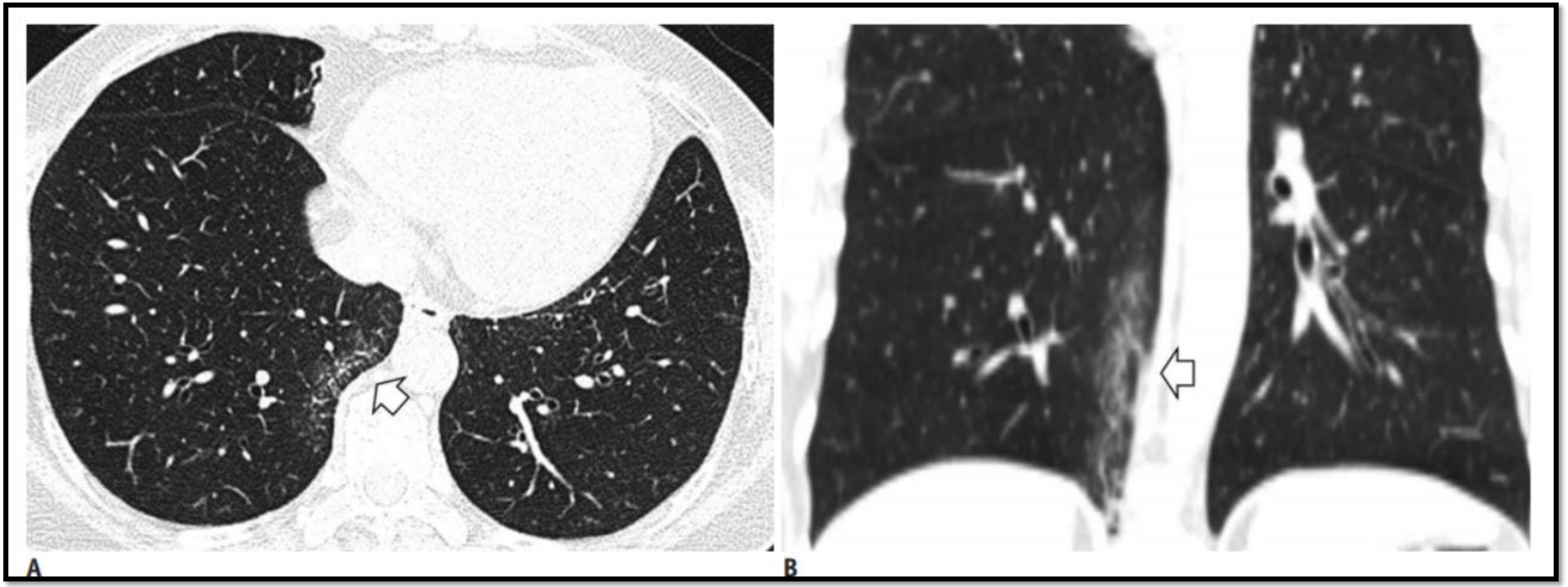
Fibrosis adjacent to spinal osteophytes



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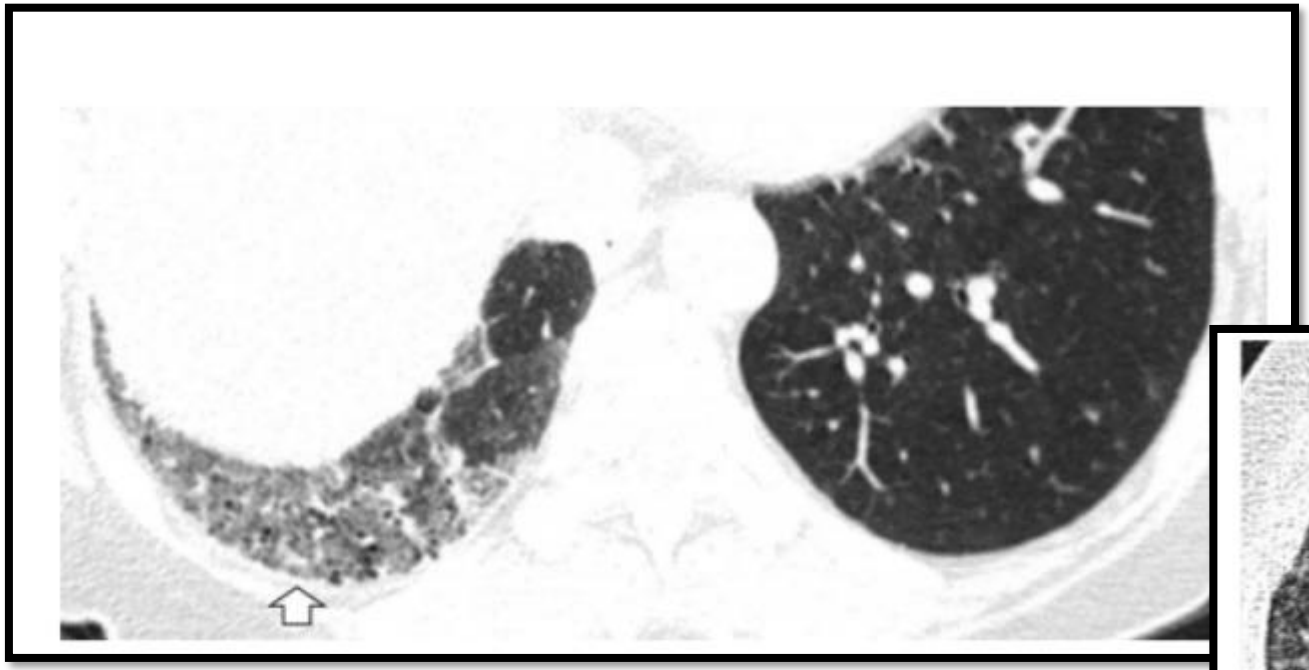
Unilateral abnormality of the lung/ ILA associated with connective tissue disease



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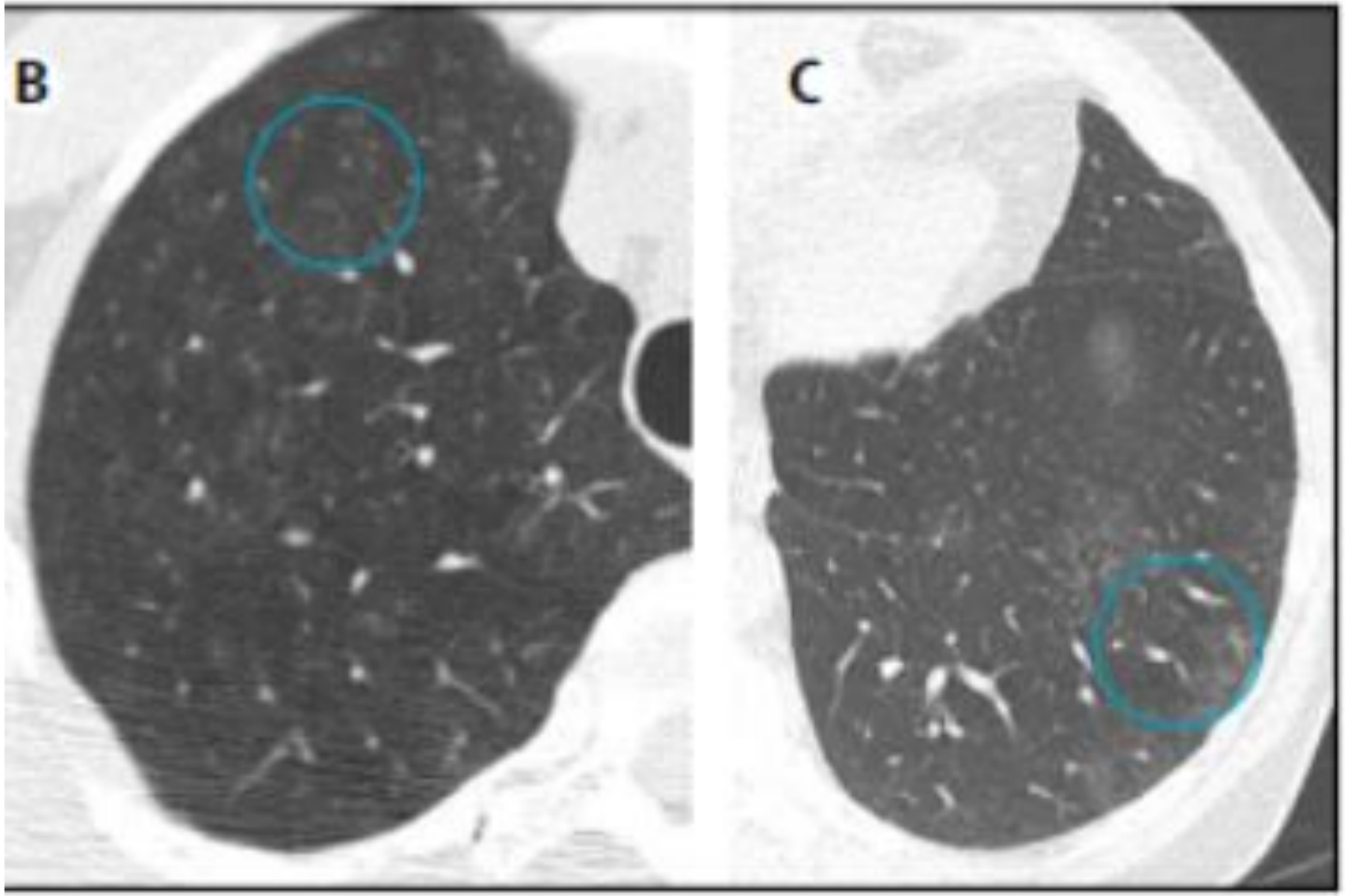

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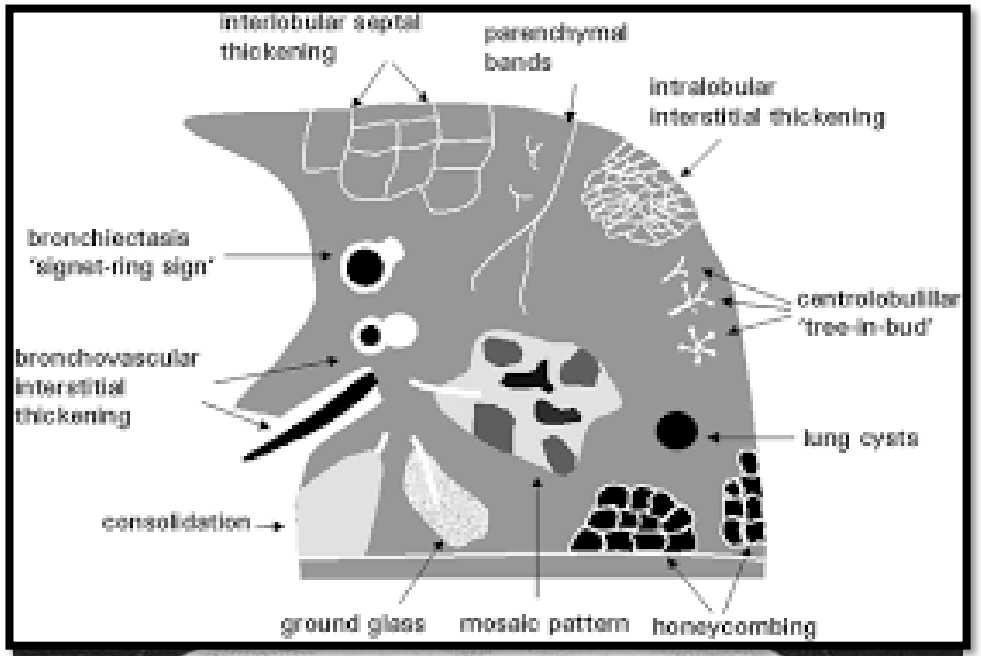
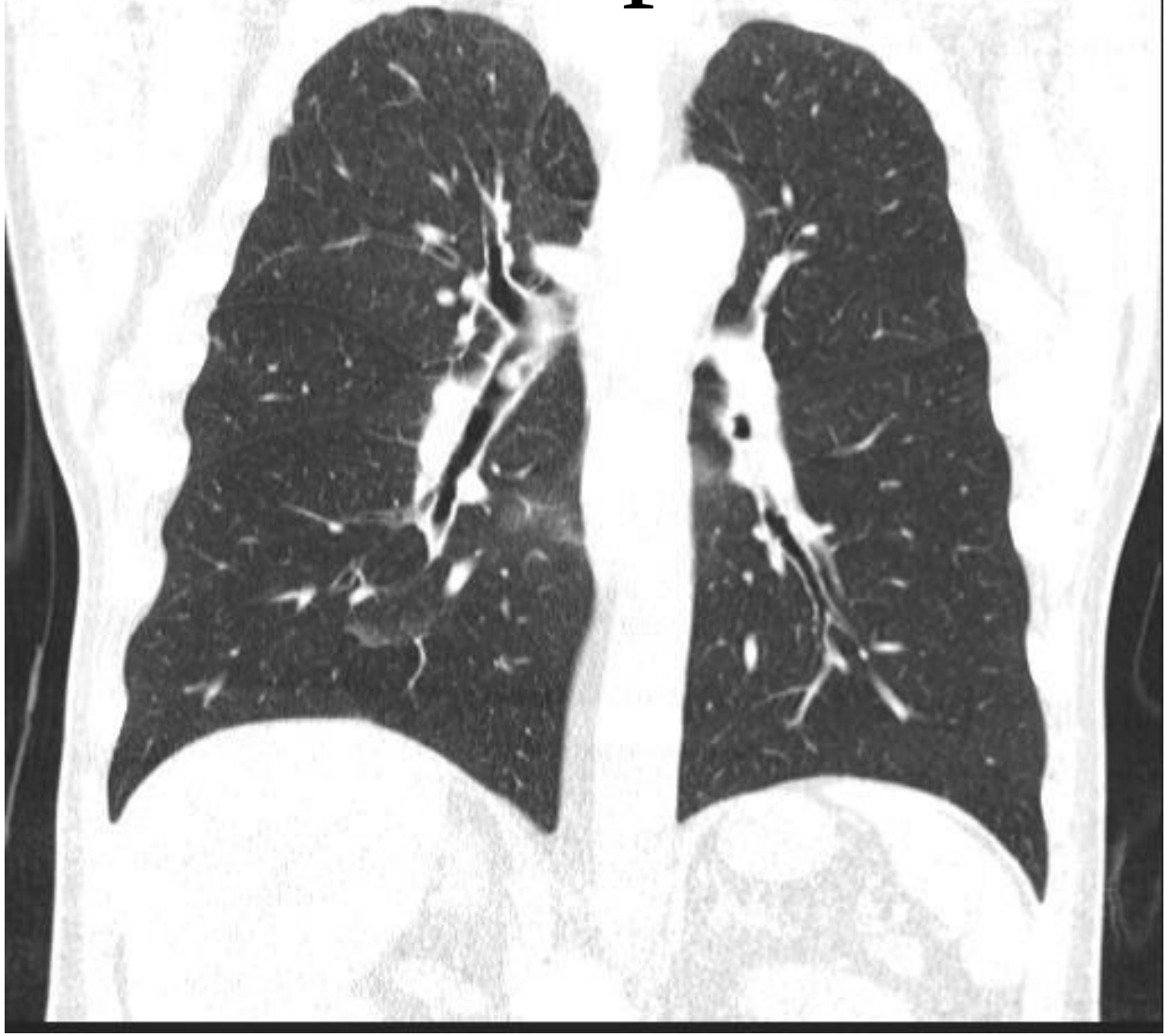
Subtypes of ILAs

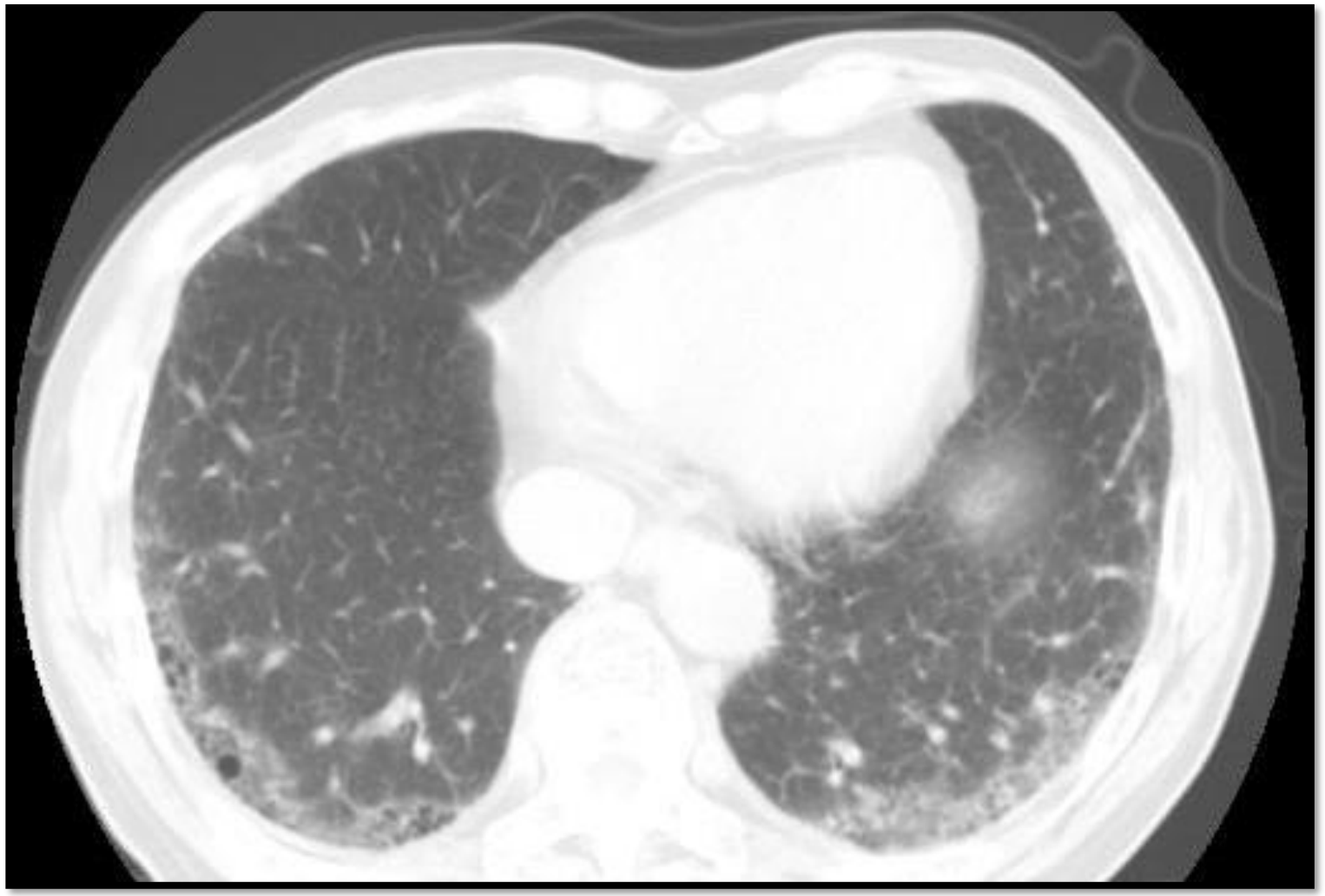
- non-subpleural
- subpleural non-fibrotic ILAs
- subpleural fibrotic ILAs



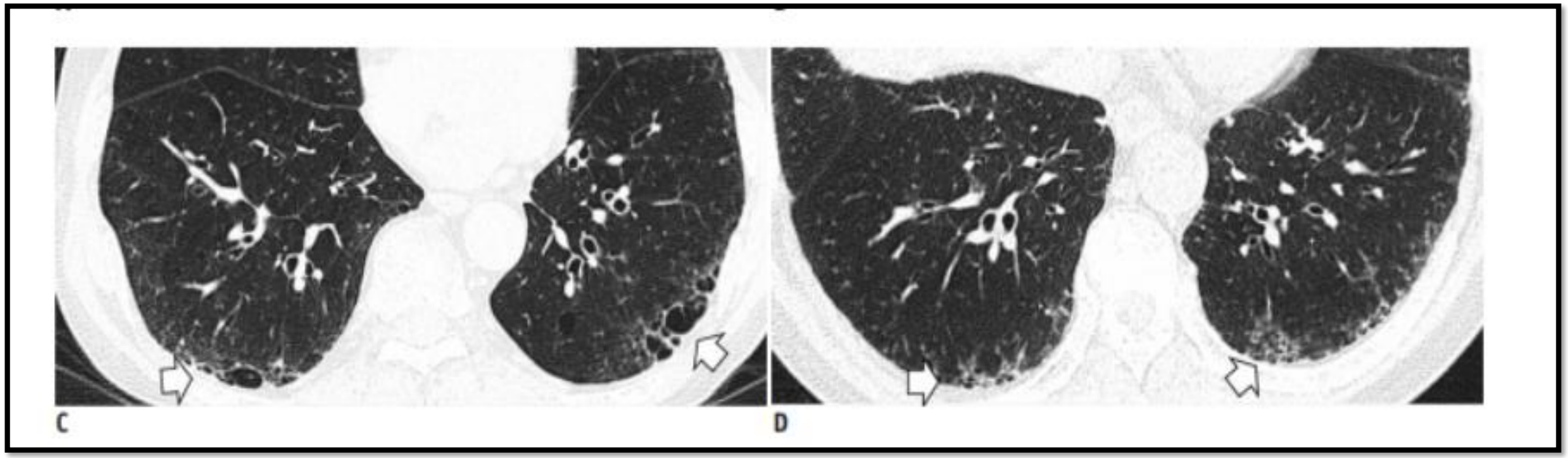
non-subpleural



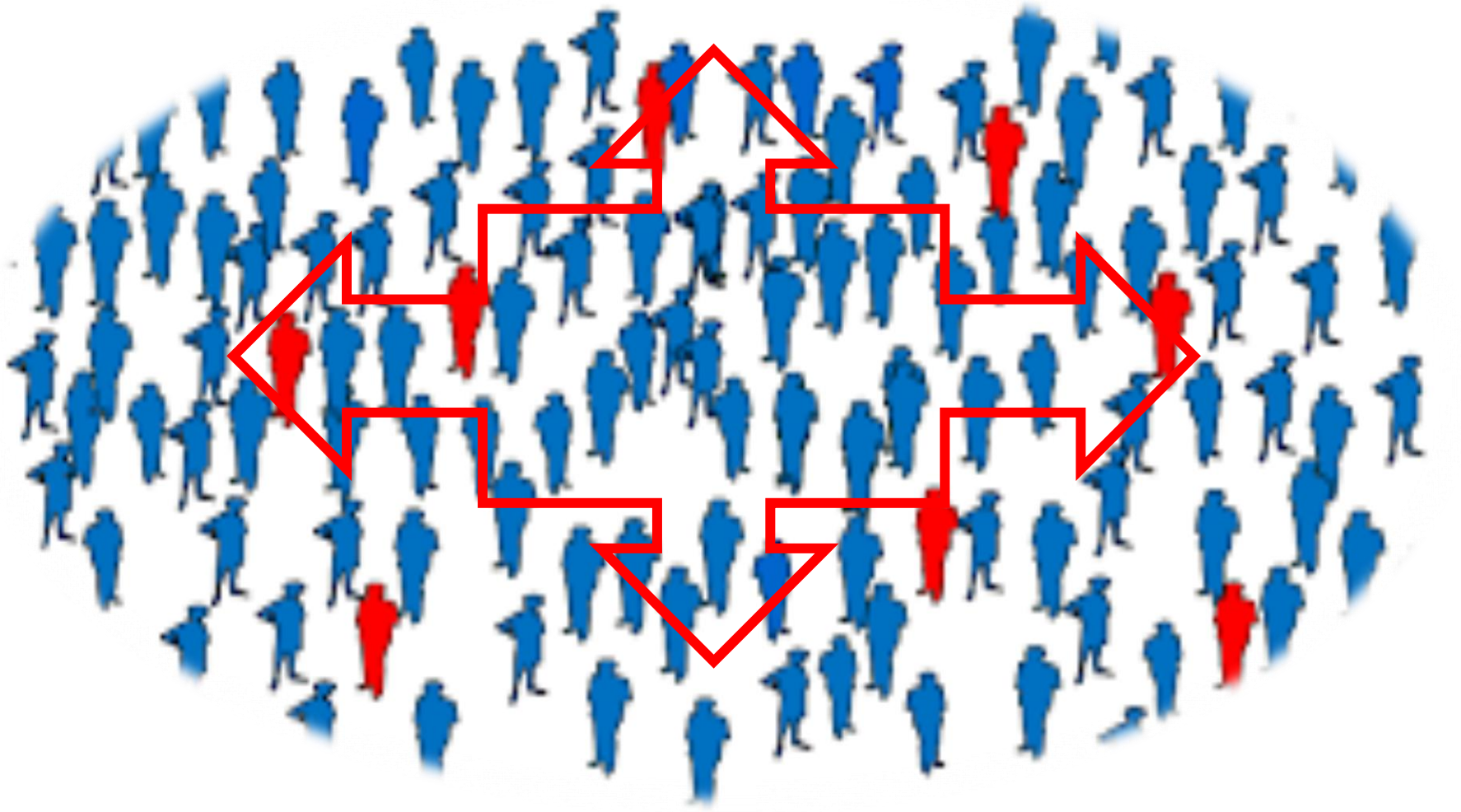
subpleural non-fibrotic ILAs



subpleural fibrotic ILAs



Prevalence and prognosis of ILA



Prevalence and progression

- The prevalence of IPF : from 1 to 63 per 100000
- prevalence of ILAs varies
  - 0.8–22.8% **in smokers**
  - 2–7% in non-smokers

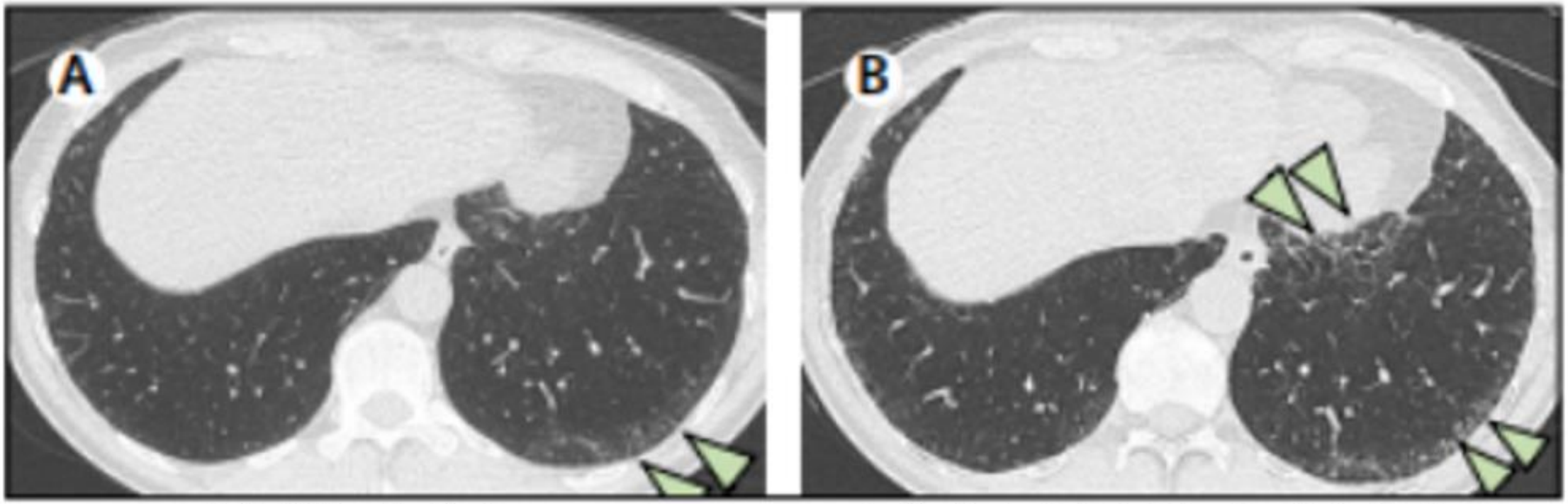
	Population-based cohorts				Smoking and lung cancer screening cohorts				
	MESA[11,12,13,14]	Nagano, Japan*[15]	FHS[6,8,9]	AGES-Reykjavik[9]	ECLIPSE[9]	NLST[7,16]	COPDGene[4,8,17]	MILD[18]	DLCST[19]
Study characteristics									
Total number of chest CT scans evaluated	3137	3061	2633	5320	1670	884	9292	692	1990
Prevalence of ILAs	310 (10%)	80 (3%)	177 (7%)	377 (7%)	157 (9%)	86 (10%)	708 (8%)	28 (4%)	332 (17%)
Mean age of those with ILAs (years)	75	62	70	78	64	62	64	60	60
Radiological progression									
Overall progression, follow-up time	NA	46%, 4 years	43%, 6 years	63%, 5 years	NA	20%, 2 years	NA	20%, 2 years	NA
Mortality									
Relative risk of death, (hazard ratio [95% CI])	NA	NA	2·7 (1·1–6·5)	1·3 (1·2–1·4)	1·4 (1·1–2·0)	NA	1·8 (1·1–2·8)	NA	2·0 (1·4–2·7)

ILAs=interstitial lung abnormalities. NA=not available. *Patients participating in a health screening programme from Nagano prefecture, Japan.

Table: **Interstitial lung abnormalities across study populations**

Interstitial lung abnormalities detected incidentally on CT:
a Position Paper from the Fleischner Society, Hiroto Hatabu* et al,

61/M, EX-SMOKER

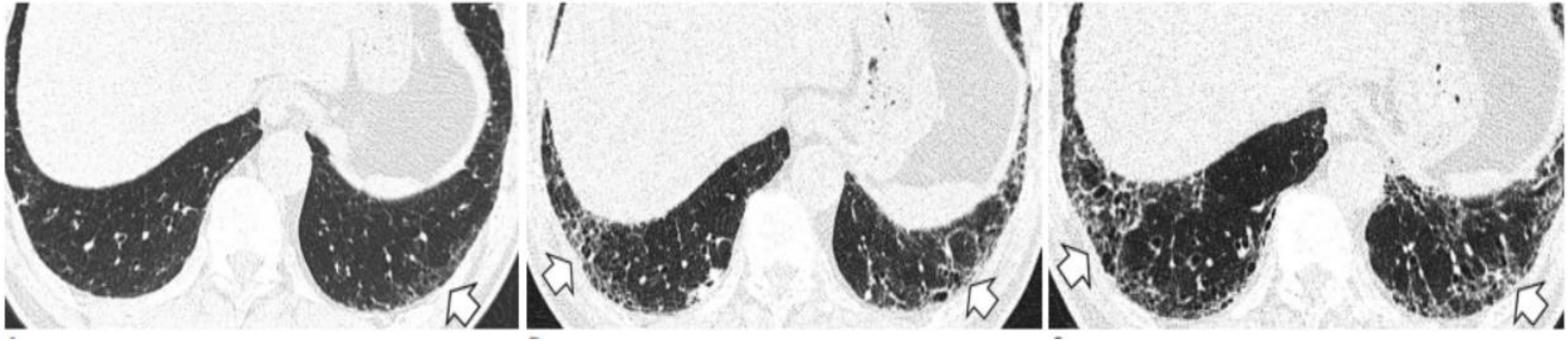


INITIAL 7 YEARS LATER

Progression from subpleural non-fibrotic to subpleural fibrotic interstitial lung abnormality

Interstitial lung abnormalities detected incidentally on CT:
a Position Paper from the Fleischner Society, Hiroto Hatabu* et al,

61/M, 46 PY



initial

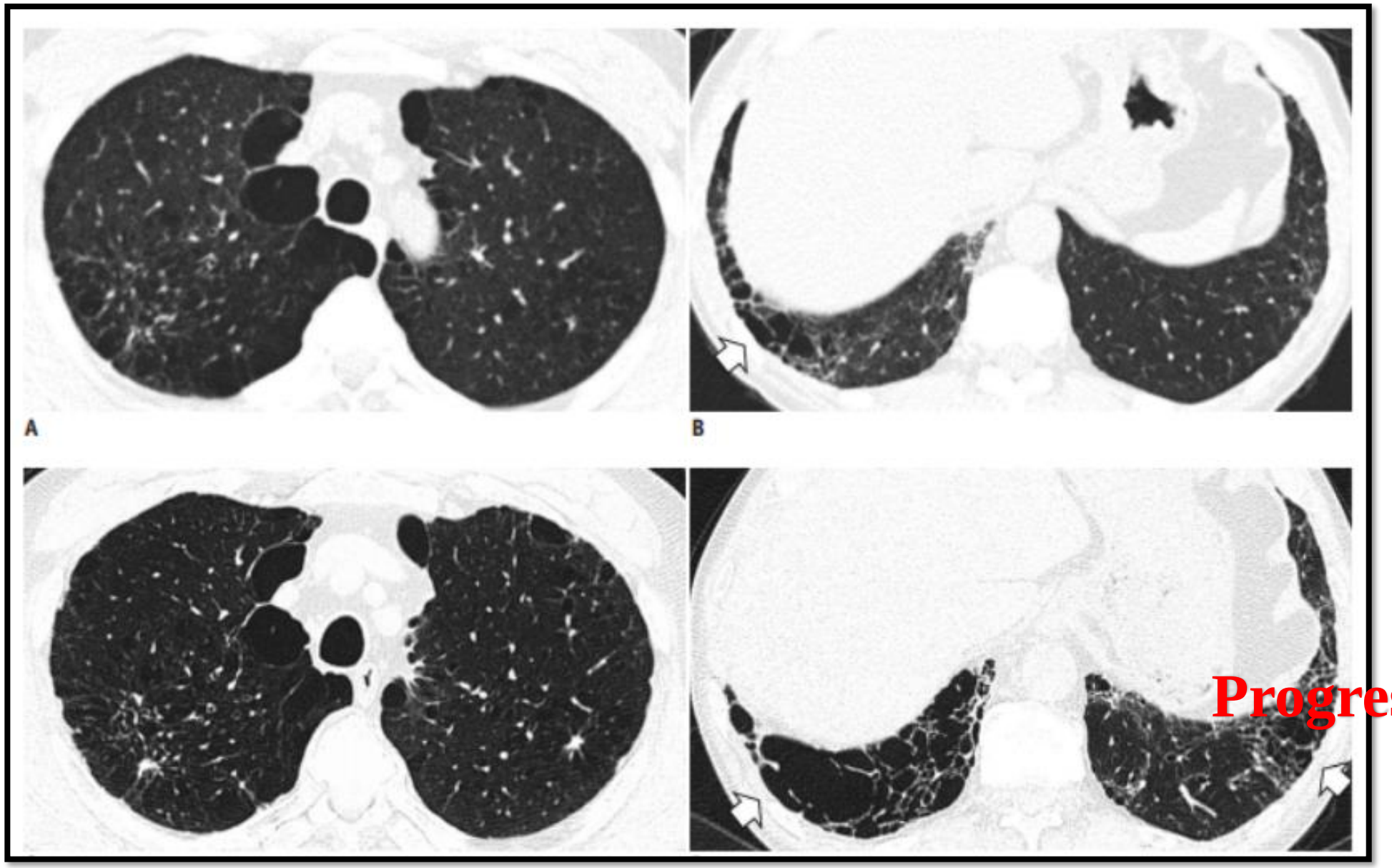
4 year

9 year

ILA

Progression of ILA

UIP



initial

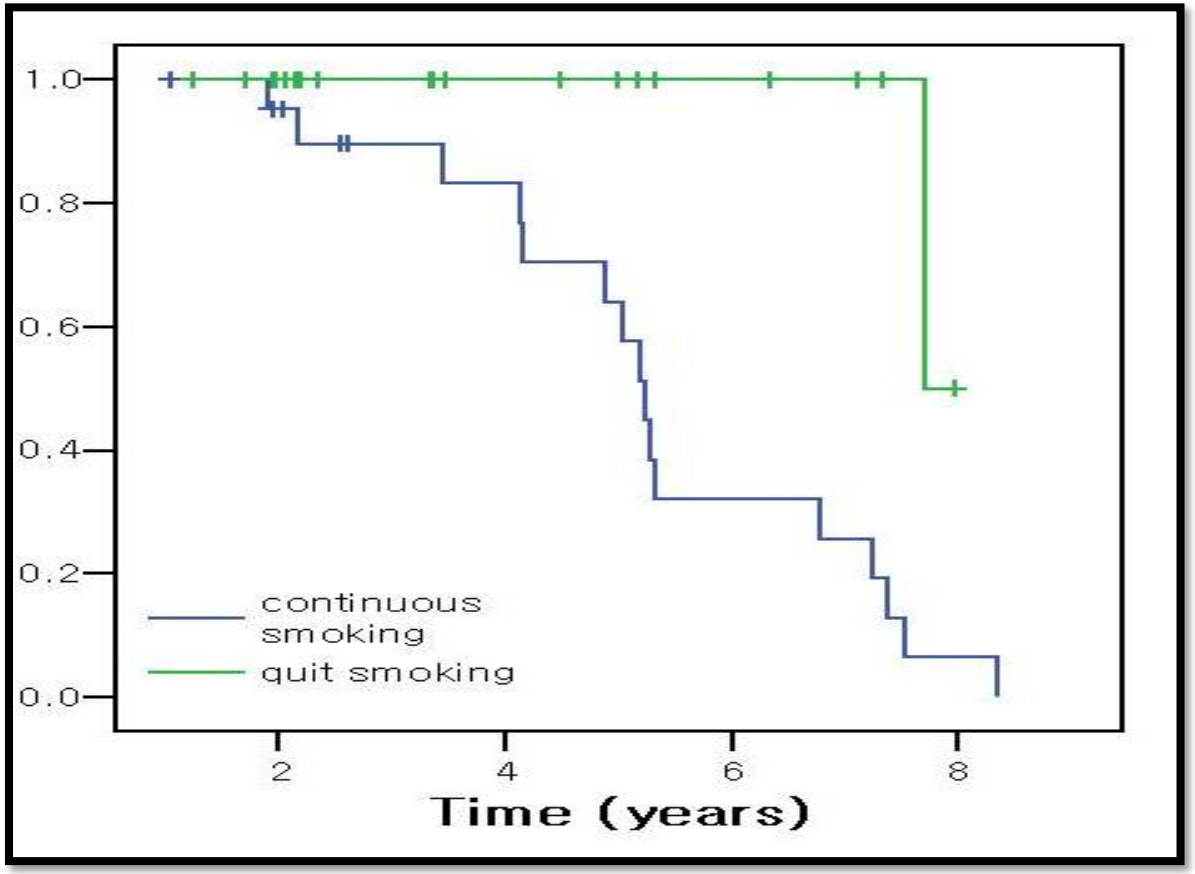
ILA

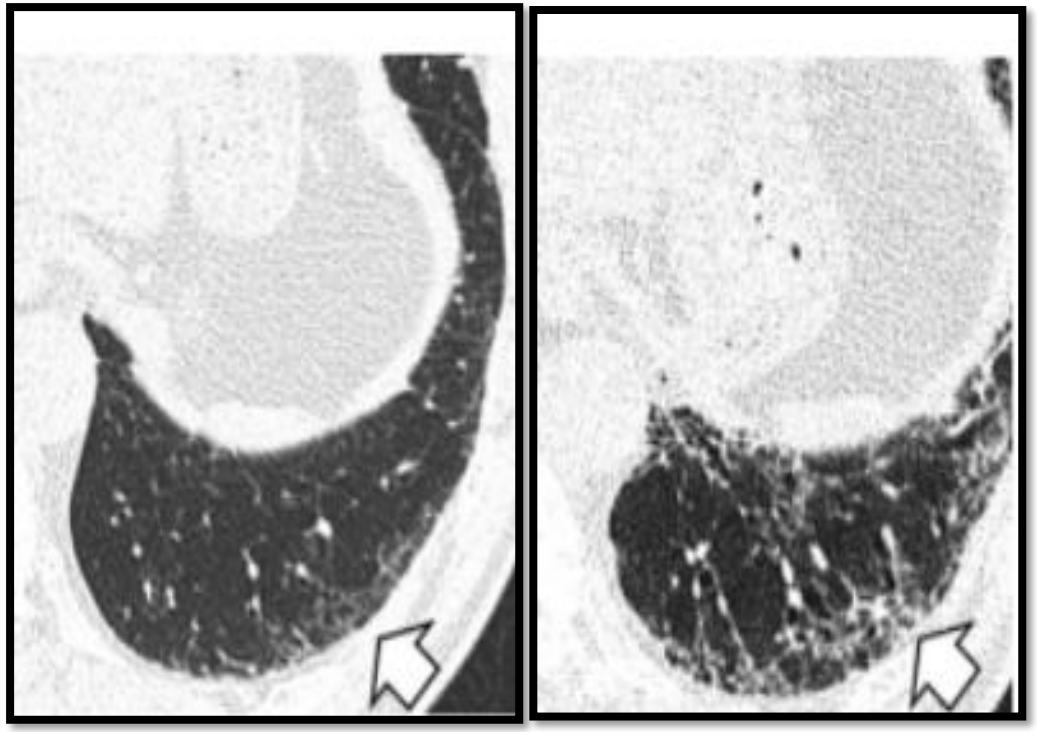
10 years

Progression of ILA

59-year-old male former smoker with 50 pack-years of cigarette consumption

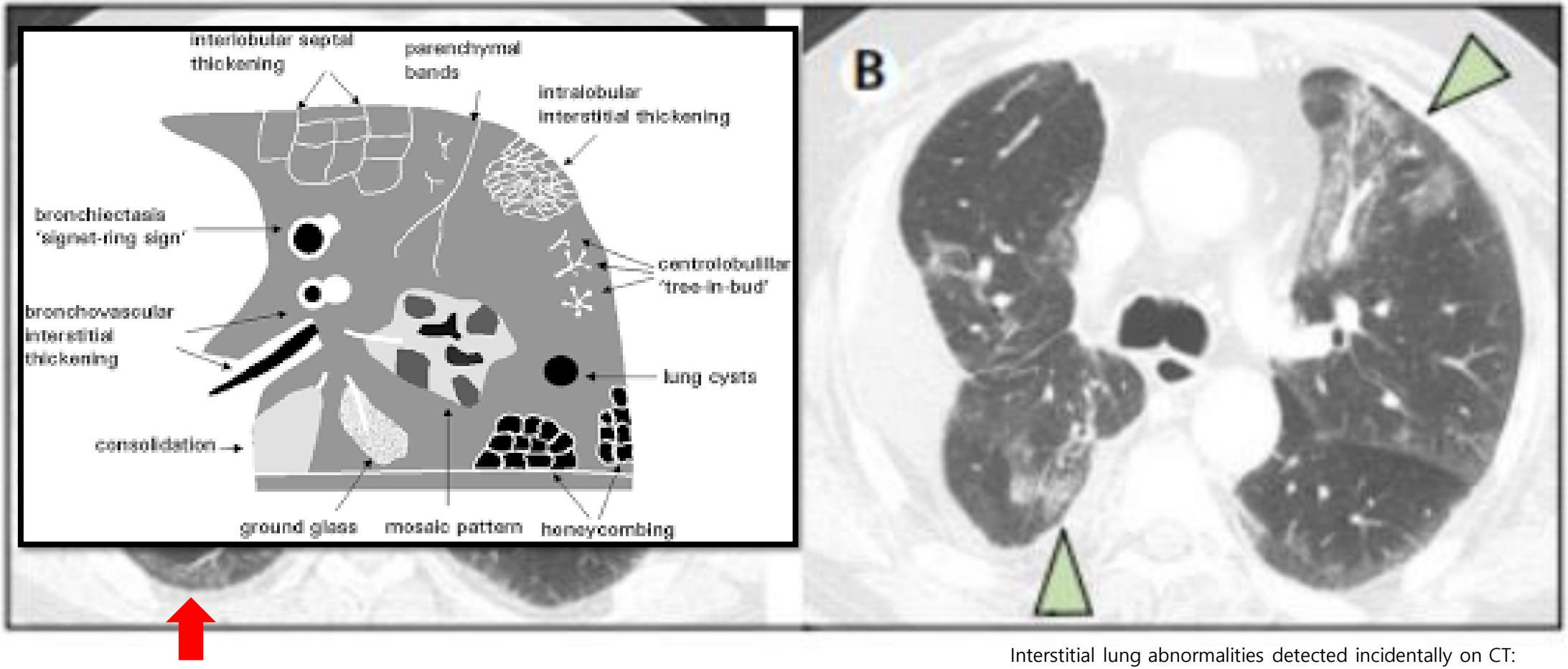
Prevalence and progression of combined pulmonary fibrosis and emphysema in asymptomatic smokers: A case-control study





Eur Radiol. 2015 Aug;25(8):2326-34

Interstitial lung abnormalities after surgery and chemotherapy for lung cancer



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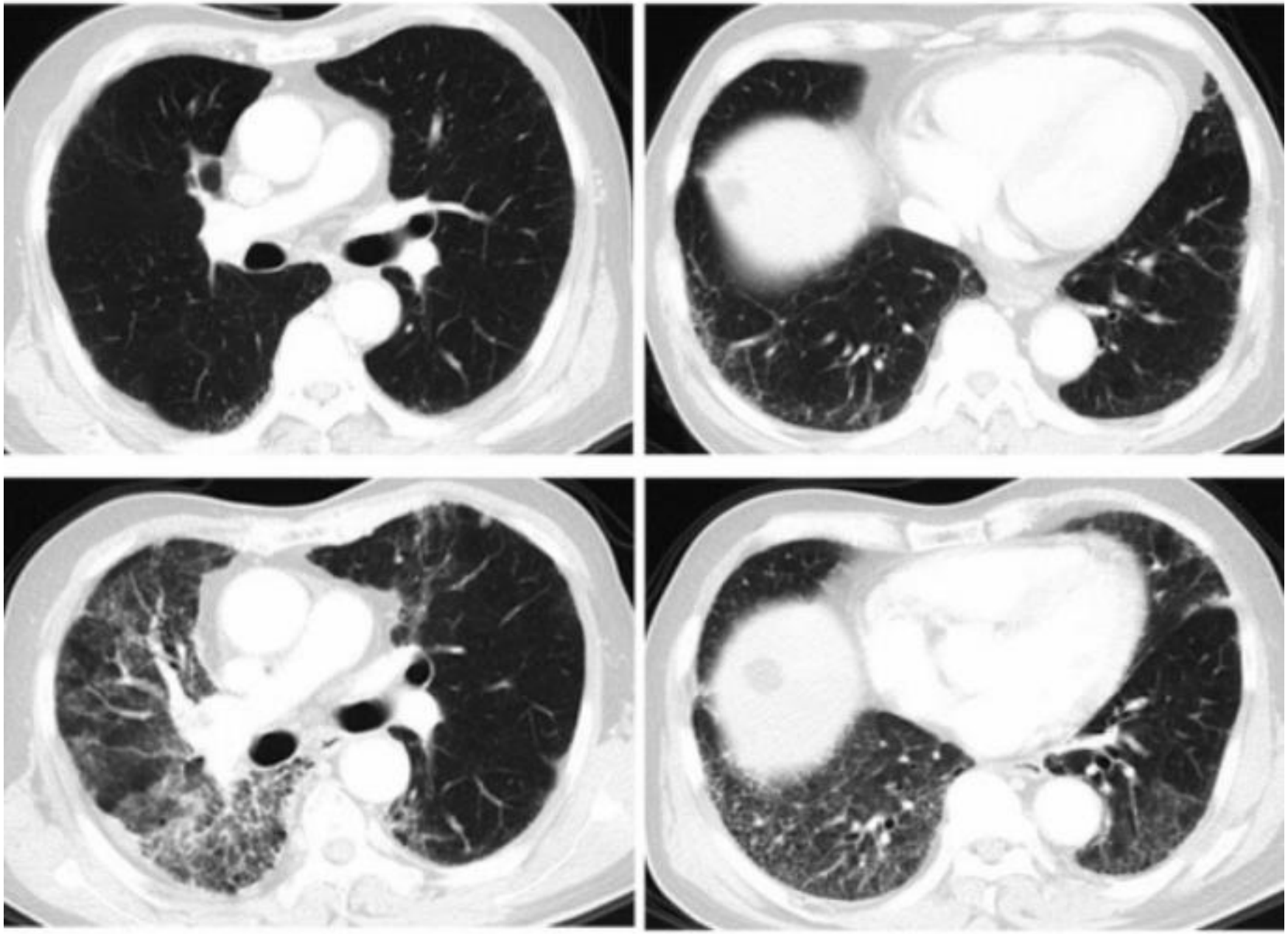
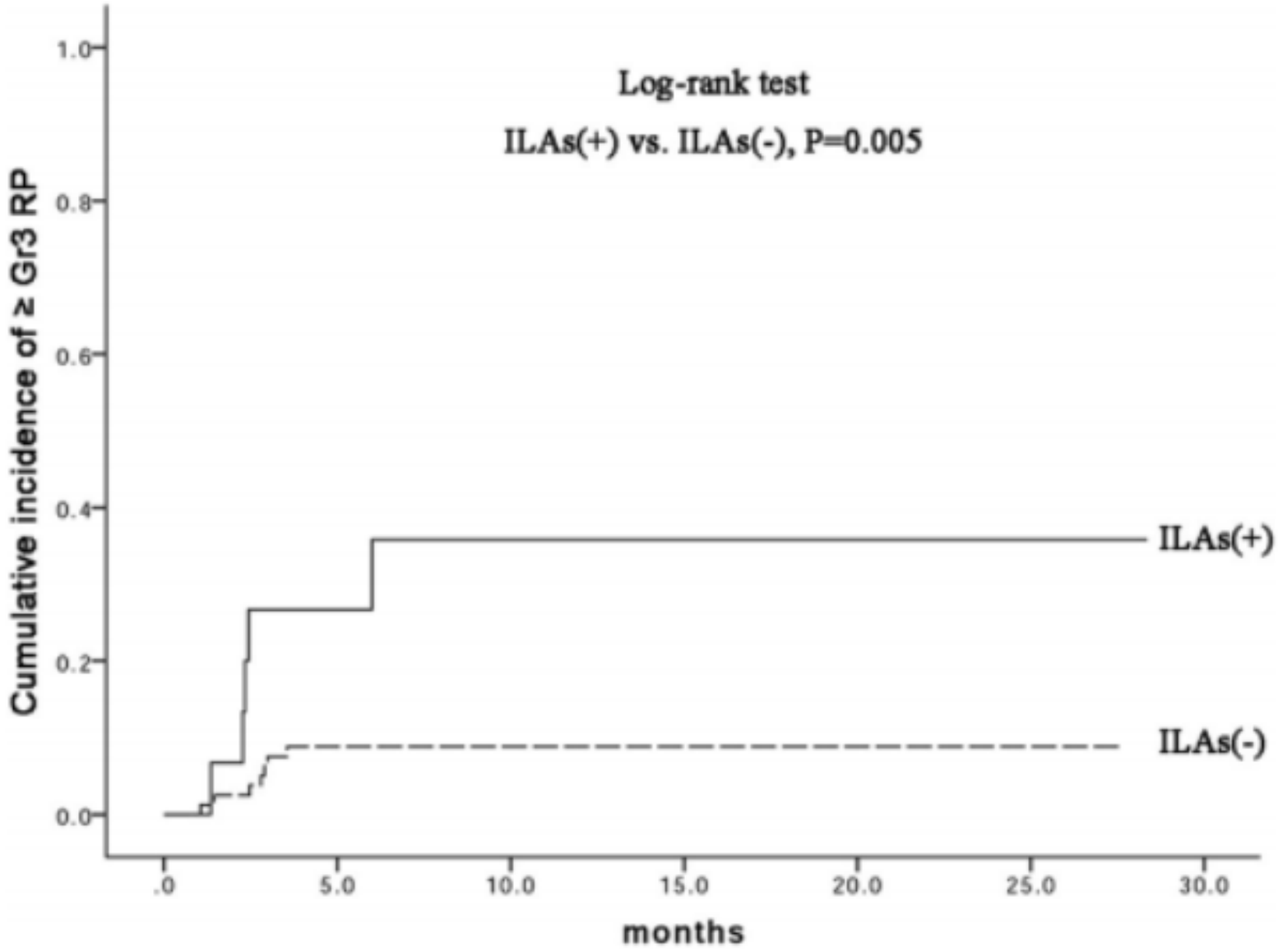


Li et al. Radiation Oncology (2018) 13:82



Li et al. Radiation Oncology (2018) 13:82

Radiologic-pathologic correlation of ILA

- ILA is a **radiological term** with **few** published studies on pathological correlates.

	prevalence	findings
Katzenstein et al	60%	Smoking-related interstitial fibrosis, UIP, pulmonary Langerhans' cell histiocytosis, asbestosis
Kawabata et al		airspace enlargement and fibrosis, respiratory bronchiolitis, UIP
Miller et al	26/424(6%)	Fibrosis (73%), UIP (8%)
Hung et al	10%	interstitial fibrosis(7%), UIP (1%)

Interstitial lung abnormalities detected incidentally on CT:
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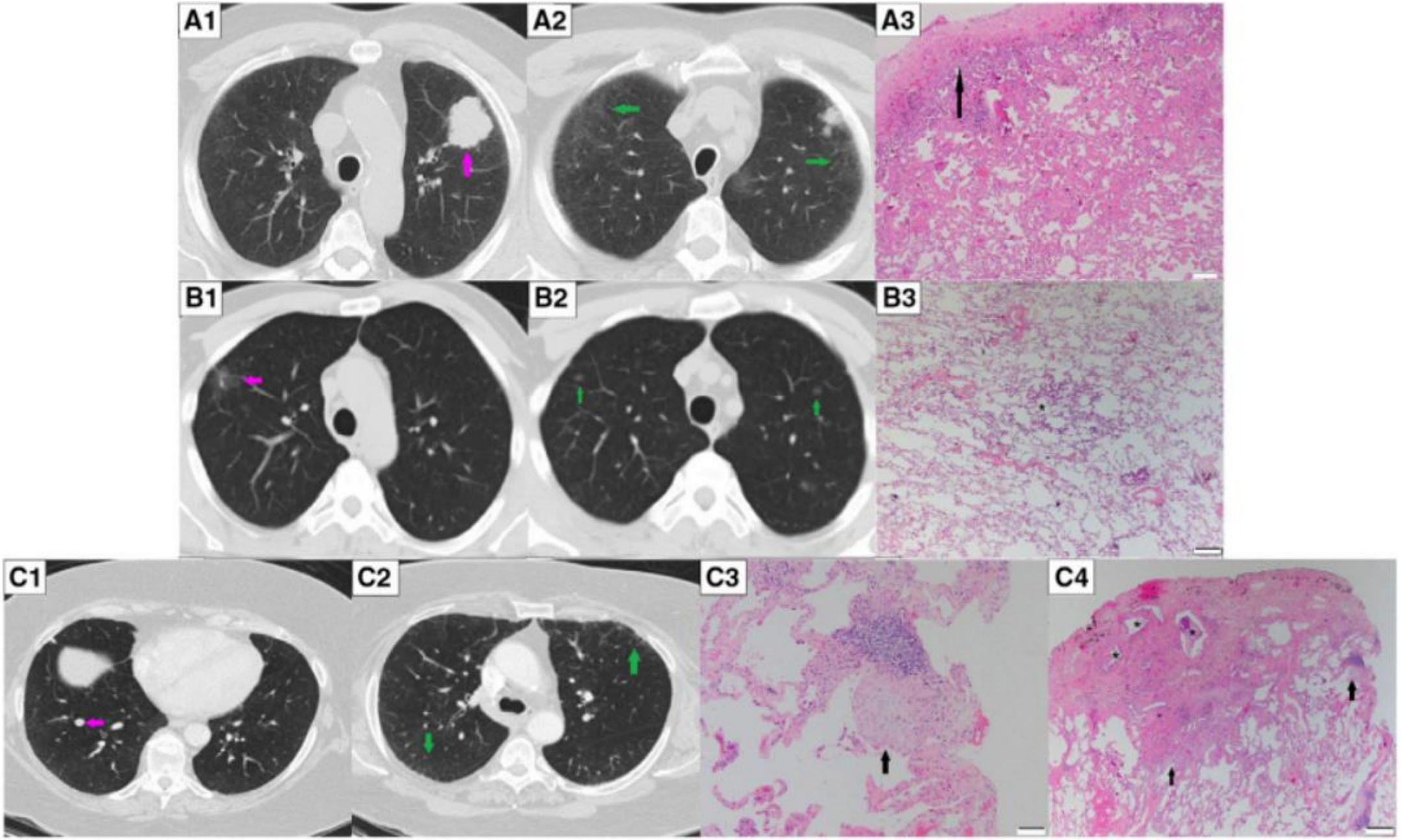
Table 5. Key Features according to Different UIP Category on High-Resolution CT with Its Correspondence to ILA/NSIP

	Typical UIP [8, 9]	Probable UIP [8, 9]	Indeterminate for UIP [8, 9]	Most consistent with non-IPF [8, 9]
Basal and subpleural predominant distribution	+	+	–; Variable/diffuse	
Heterogeneity	+	+		
Distortion	+	+	Subtle	
GGO		±	±	
Peripheral traction bronchiectasis or bronchiolectasis	+	+	-	
Honeycombing	+	-	-	
ILA defined by CT [10]		Subpleural Fibrotic ILA	Subpleural Non-Fibrotic ILA	Non-Subpleural ILA
NSIP defined by pathology [37]		Progressive NSIP	Fibrosing NSIP	Cellular NSIP

GGO = ground-glass opacities, ILA = interstitial lung abnormality, IPF = idiopathic pulmonary fibrosis, NSIP = nonspecific interstitial pneumonia, UIP = usual interstitial pneumonia

Takuya Hino, Kyung Soo Lee, Korean J Radiol 2020



American Journal of Respiratory and Critical Care Medicine Volume 197 Number 7 | April 1 2018

	No ILA (*n* = 257; 61%)	Indeterminate ILA (*n* = 141; 33%)	ILA (*n* = 26; 6%)	*P* Value* All Groups	*P* Value* ILA vs. No ILA
Histopathologic features					
Fibrosis					
Any fibrosis present‡, *n* (%)	133 (52%)	74 (52%)	19 (73%)	0.11	0.04
Subpleural fibrosis, *n* (%)	43 (17%)	24 (17%)	12 (46%)	0.003	0.001
Peribronchiolar fibrosis, *n* (%)	62 (24%)	32 (23%)	9 (35%)	0.41	0.24
Interstitial fibrosis, *n* (%)	53 (21%)	30 (21%)	9 (35%)	0.27	0.13
Emphysematous fibrosis§, *n* (%)	39 (15%)	24 (17%)	4 (15%)	0.88	1.0
Additional histopathologic features					
Fibroblastic foci, *n* (%)	9 (4%)	4 (3%)	7 (28%)	0.0001	0.0001
Honeycombing, *n* (%)	0 (0%)	0 (0%)	2 (8%)	0.004	0.008
UIP, *n* (%)	0 (0%)	0 (0%)	2 (8%)	0.004	0.008
Respiratory bronchiolitis, *n* (%)	156 (67%)	89 (71%)	17 (71%)	0.70	0.82
Airways disease‖, *n* (%)	126 (51%)	62 (47%)	11 (48%)	0.73	0.83
Smoking-related interstitial fibrosis¶, *n* (%)	21 (8%)	8 (6%)	1 (4%)	0.66	0.70
Pulmonary arterial hypertensive changes**, *n* (%)	213 (83%)	115 (82%)	23 (92%)	0.47	0.39
Atypical adenomatous hyperplasia, *n* (%)	43 (17%)	36 (26%)	9 (35%)	0.02	0.03
Pigment-laden macrophages, *n* (%)	188 (73%)	105 (75%)	20 (80%)	0.82	0.63
Pleural disease††, *n* (%)	18 (7%)	8 (6%)	3 (13%)	0.43	0.41

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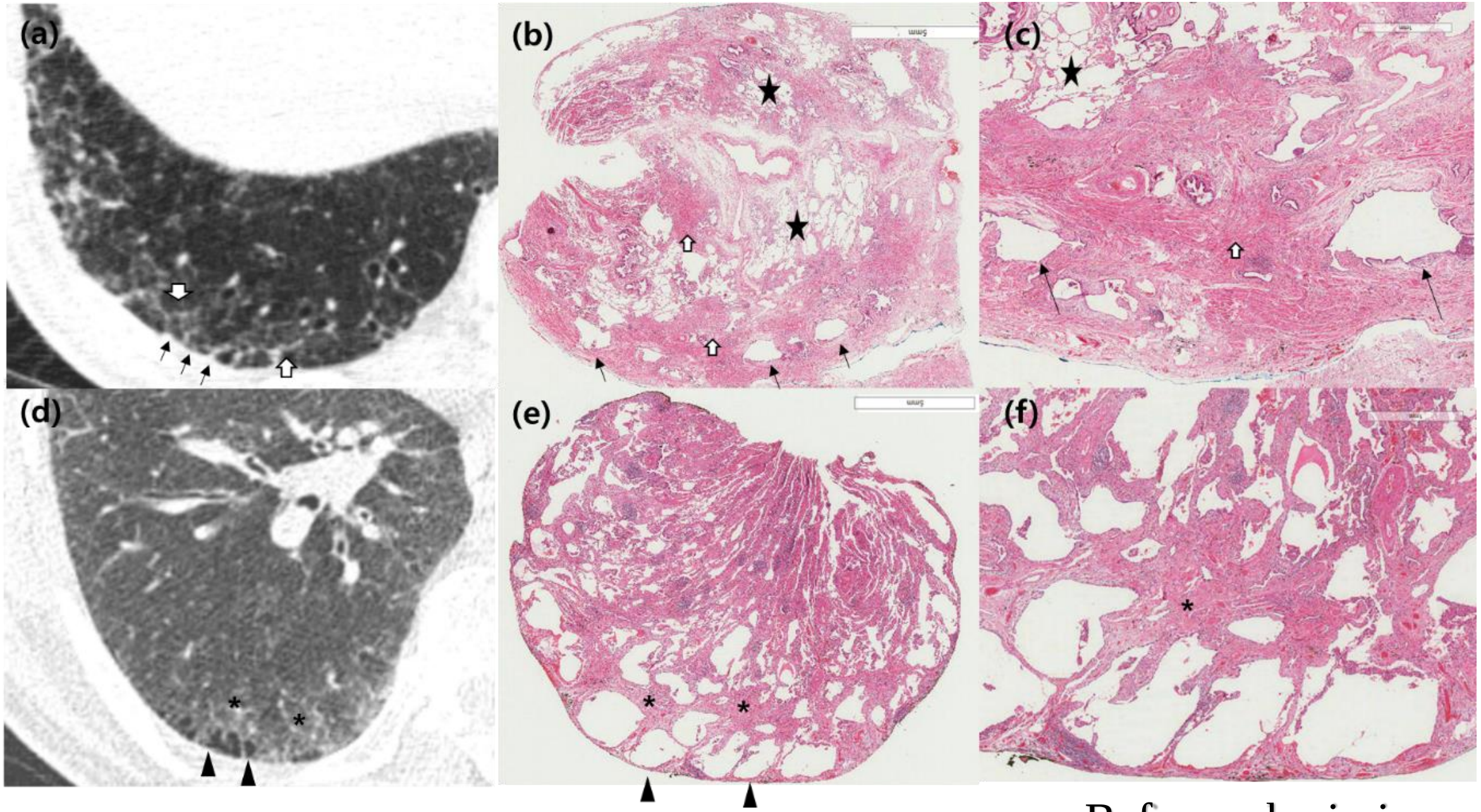


Before submission

to evaluate interstitial abnormality on chest CT from January 2004 to April 2019

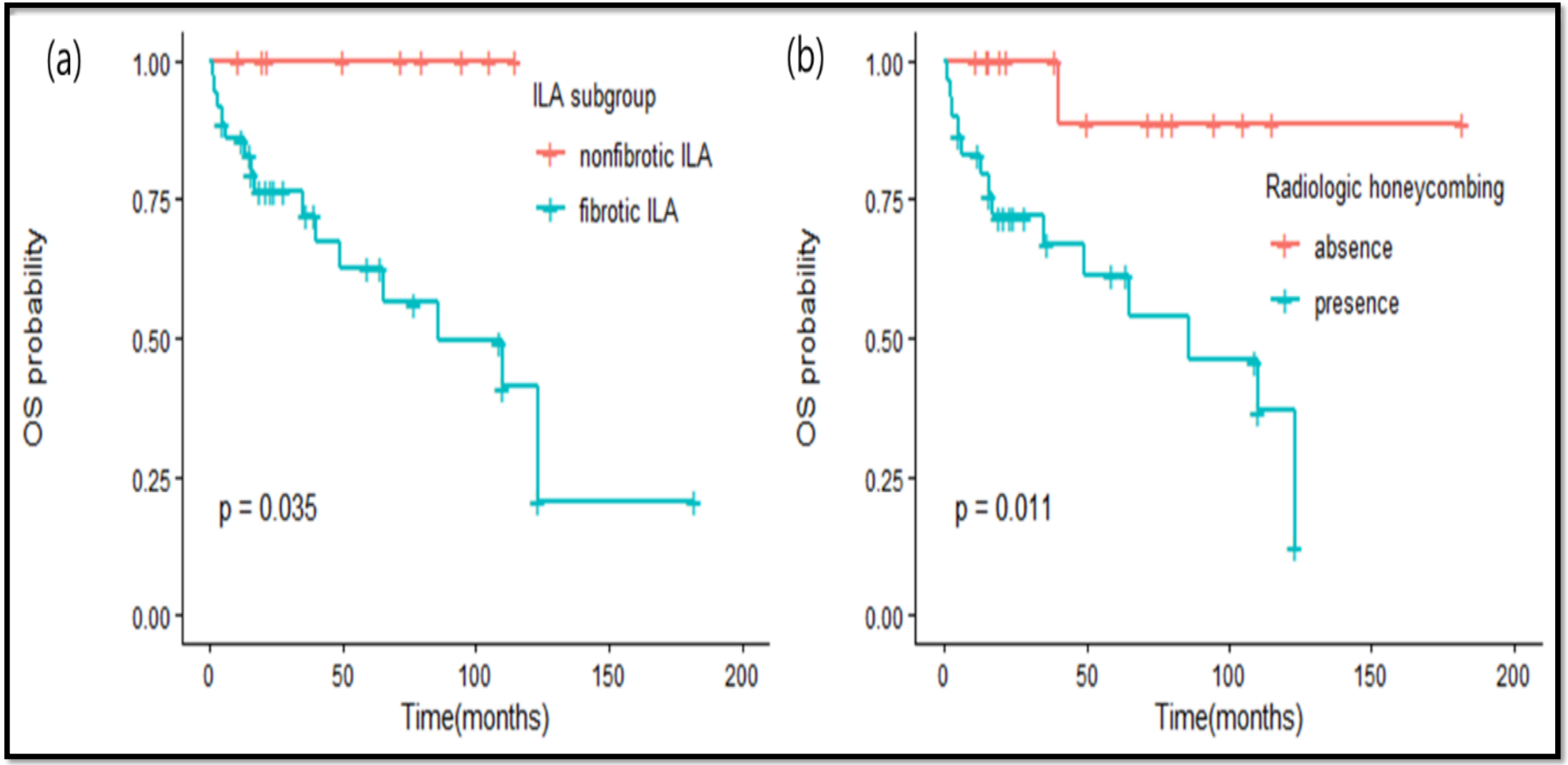
Table 2. Radiologic-Pathologic Correlation, According to the Radiologic Status of Fibrotic ILA, Non-Fibrotic ILA.

Radiology / Pathology	Fibrotic ILA (n=36)	Non-Fibrotic ILA (n=9)	Overall (n=45)
UIP	17 (47.2)	1 (11.1)	18 (40.0)
Probable UIP	8 (22.2)	0 (0.00)	8 (17.8)
Indeterminate UIP	8 (22.2)	4 (44.4)	12 (26.7)
Alternative diagnosis for UIP	3 (8.3)	4 (44.4)	7 (15.6)

Note. - Numbers in parentheses are percentages

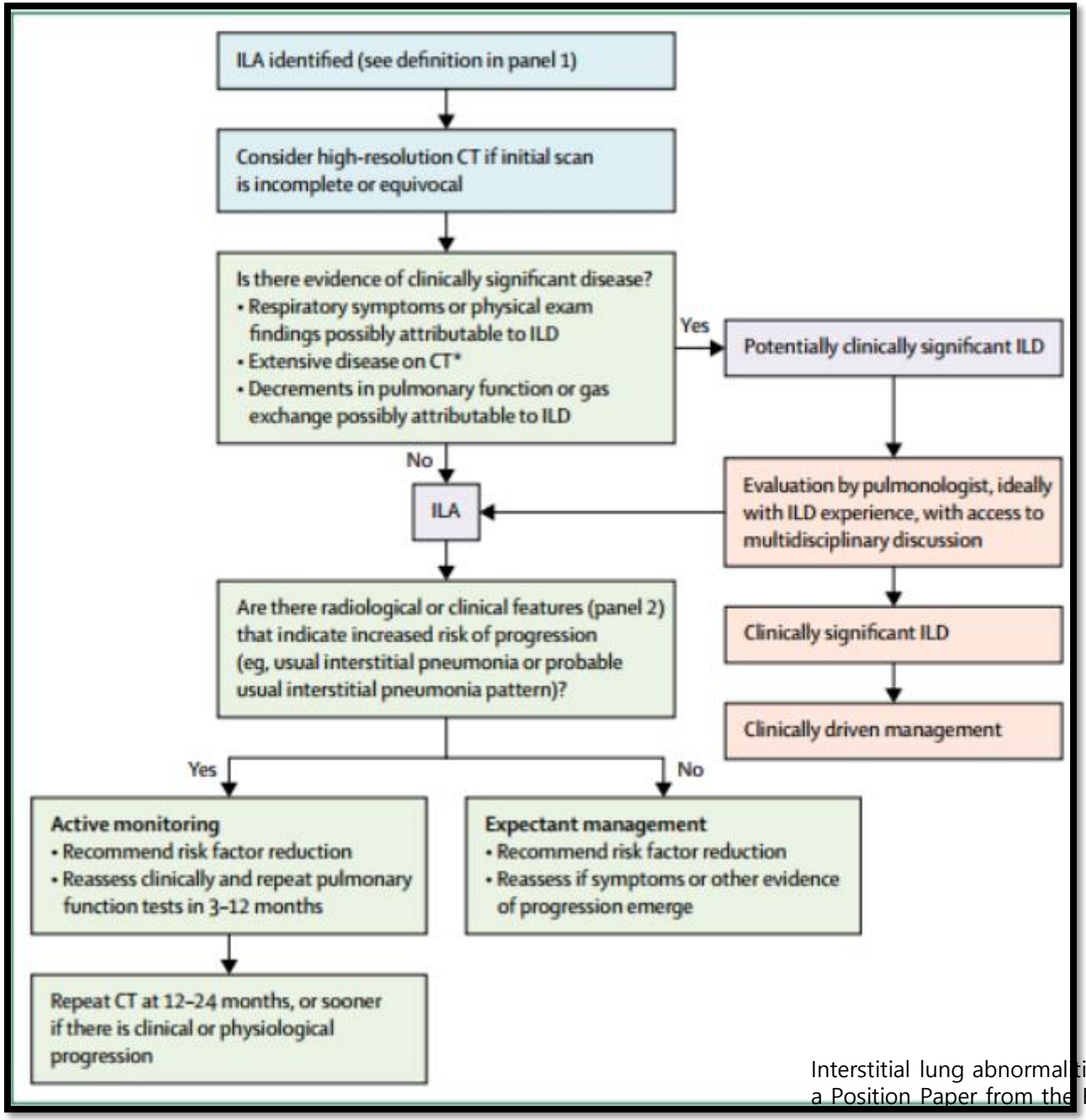
ILA=interstitial lung abnormality; UIP=usual interstitial pneumonia

Before submission



Before submission

Management of ILA



Interstitial lung abnormalities detected incidentally on CT:
a Position Paper from the Fleischner Society, Hiroto Hatabu* et al,

Summary

- Separating clinically significant ILD from ILAs is essential.
- ILAs are important because they are associated with mortality as well as increased risk of complications from surgery, chemotherapy, and radiotherapy.
- The morphology and distribution of ILAs should be clearly described and the descriptive categories of non-subpleural, subpleural non-fibrotic, and **subpleural fibrotic ILAs** should be recorded in the radiology report, as this information could be useful in predicting progression and mortality

Interstitial lung abnormalities detected incidentally on CT:
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경청해주셔서

감사합니다