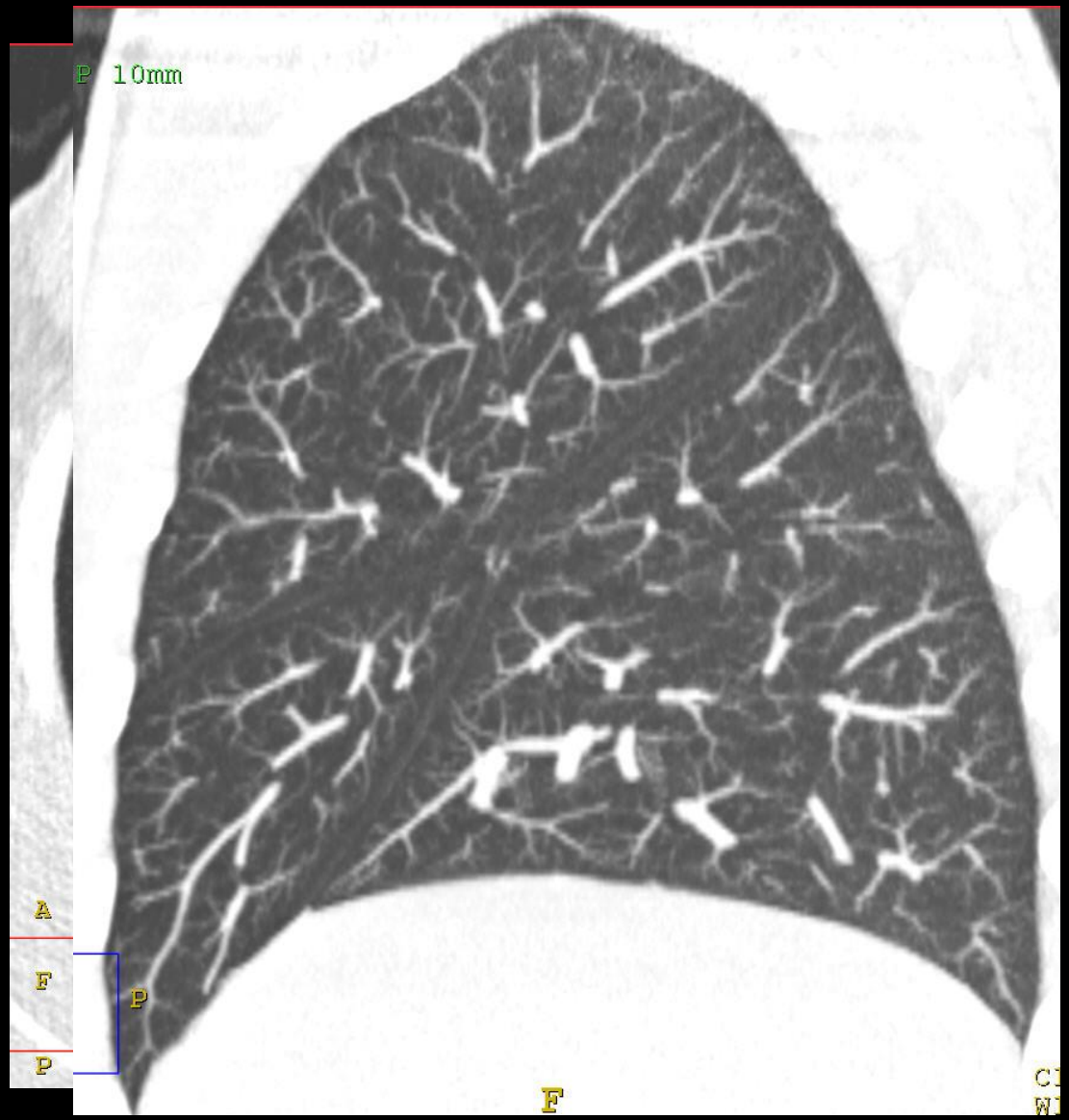
Sémiologie élémentaire des PID

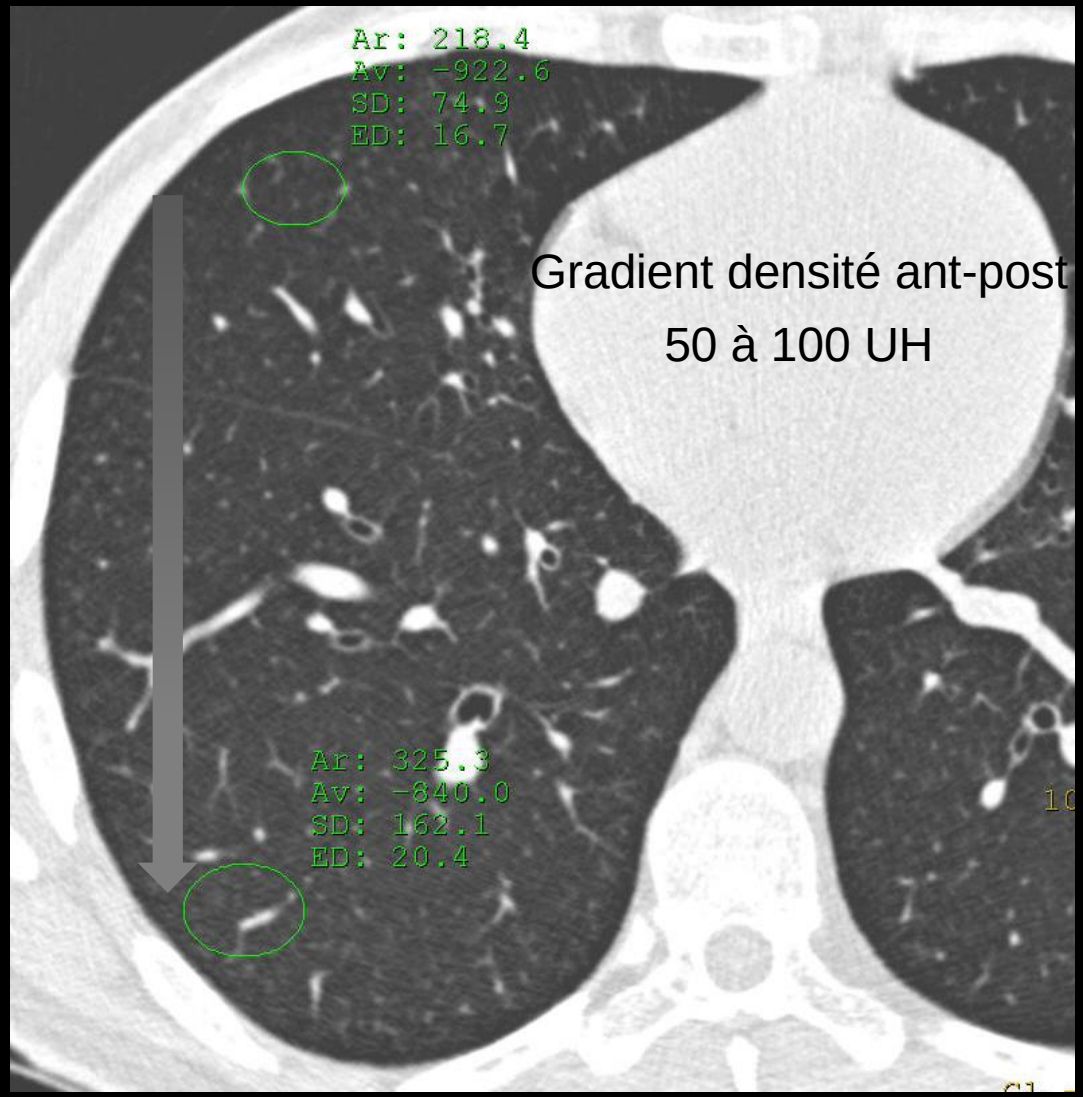
Marie-Pierre Debray

Hôpital Bichat, Paris, France

Séminaire imagerie DES de pneumologie
25 Novembre 2022

Parenchyme normal

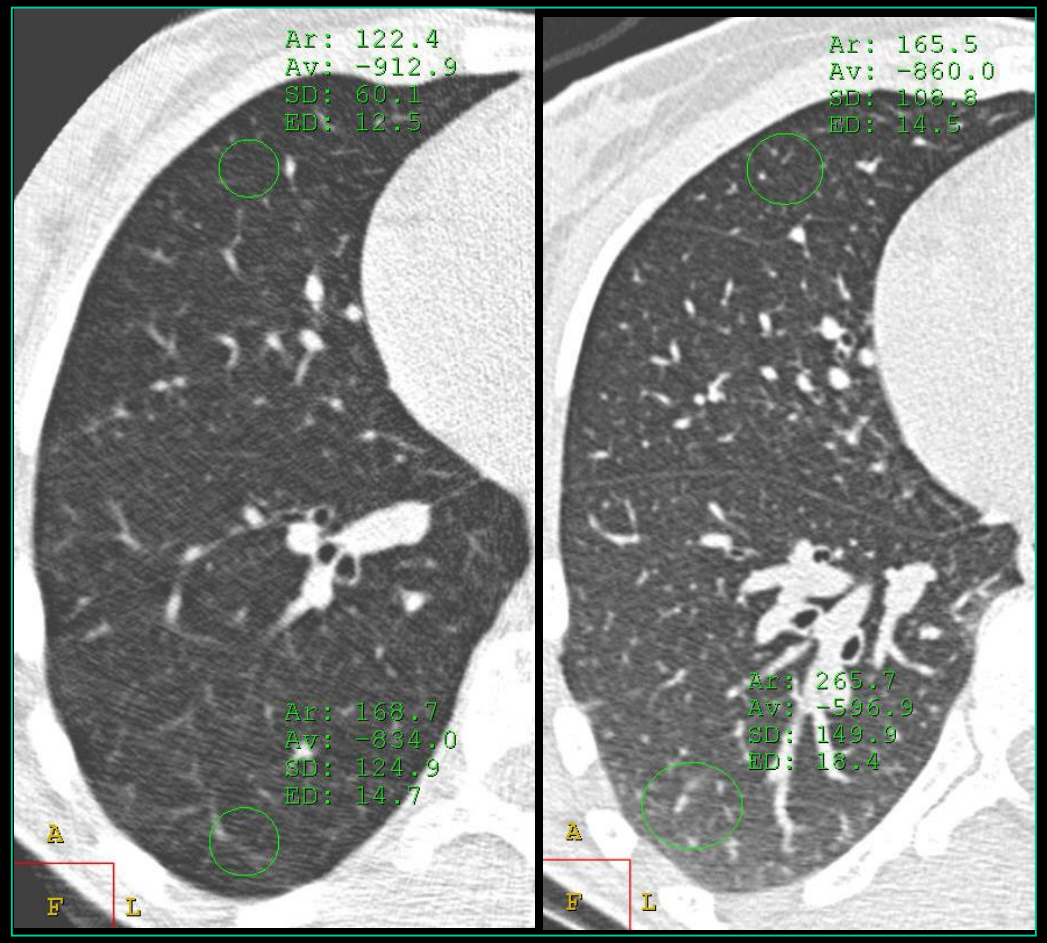




Gradient densité ant-post

50 à 100 UH

Parenchyme normal en expiration



↗ Densité

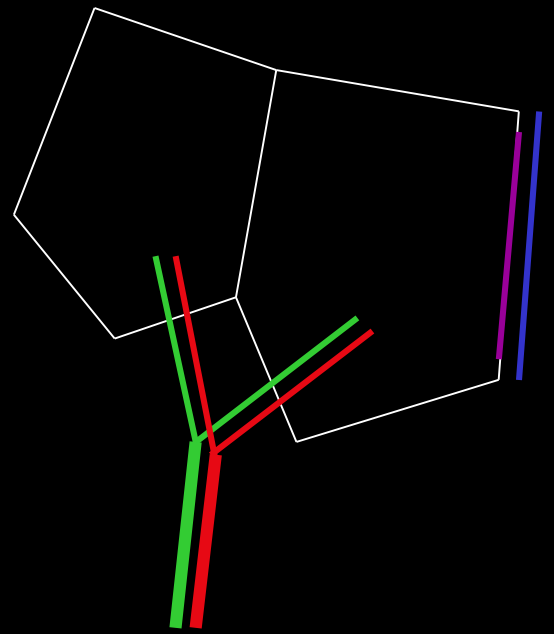
↗ Gradient densité

Comment reconnaître l'expiration?

Convexité antérieure de la membraneuse trachéale

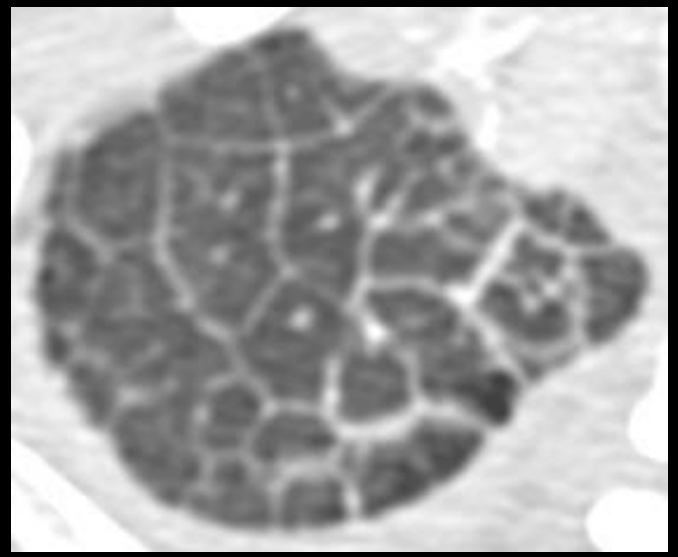
Anatomie du lobule pulmonaire secondaire

Unité morphologique limitée par septas interlobulaires



Centre lobule artériole bronchiole conjonctif

Septa interlobulaires veines lymphatiques conjonctif



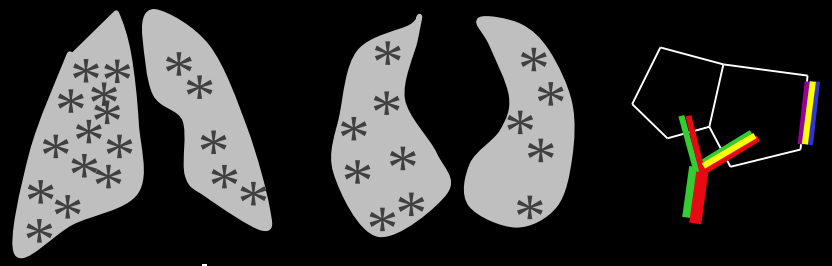
Méthode d'analyse du scanner

Sans injection
< 1,5 mm
Filtre poumon
Inspiration maximale

Scanner thoracique

Qualité ?
Artéfacts ?

Distribution

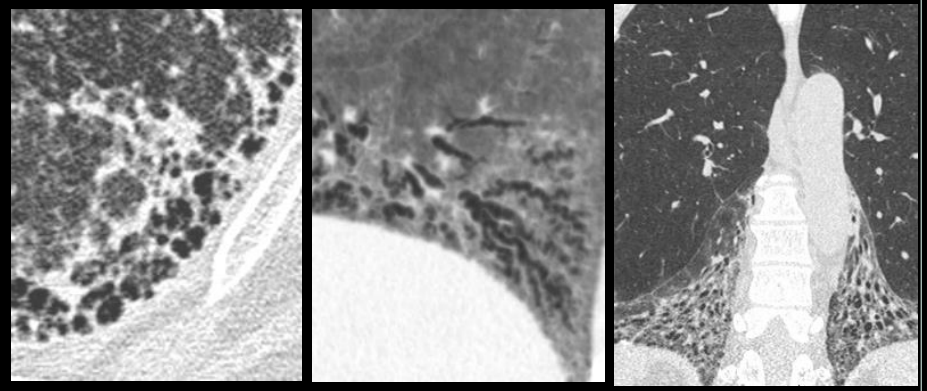


Zonale — Axiale — Lobule

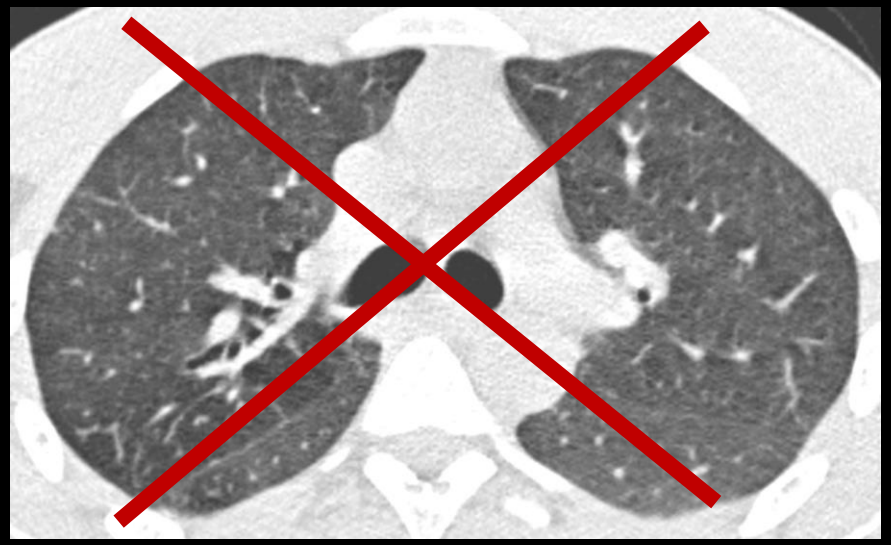
Signes élémentaires

- Signe dominant
- Signe associés

Signes de fibrose

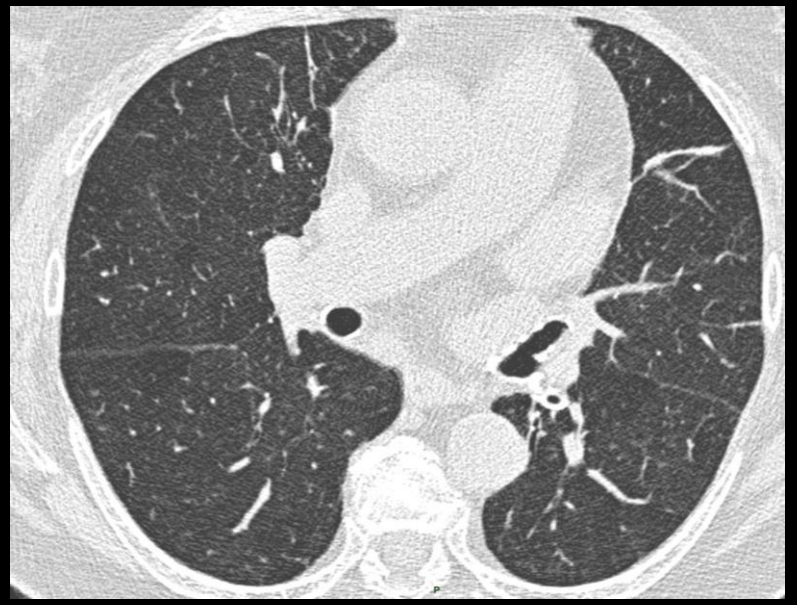


Rayon de miel, bronch. traction, perte volume



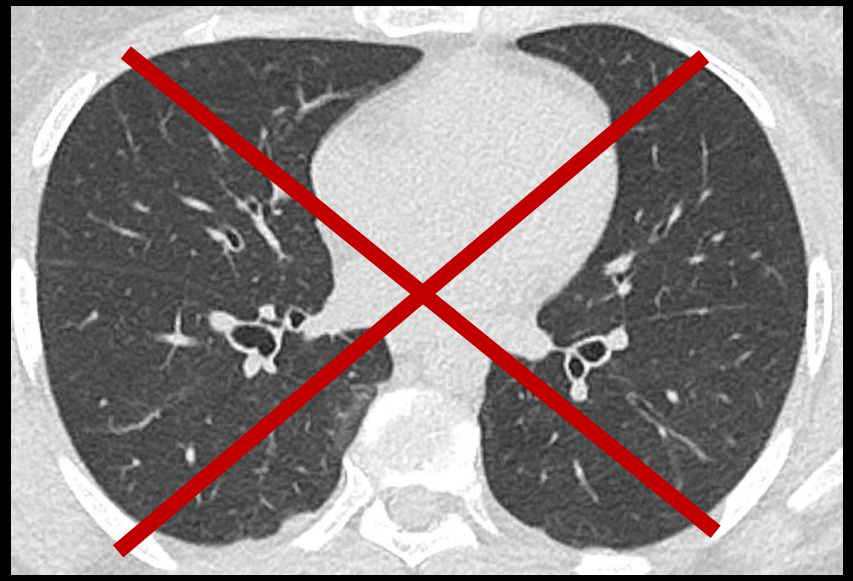
Pseudo-verre dépoli expiratoire

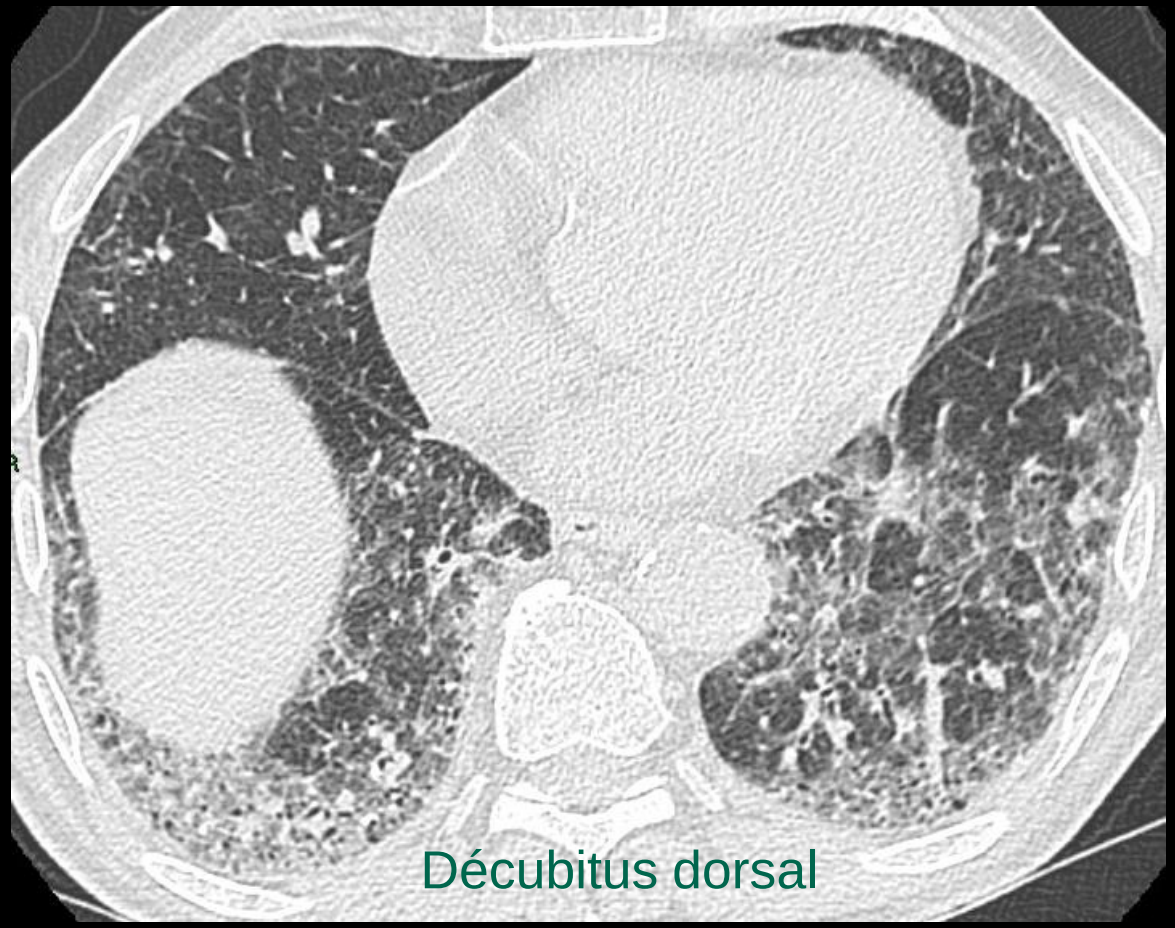
Densité normale en inspiration profonde

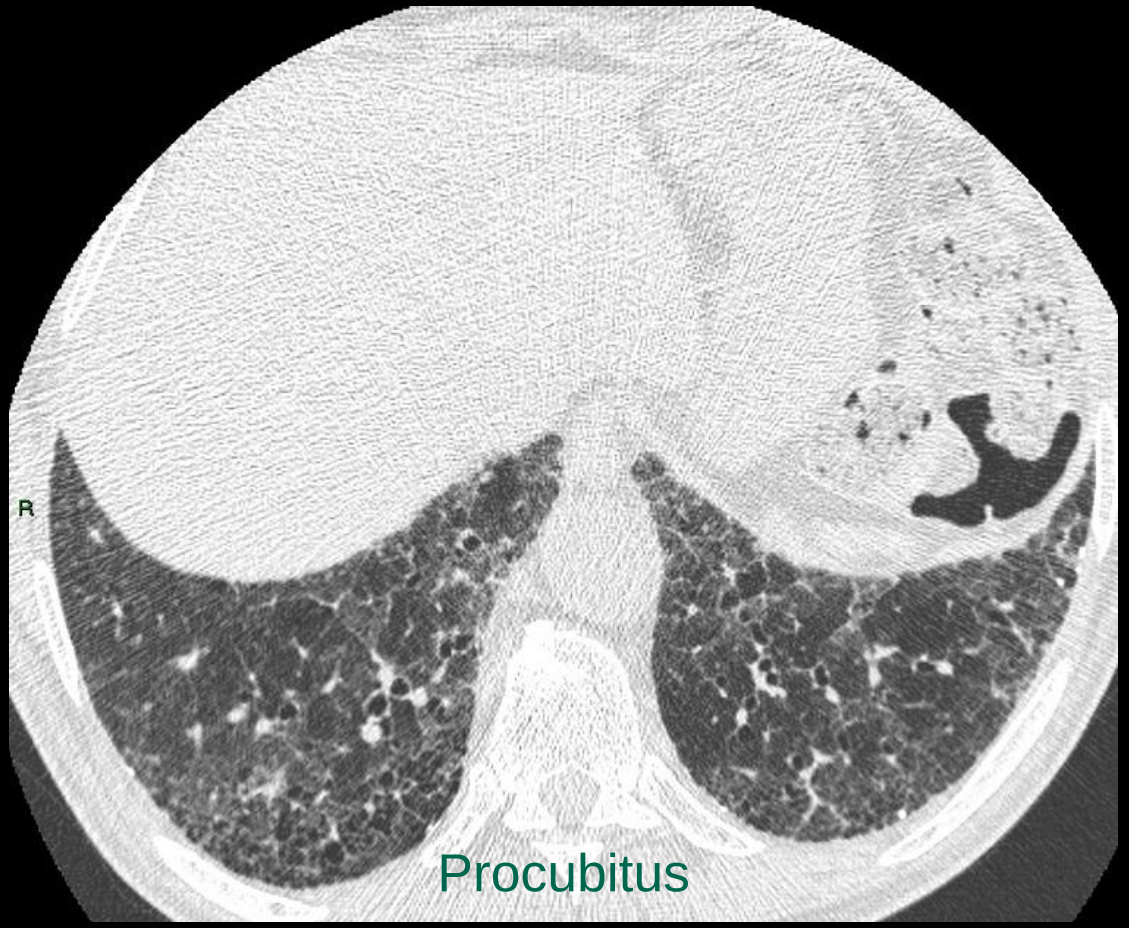


Opacités gravito-dépendantes

Disparition en procubitus







Déclivité + inspiration sous-maximale

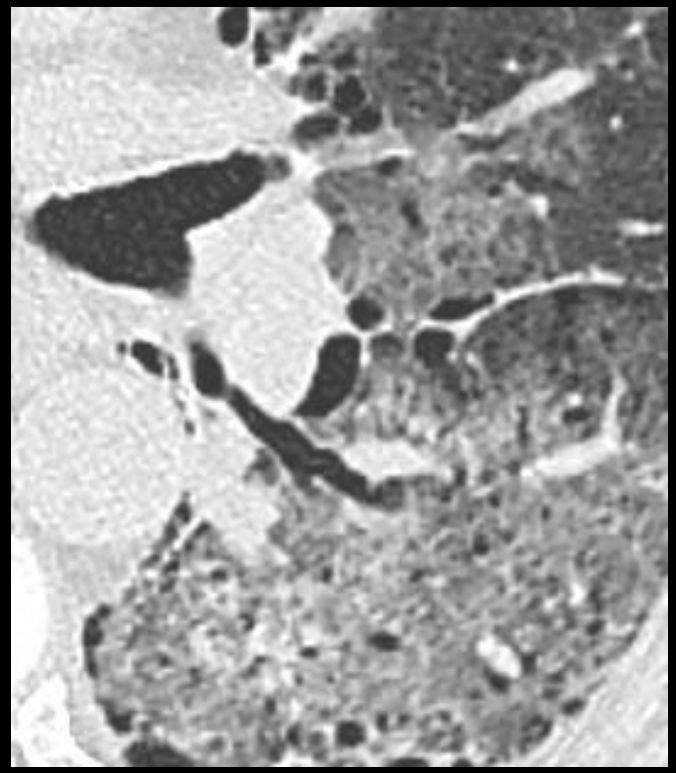
⇨Vérifier l’inspiration

⇨Procubitus si anomalies en zones déclives

Opacités en plages

- Verre dépoli

N’efface pas les vaisseaux



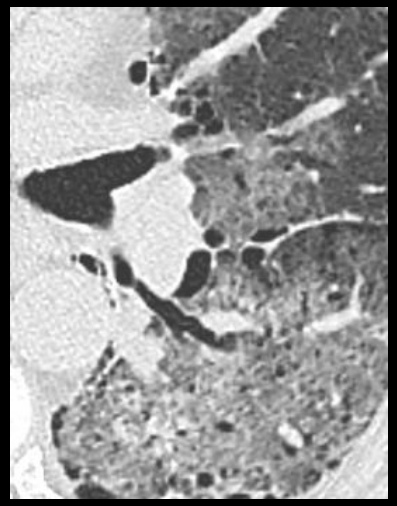
-400 à -200 HU

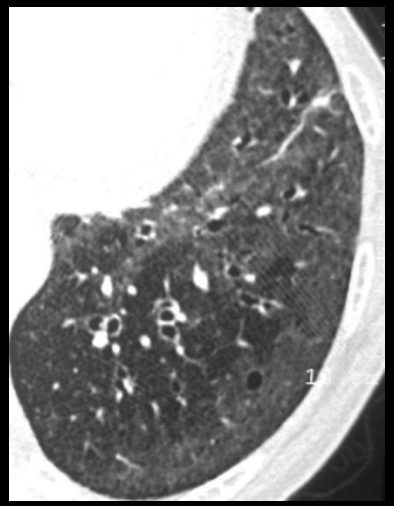
- Condensation

Efface les vaisseaux

40 à 60 HU

Verre dépoli

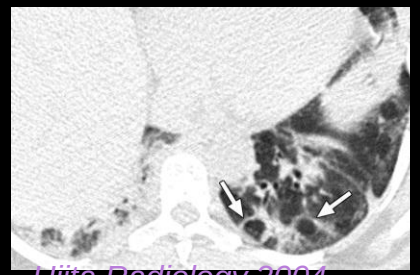




Effet de volume partiel

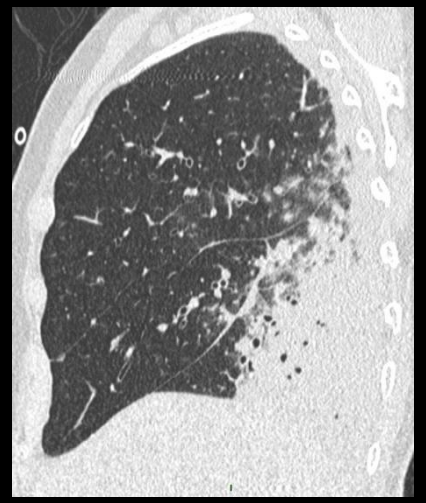
- Remplissage alvéolaire partiel
- Infiltration interstitielle
- Atteinte mixte, alvéolaire et interstitielle
- *Augmentation du volume sanguin capillaire*

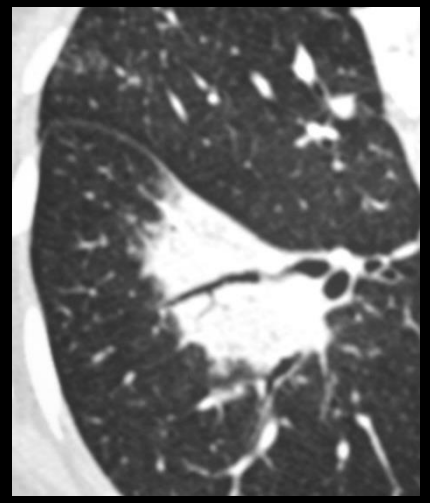
A l'échelle du lobule



Ujita Radiology 2004

Condensations

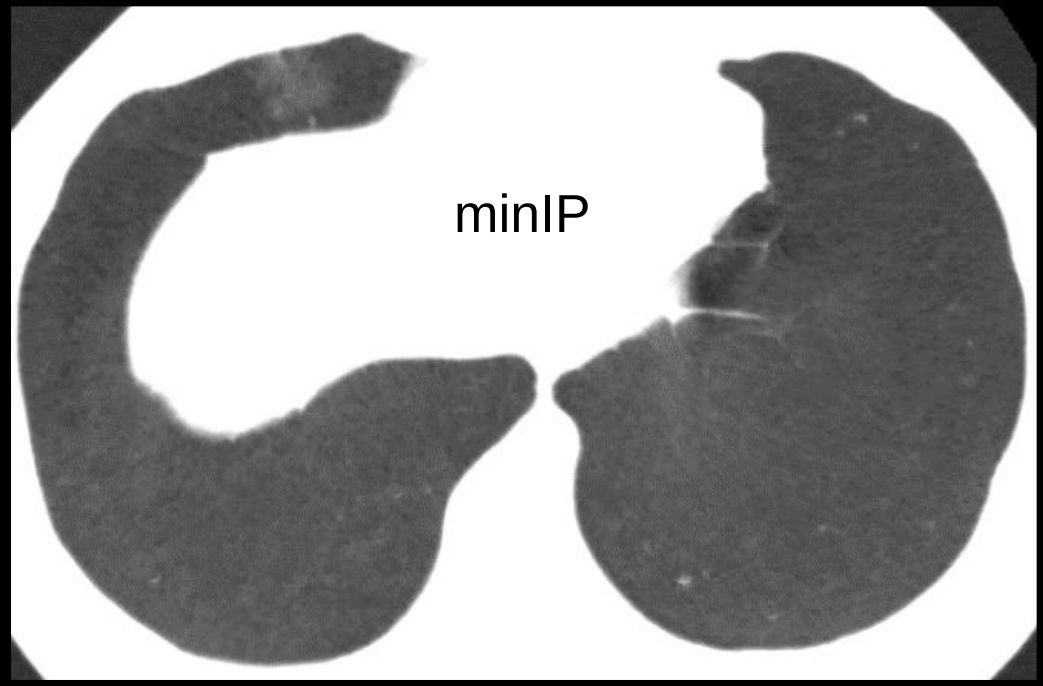




- Remplissage alvéolaire ++
- Infiltration interstitielle profuse

Verre dépoli de très faible intensité

S’aider du minIP



Opacités en verre dépoli

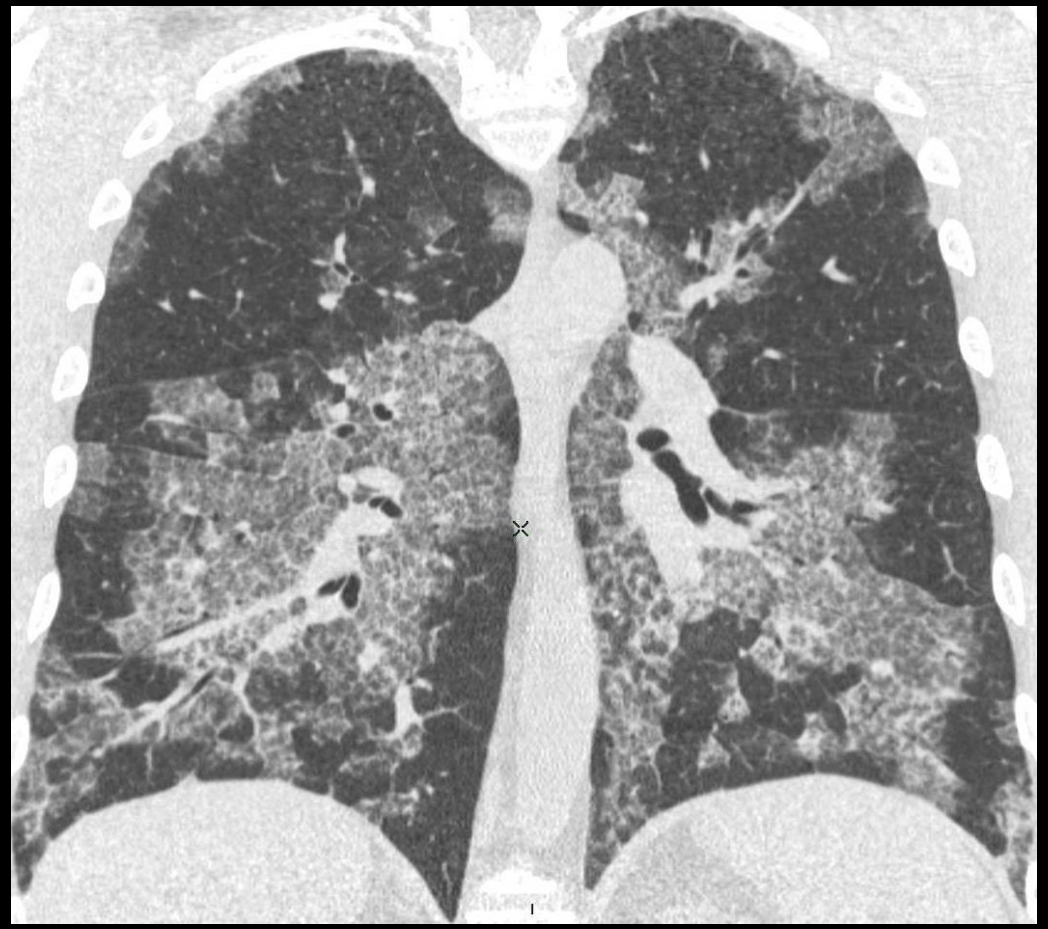
Contexte aigü

- Œdème pulmonaire
- Hémorragie pulmonaire
- Infection
  - P. jiroveci
  - Virus, M. pneumoniae
- …

Contexte chronique

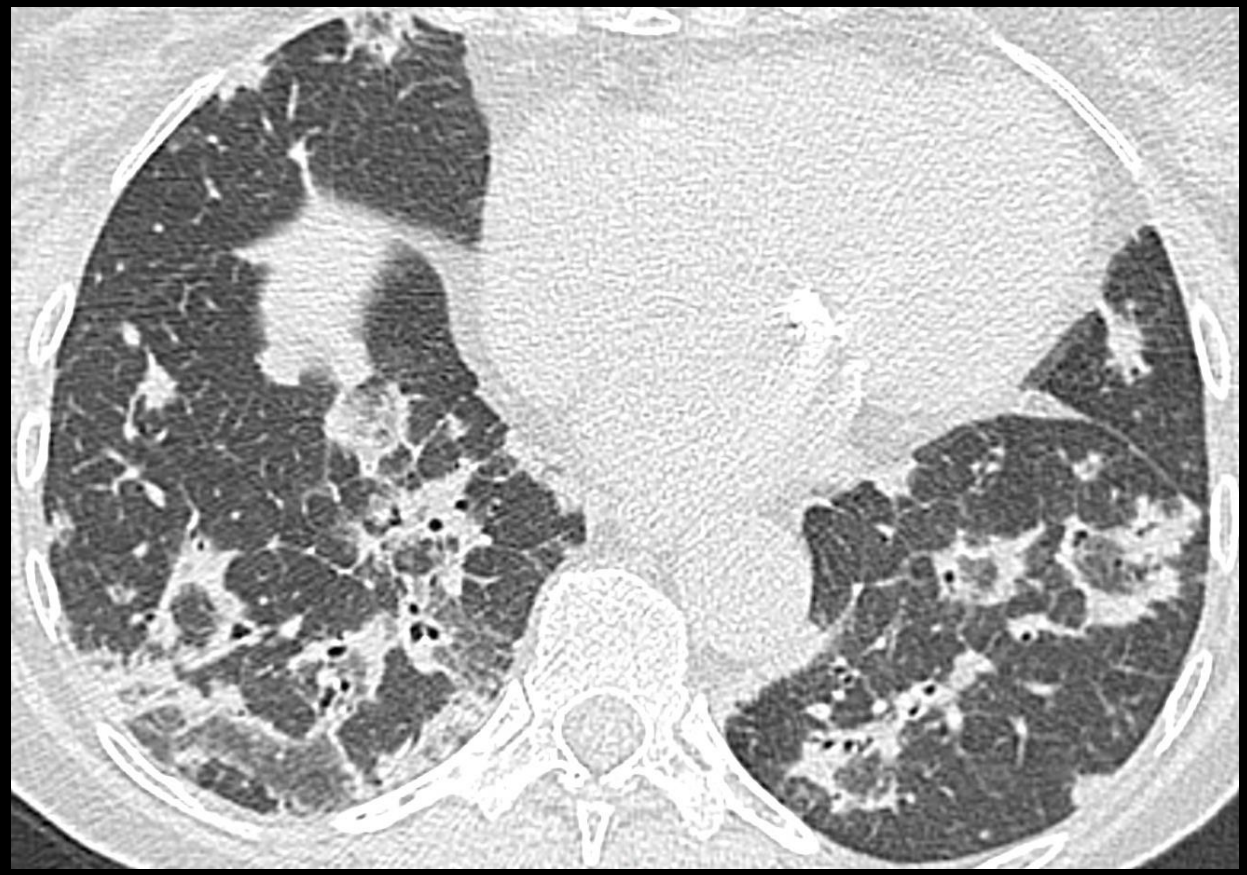
- PINS
- Pneumopathie d’hypersensibilité
- DIP, RB-ILD
- Pneumopathie médicamenteuse
- LIP
- Pneumonie lipidique
- Adenocarcinome
- Protéinose alvéolaire
- Nieman-Pick
- …

« Crazy paving »



- Superposition réticulations et verre dépoli
- Aspect en carte de géographie
- Pas de signe de fibrose

« Halo inversé»



- Plage de verre dépoli
- Couronne de condensation

Verre dépoli en contexte chronique

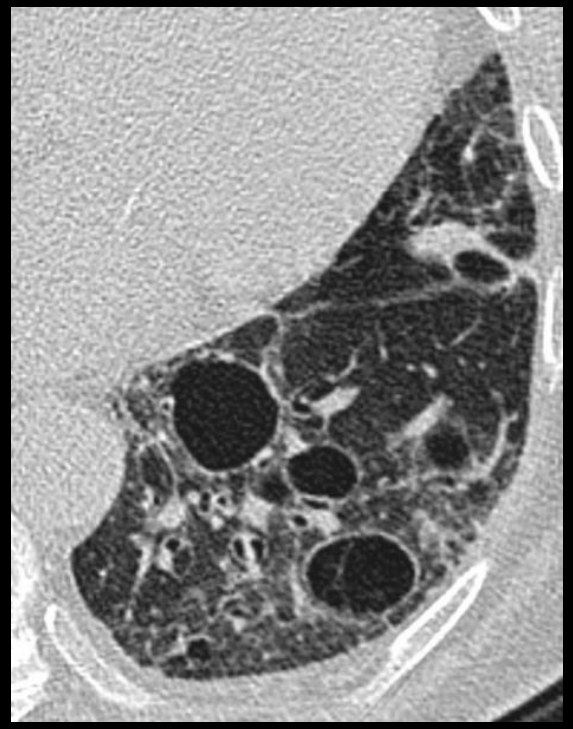
Rechercher des signes de fibrose

DIP

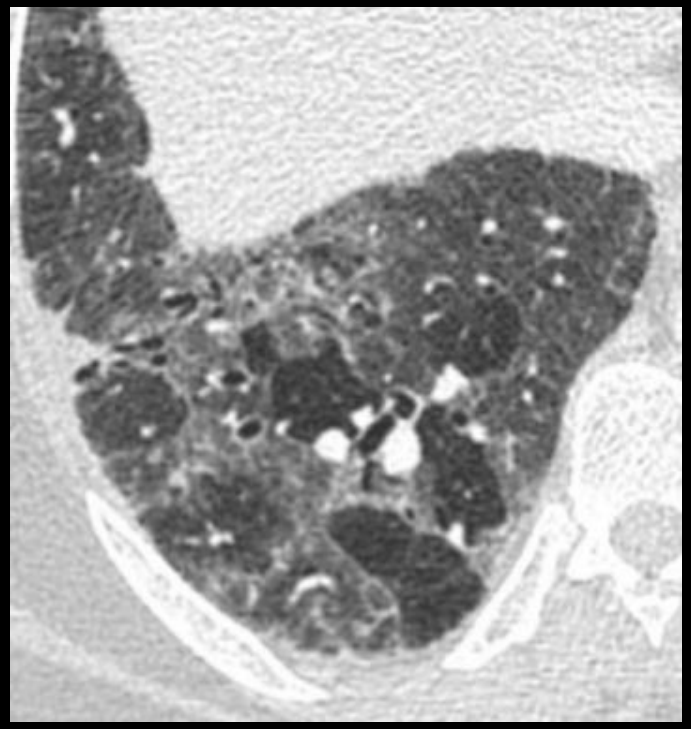
PINS fibrosante

Verre dépoli en contexte chronique

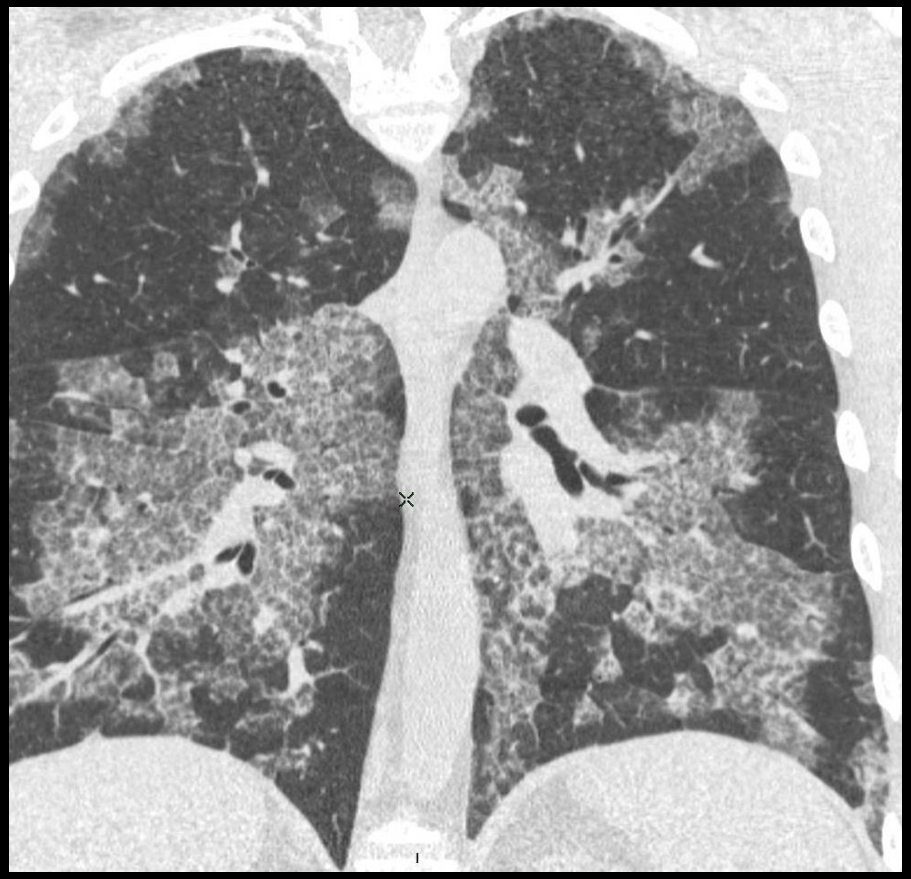
Rechercher des kystes, lobules clairs, un crazy paving



LIP



Pneumopathie d’hypersensibilité

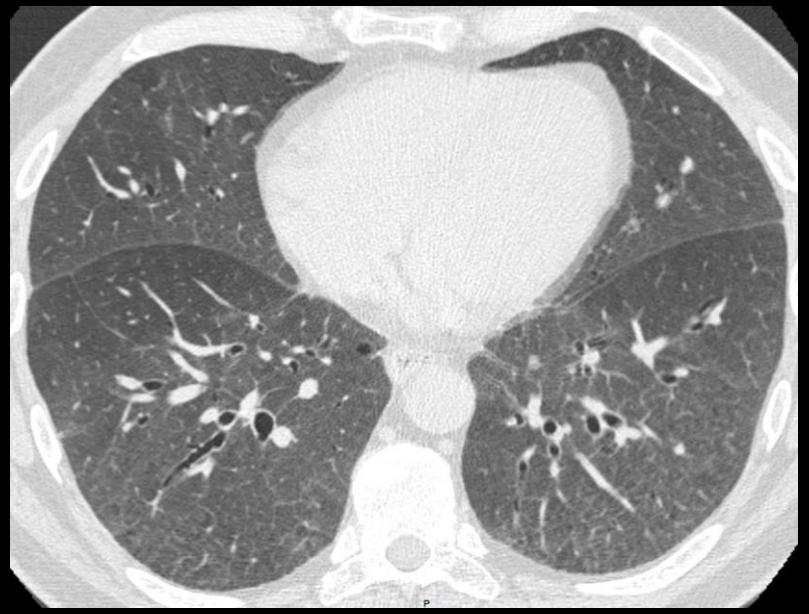


Protéinose alvéolaire

Aspect en mosaïque des densités

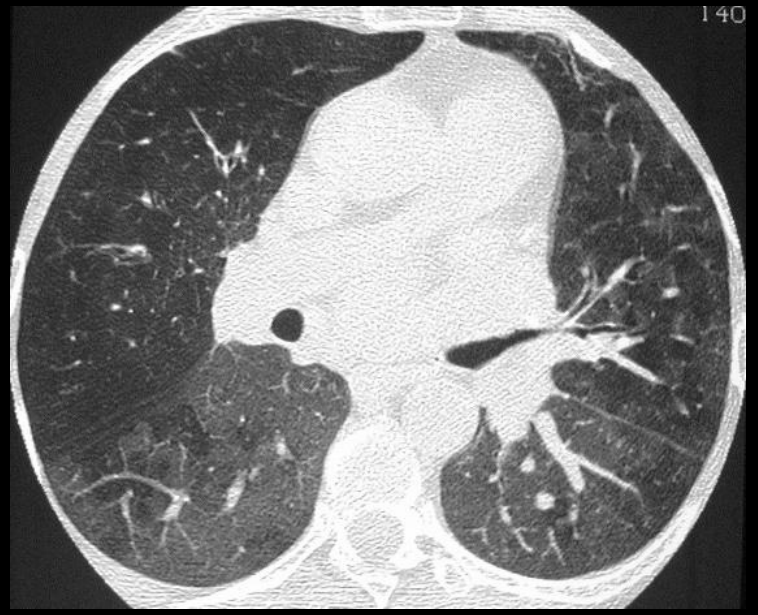
- Verre dépoli patchy

Zones les plus denses sont pathologiques

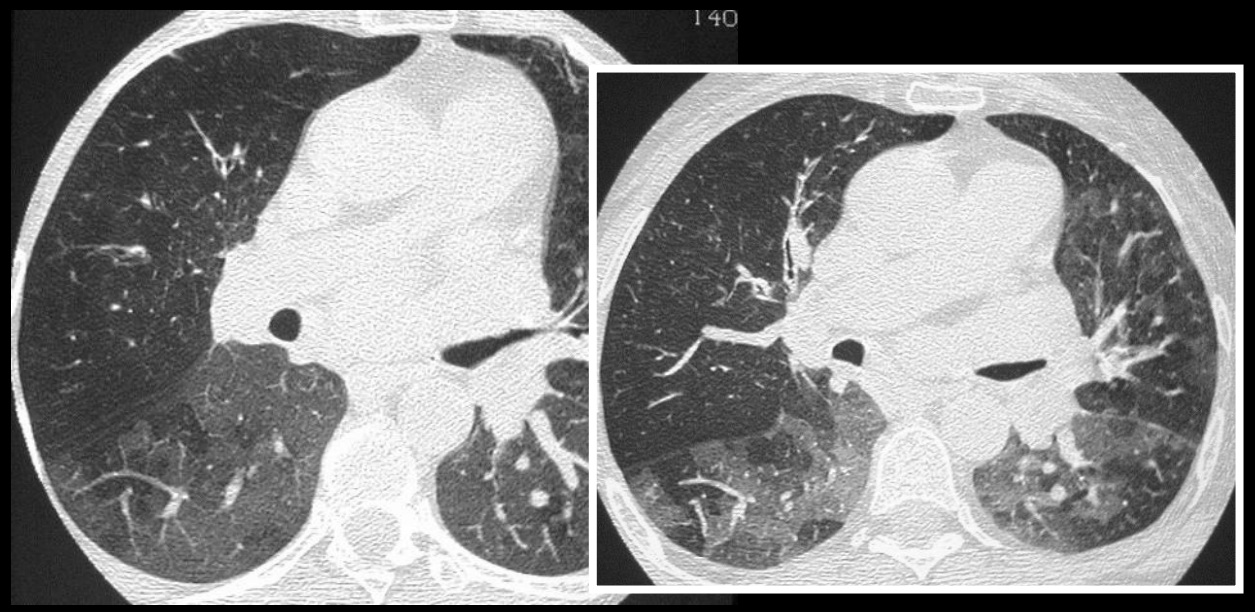


- Perfusion en mosaïque

Zones les moins denses sont pathologiques



Perfusion en mosaïque



Comment la reconnaître ?

↓ calibre vaisseaux des zones moins denses

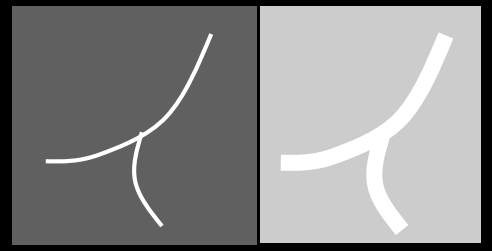
Comment identifier la cause ?

Rechercher un piégeage aérique

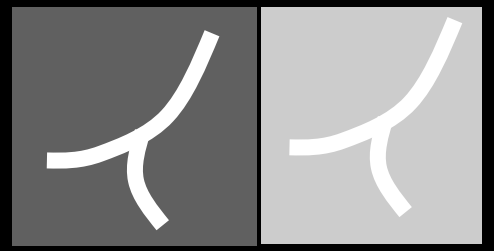
⇒ Coupes en <u>expiration</u>

- Zones les moins denses hypoperfusées
  - Séquelle embolique
  - Vasoconstriction réactionnelle à atteinte bronchiolaire
- Zones les plus denses bien perfusées

Comparer le calibre des vaisseaux

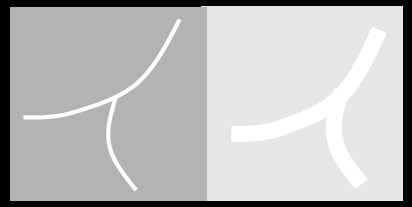


Perfusion en mosaïque



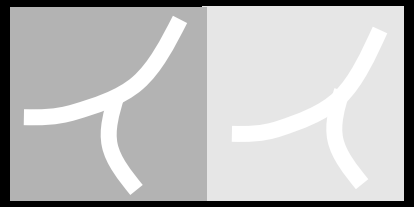
Aspect en mosaïque

Expiration



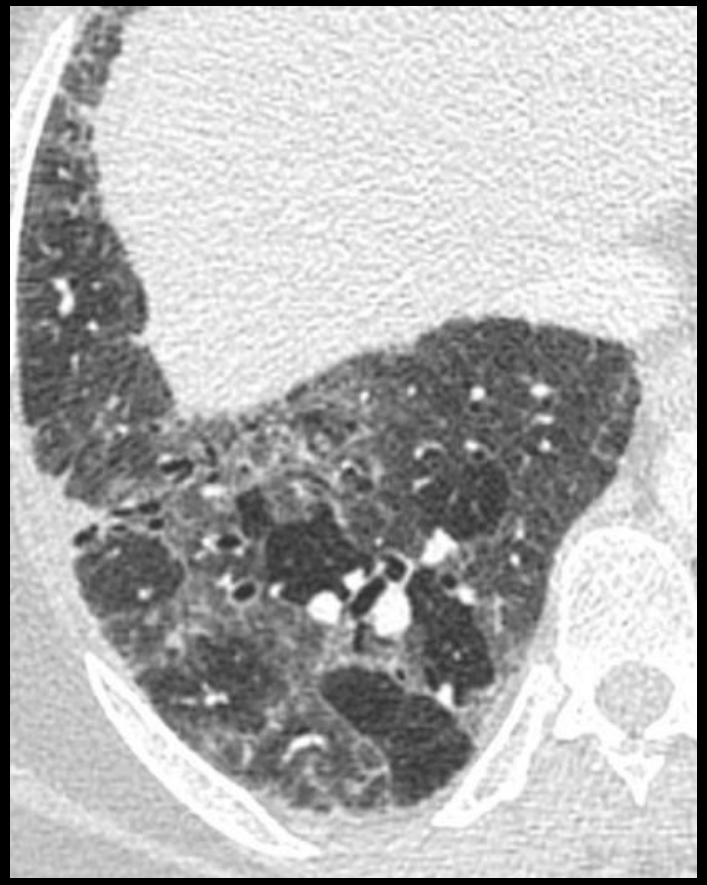
Maladie vasculaire

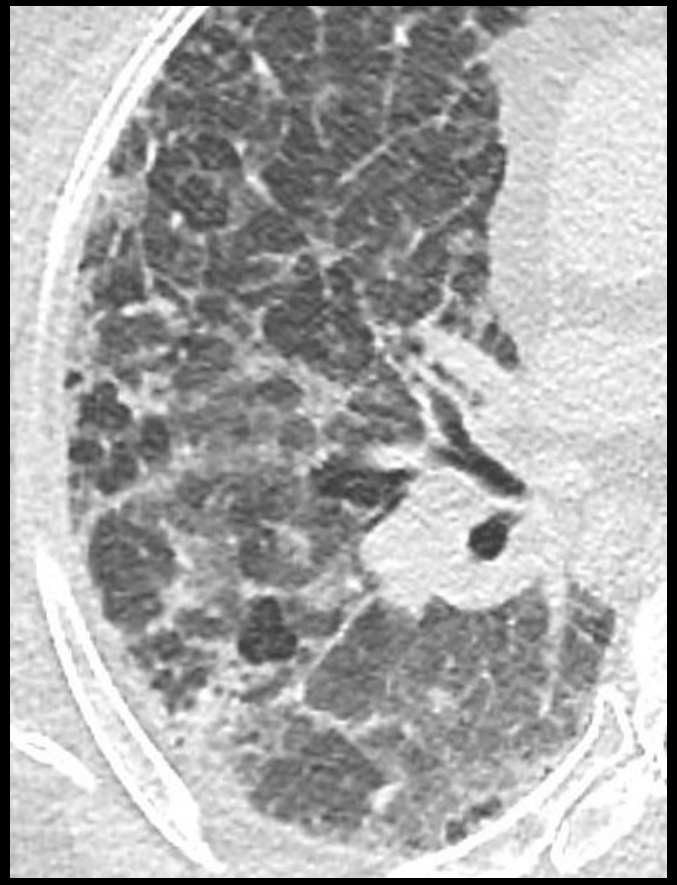
Maladie voies aériennes

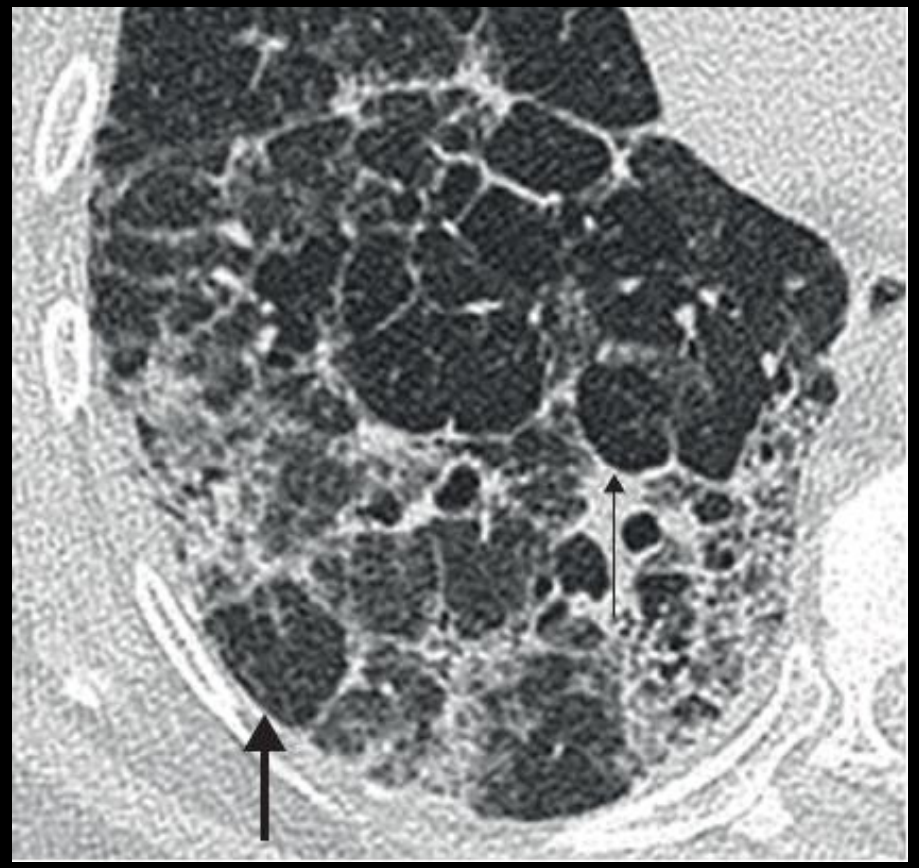


Maladie infiltrative

Aspect « 3 densités »







Verre dépoli
Lobules hyperclairs
Lobules de densité normale

→

- Pneumopathie d’hypersensibilité
- Sarcoidose
- PID liées au tabac
- Syndrome de Gougerot-Sjögren

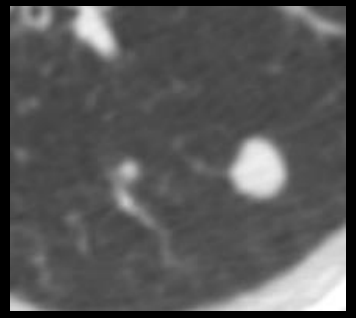
Nodules

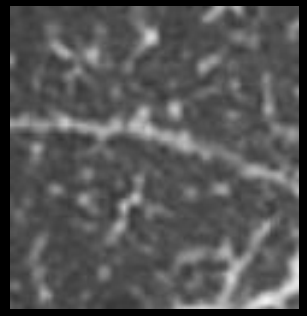
- Focal, rond ou ovale

  Micro - < 3 mm
  Masses > 30 mm

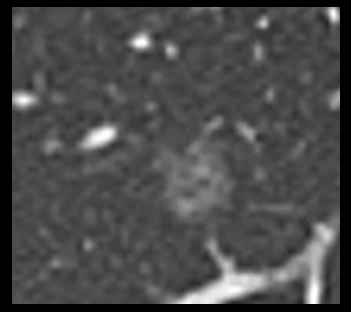
- « Solide » ou de faible densité

« Solide »



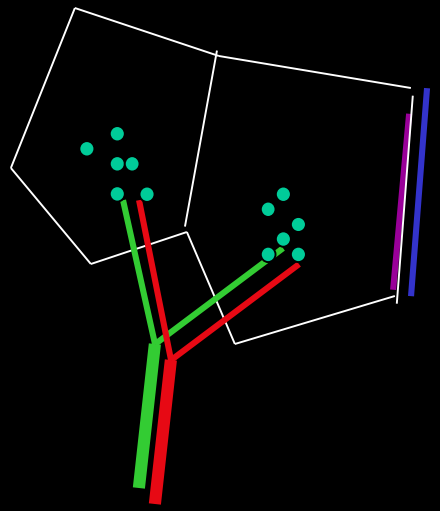


Faible densité

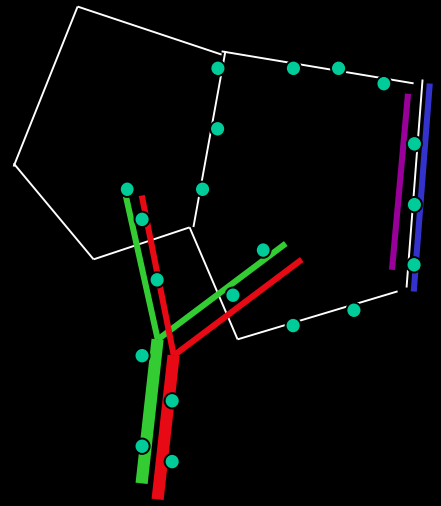


Lésions micronodulaires

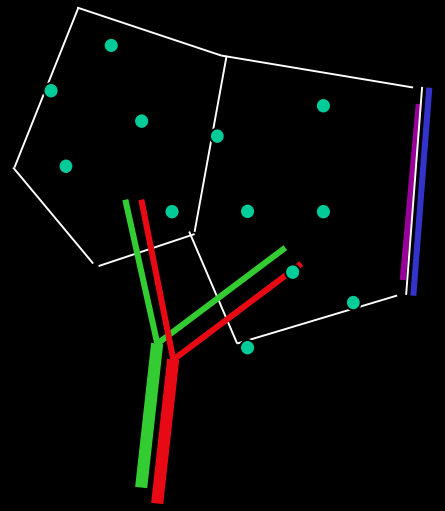
Distribution centrolobulaire



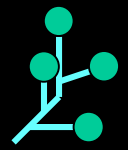
Distribution périlymphatique



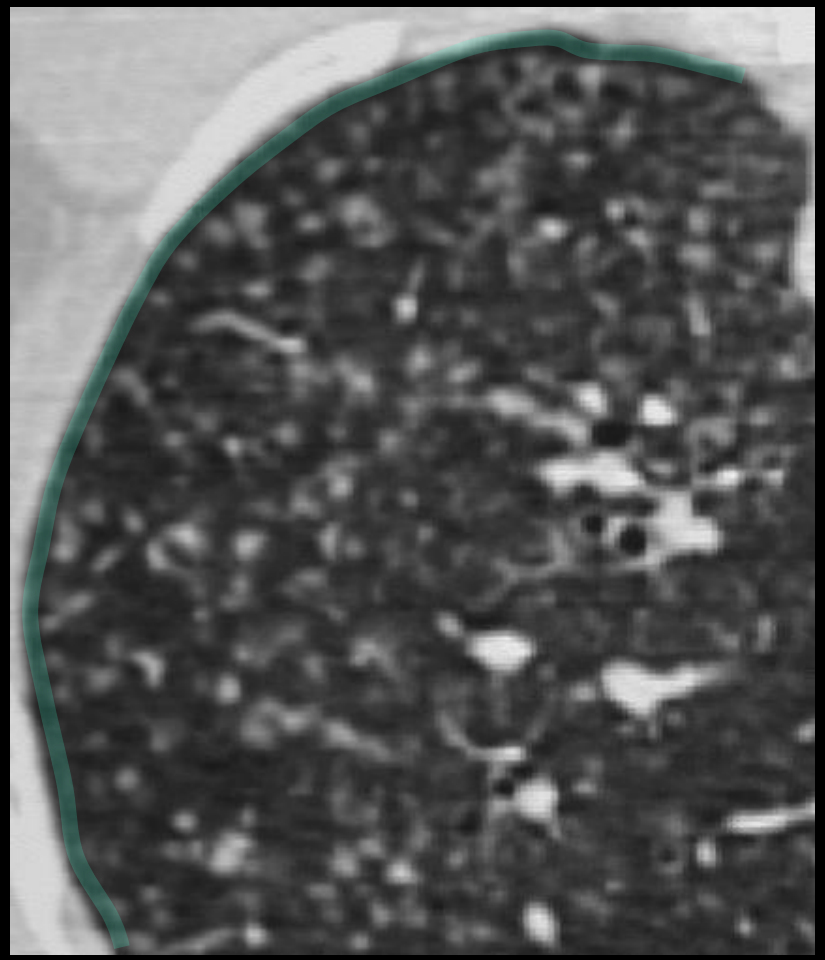
Distribution au hasard

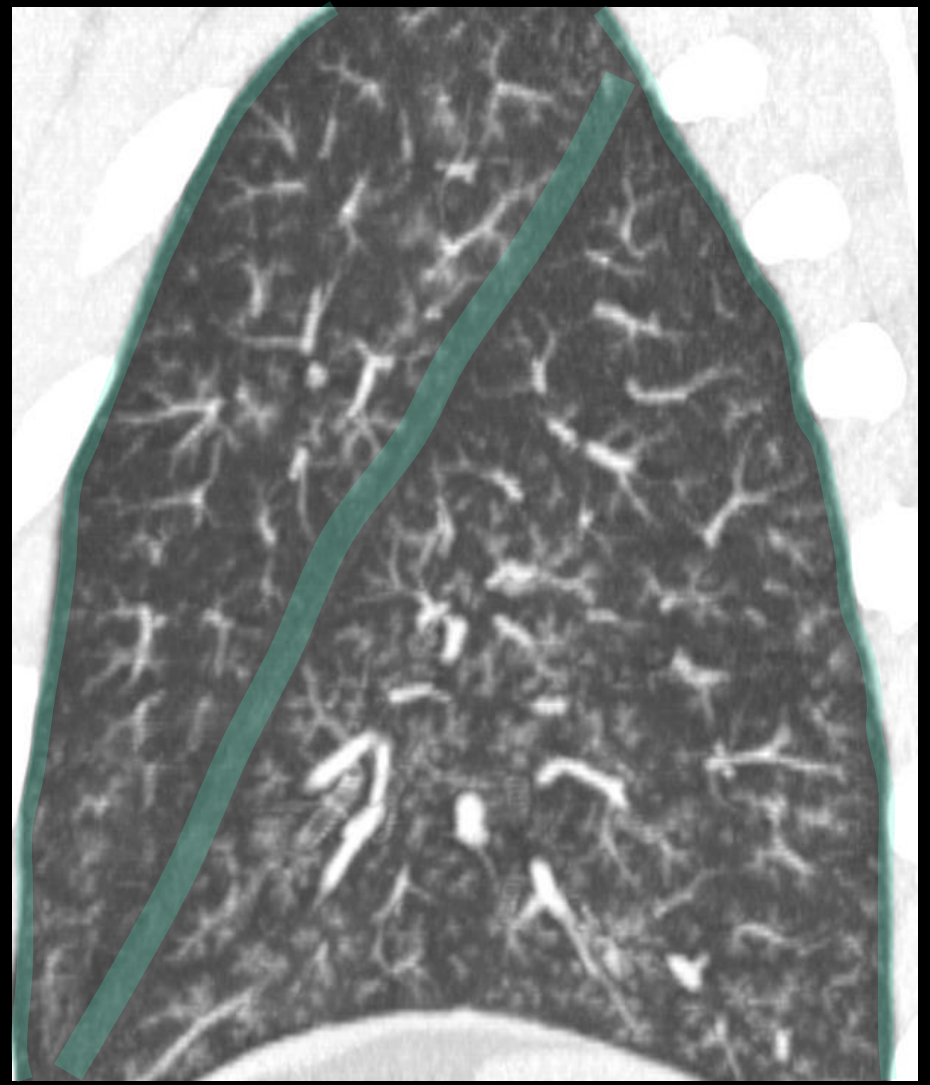


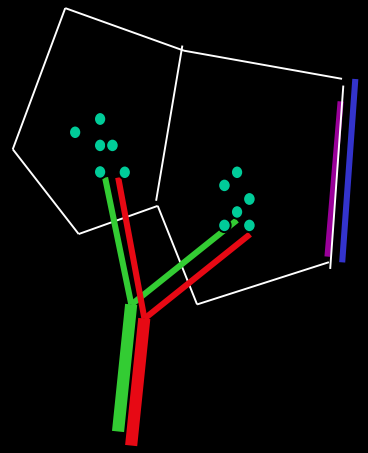
Avec arbre en bourgeons



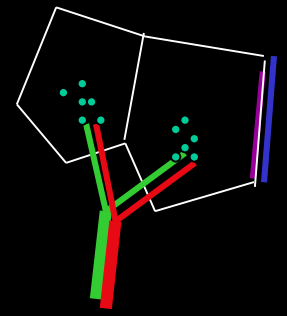
Distribution centrolobulaire







Distribution centrolobulaire



Maladie péribronchiolaire

- Bronchiolite infectieuse
- Bronchiolite respiratoire
- Pneumopathie d’hypersensibilité
- Bronchiolite folliculaire
- …

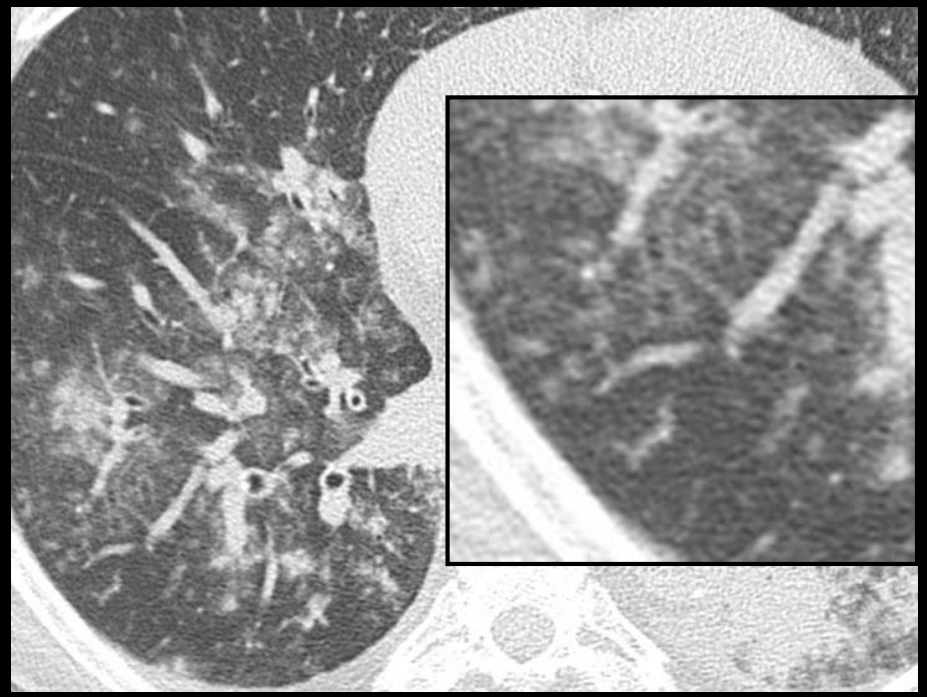
Maladie périvasculaire

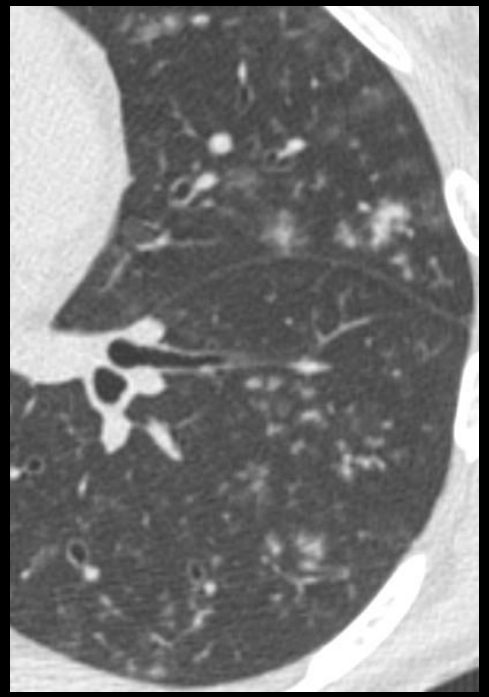
- Œdème pulmonaire débutant
- Hémorragie alvéolaire
- Hypertension artérielle pulmonaire
- …

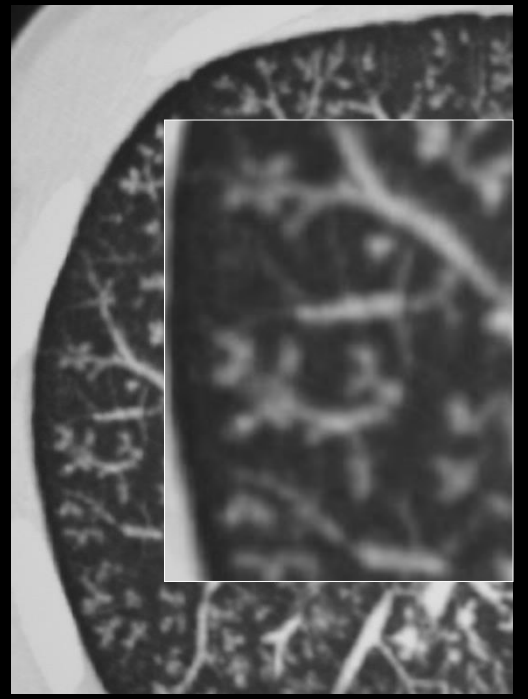
Distribution centrolobulaire

Infection ++

- Arbre en bourgeons fréquent
- ± Verre dépoli, condensations, épaississement parois bronchiques
- Souvent patchy



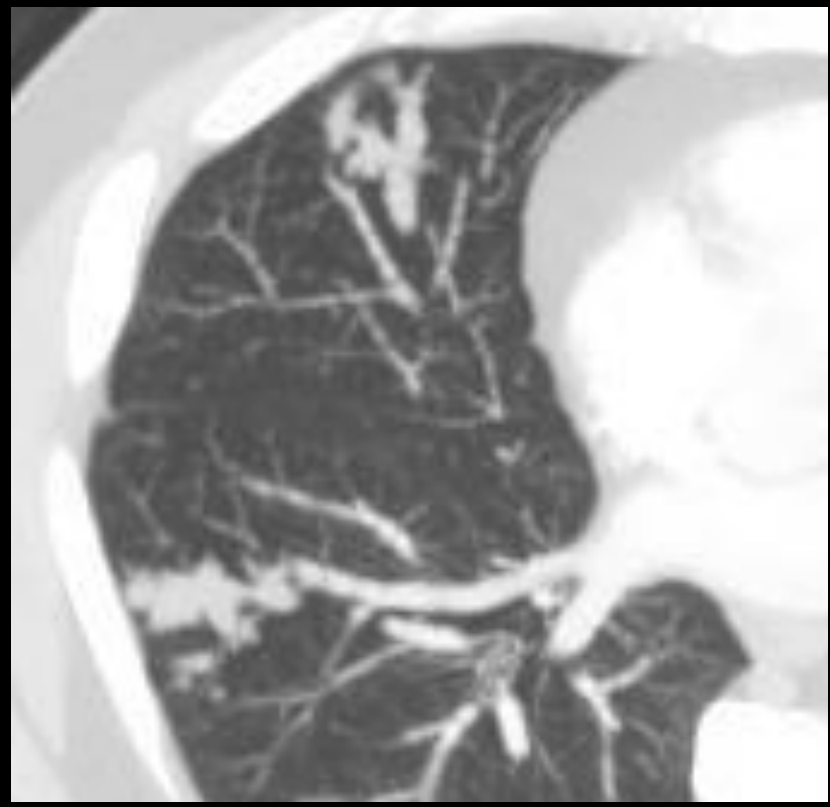




Causes non infectieuses d’arbre en bourgeons

- Certaines bronchiolites inflammatoires
- Métastases endobronchiques/endovasculaires

Bronchiolite folliculaire (Sjögren)



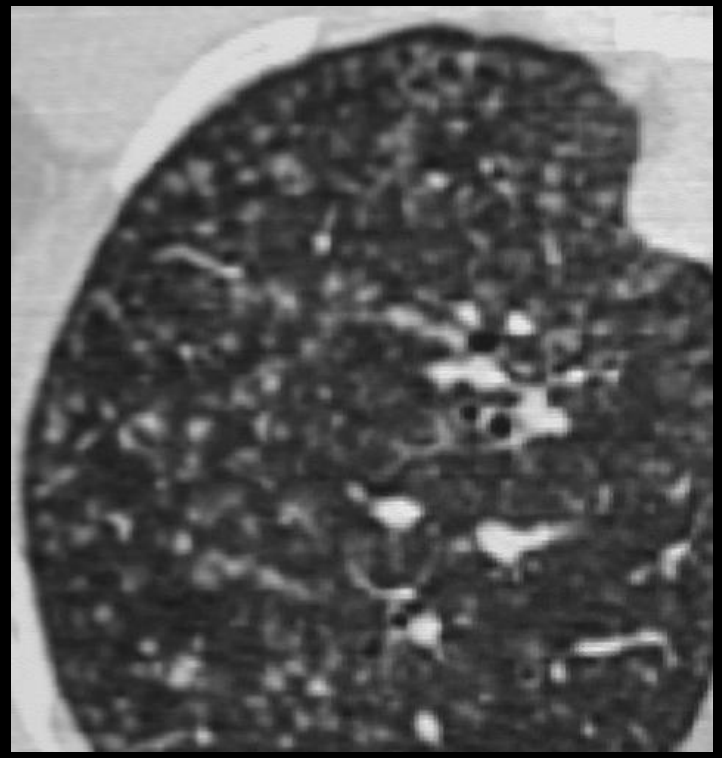
Métastases endovasculaires

Distribution centrolobulaire sans arbre en bourgeons

Bronchiolite respiratoire et pneumopathie d’hypersensibilité

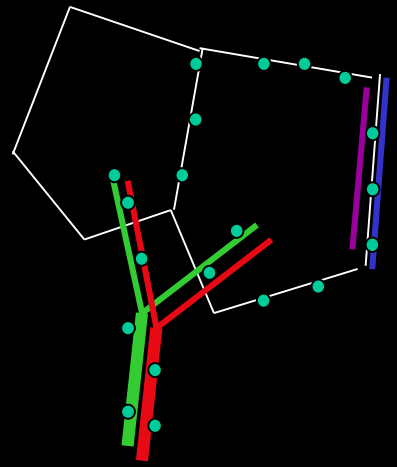
- Faible densité
- Diffus ou à prédominance supérieure

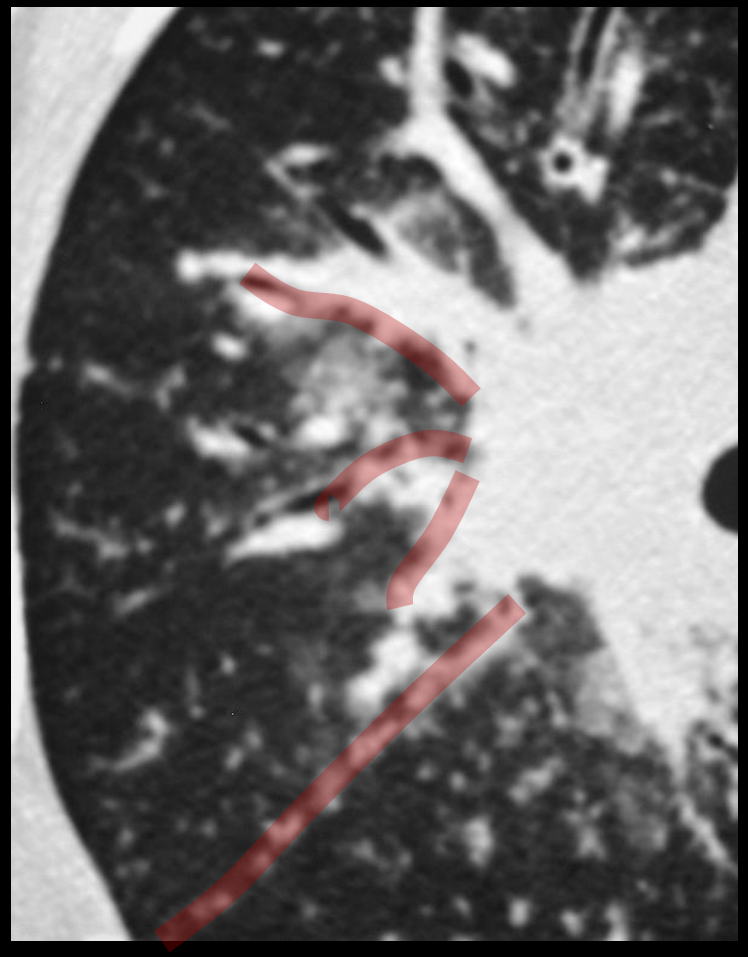
Bronchiolite respiratoire

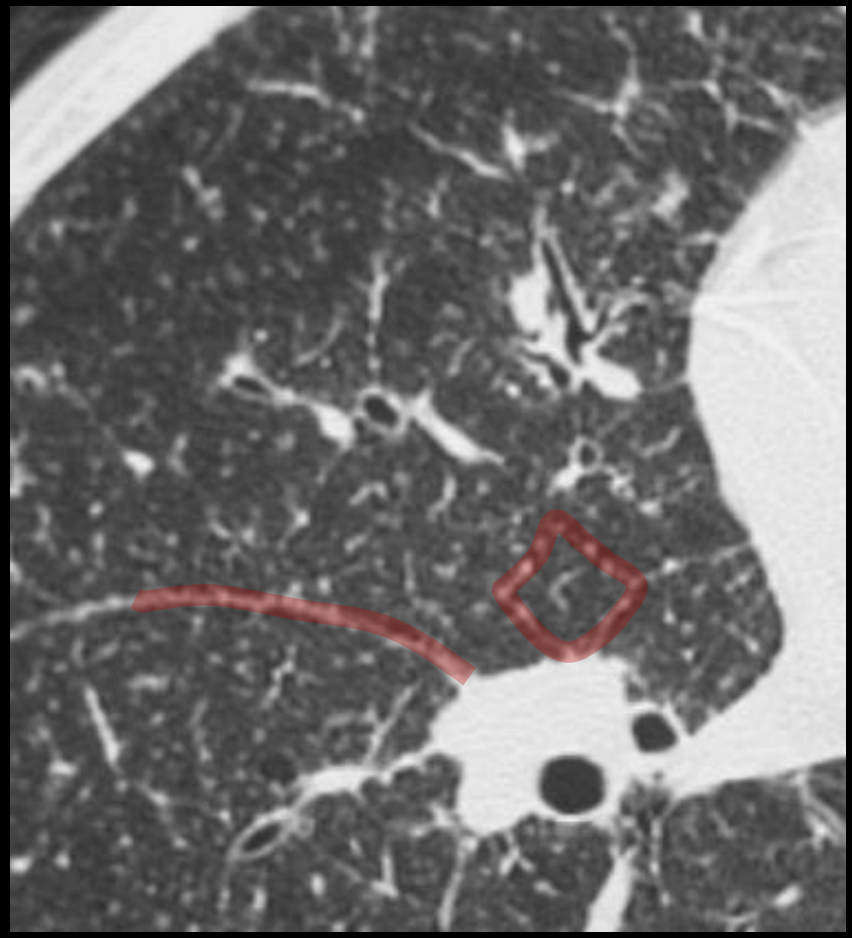


Pneumopathie d’hypersensibilité

Distribution périlymphatique







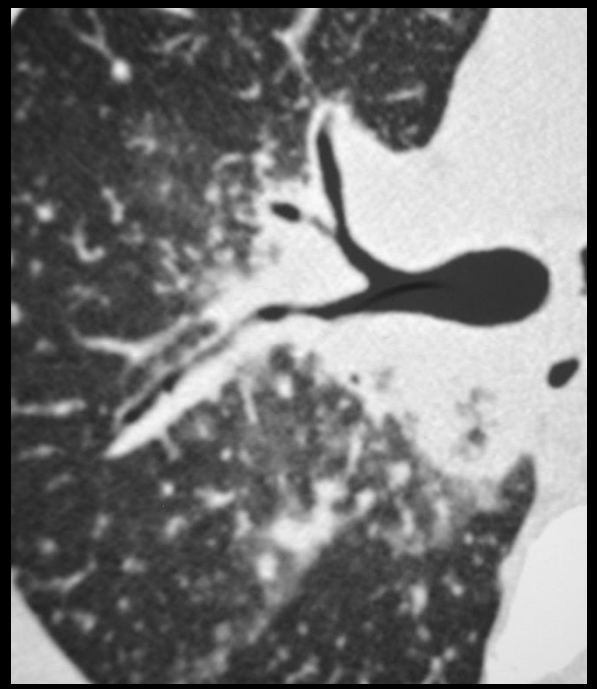
Distribution périlymphatique

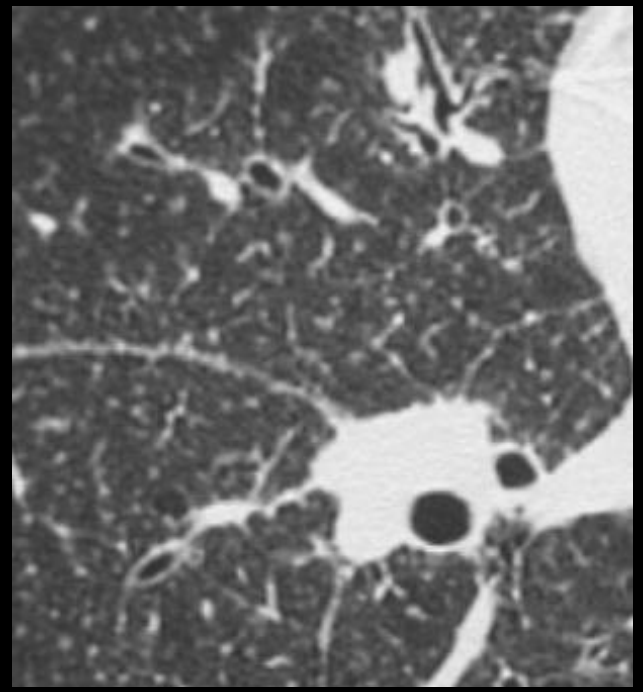
- Sarcoidose
- Pneumoconioses
  - Silicose
  - Bérylliose
- Lymphangite carcinomateuse
- Amylose
- …

Distribution périlymphatique

Sarcoidose

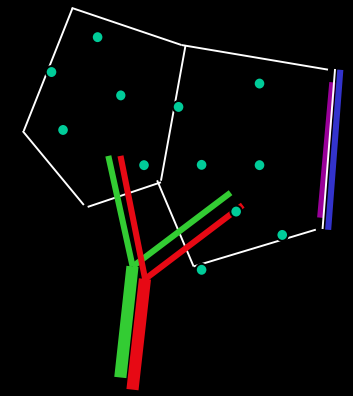
- Le plus souvent le long des axes bronchovasculaires centraux et des scissures
- Parfois aspect perlé des septas interlobulaires
- Prédominance supérieure, patchy

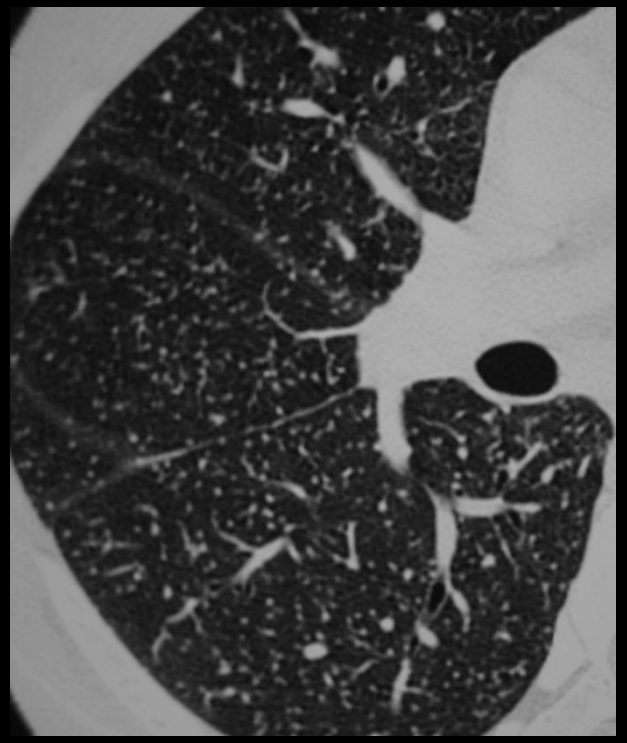




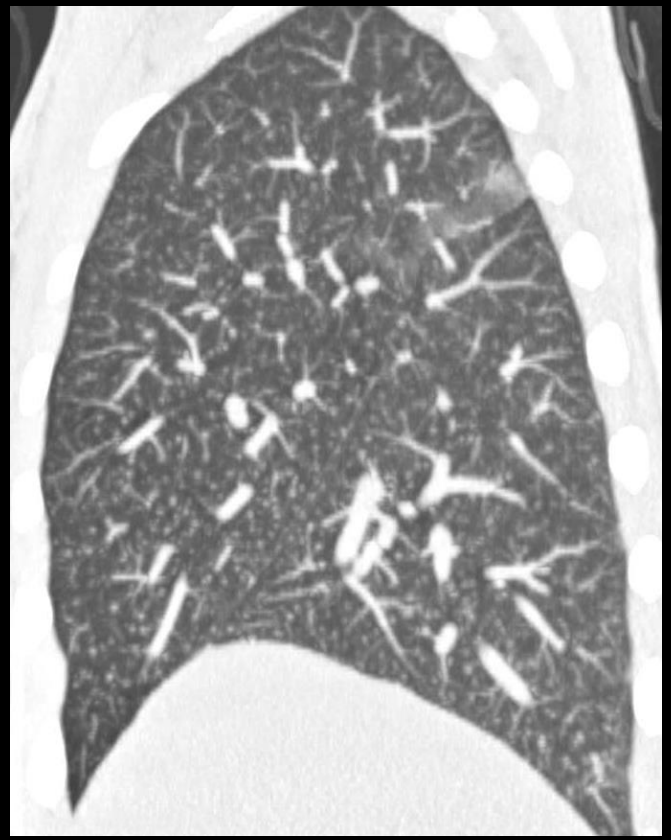
Distribution au hasard

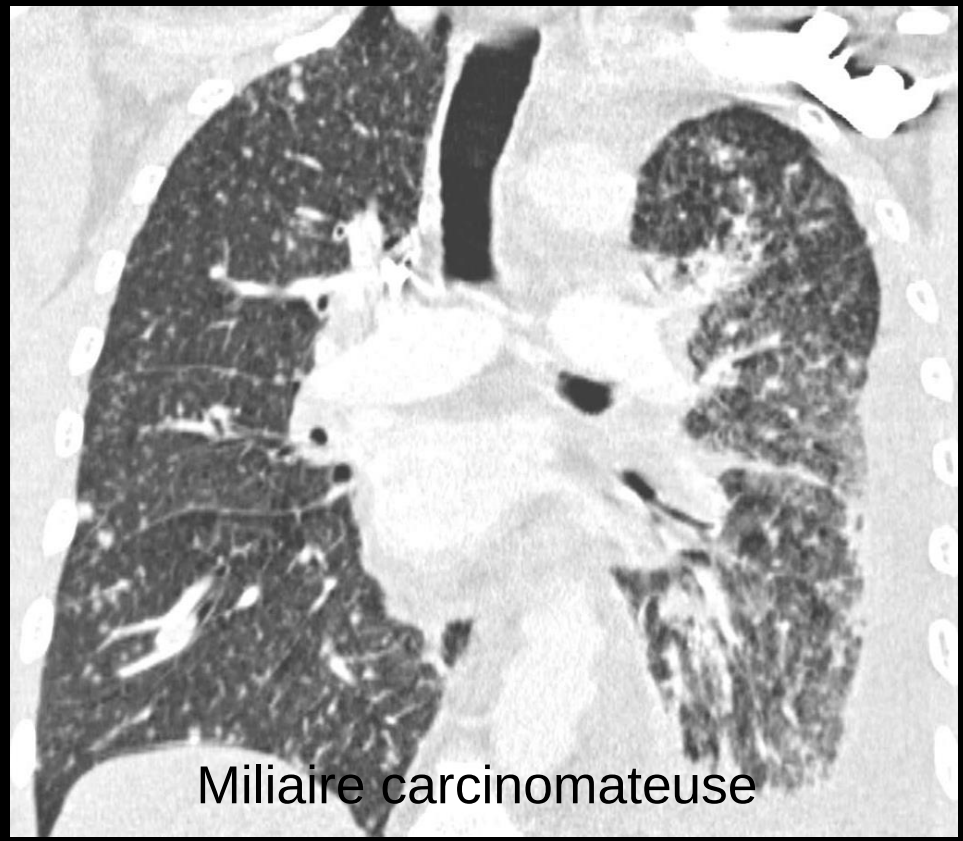
- Miliaire tuberculeuse
- Miliaire carcinomateuse
- Miliaire fungique





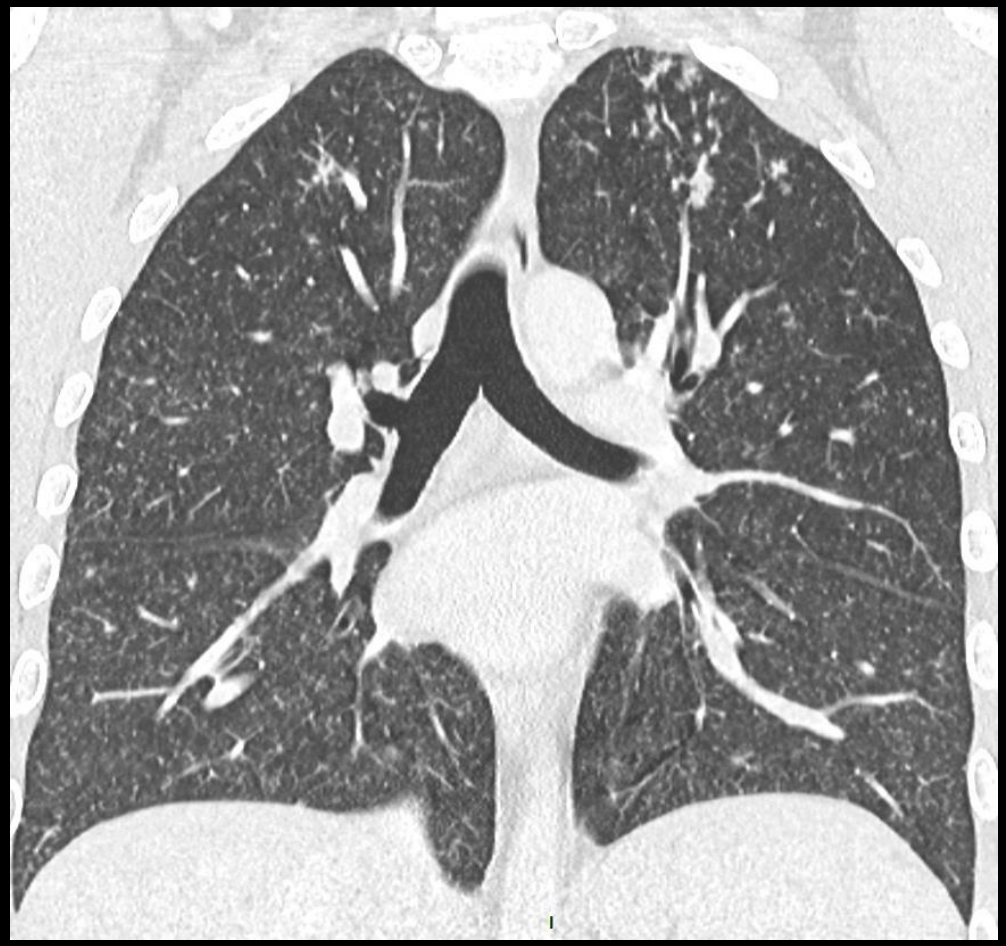
Miliaire tuberculeuse

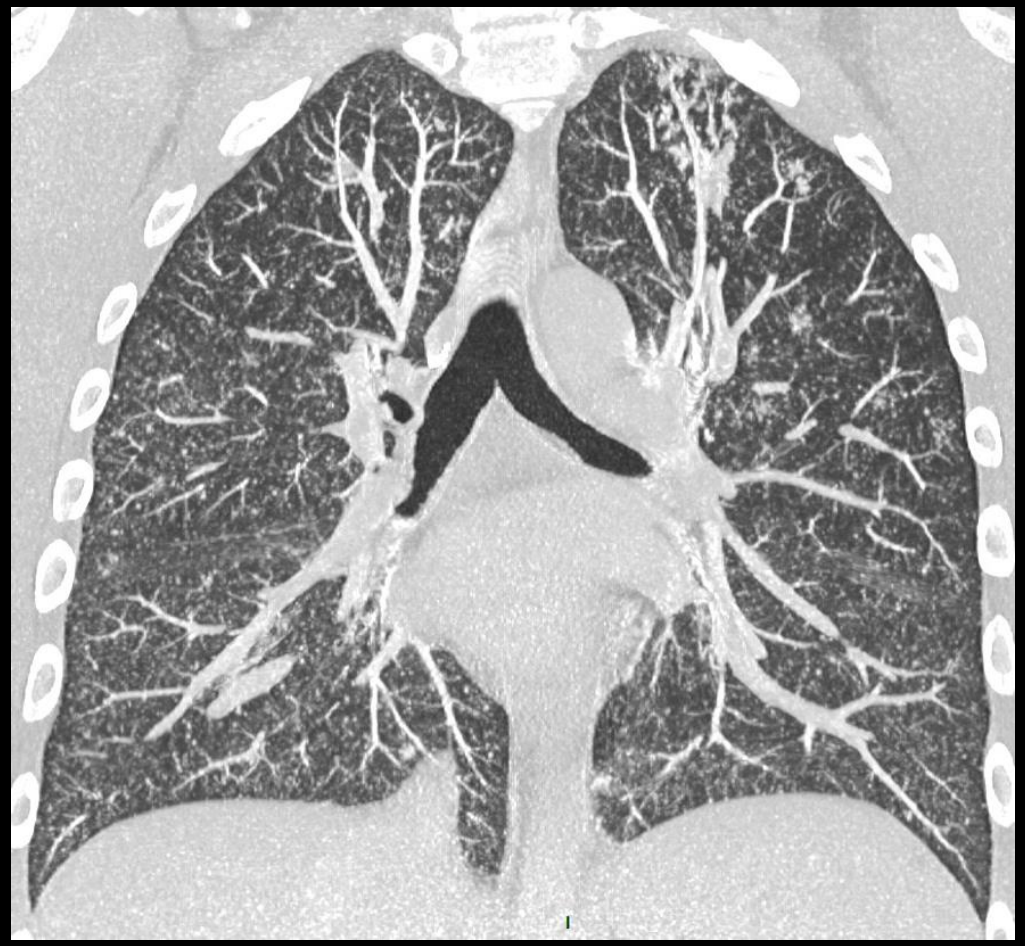




Miliaire carcinomateuse

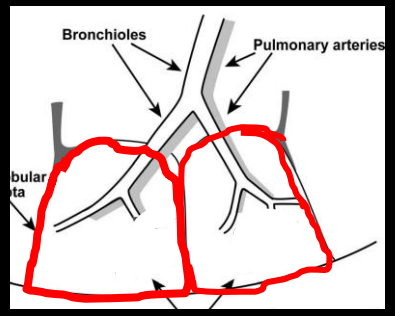
Distribution mixte



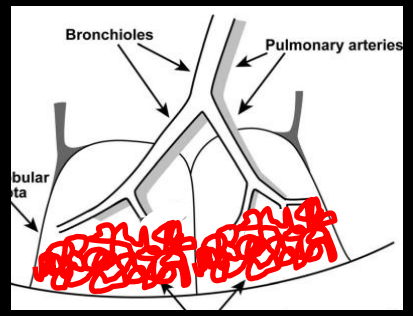


Au hasard et centrolobulaire, avec arbre en bourgeons

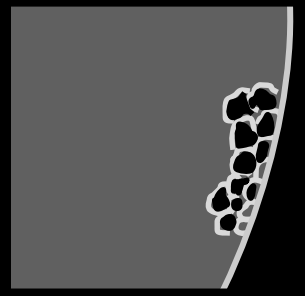
Opacités linéaires et réticulaires



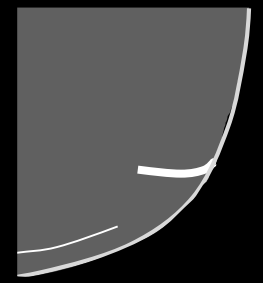
Septas



Intralobulaires

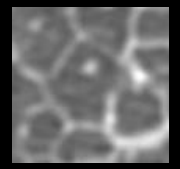


Rayon de miel

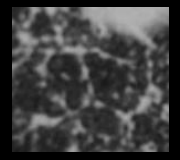


Bandes

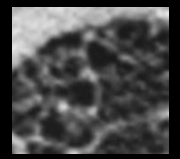
Lisse



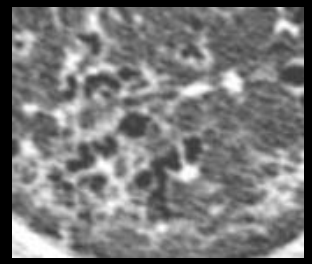
Nodulaire



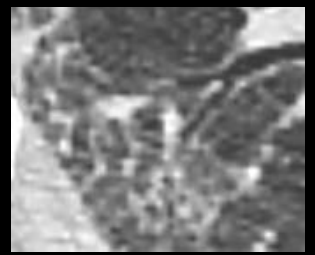
Irrégulier

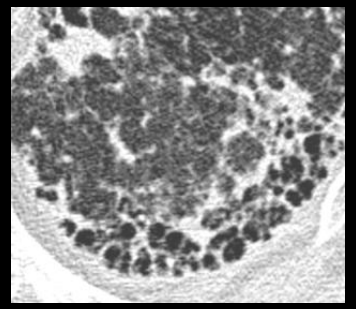


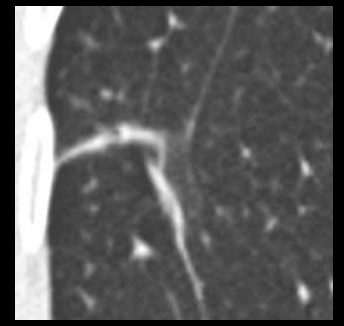
Avec fibrose



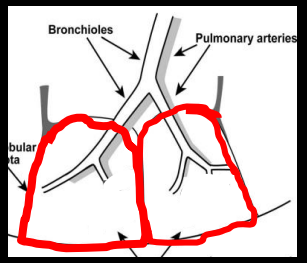
Sans fibrose

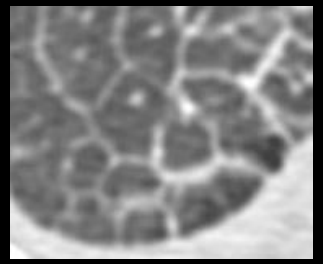






Epaississement septal





Régulier

- Œdème pulmonaire
  - Cardiogénique
  - Obstruction veineuse pulmonaire
- Hémorragie pulmonaire
- Lymphangite carcinomateuse
- Amylose
- ….

Nodulaire: maladies de distribution lymphatique

- Sarcoidose
- Lymphangite carcinomateuse
- …

Irrégulier: fibrose

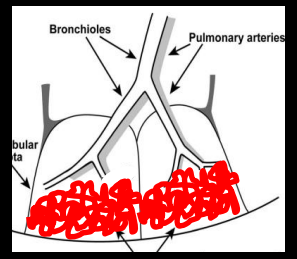
- Sarcoidose
- Pneumopathie d’hypersensibilité fibreuse
- …

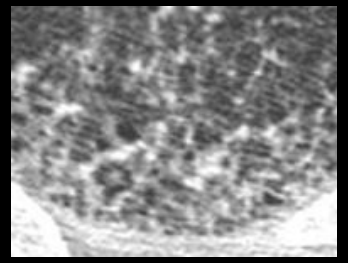
Atteinte septale prédominante

Œdème pulmonaire cardiogénique

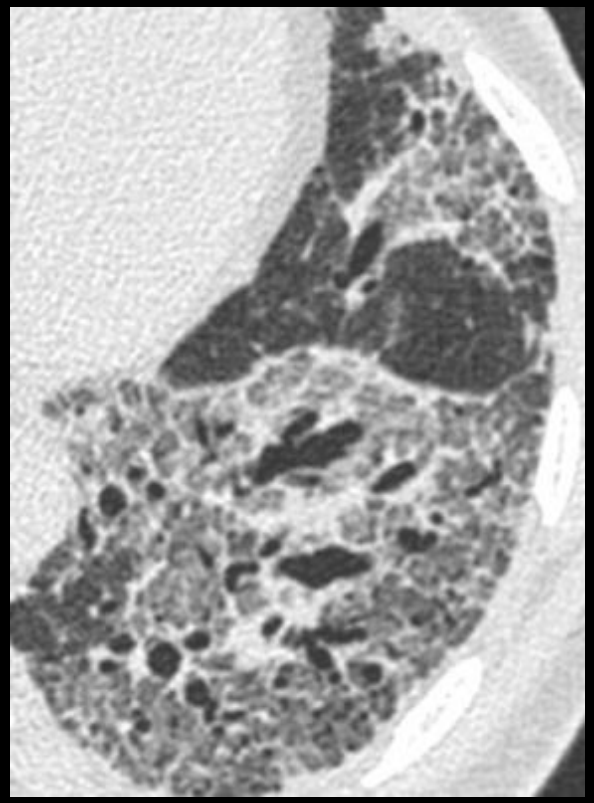
Lymphangite carcinomateuse

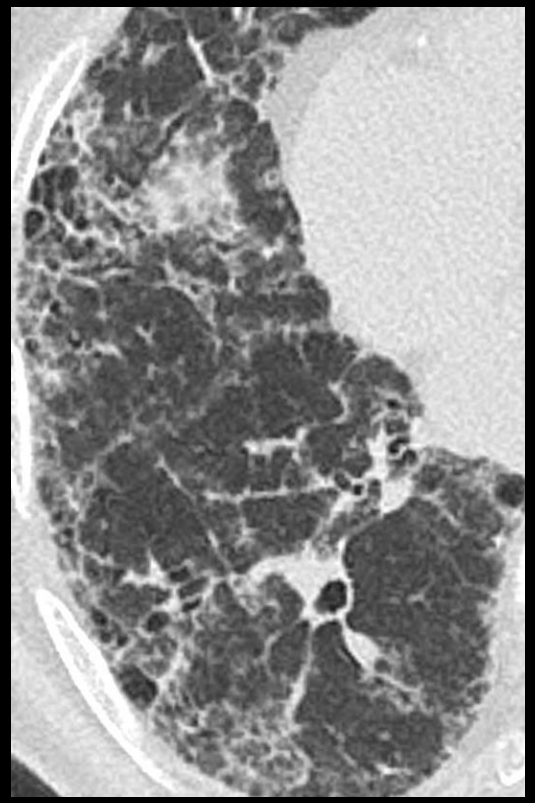
Réticulations intralobulaires



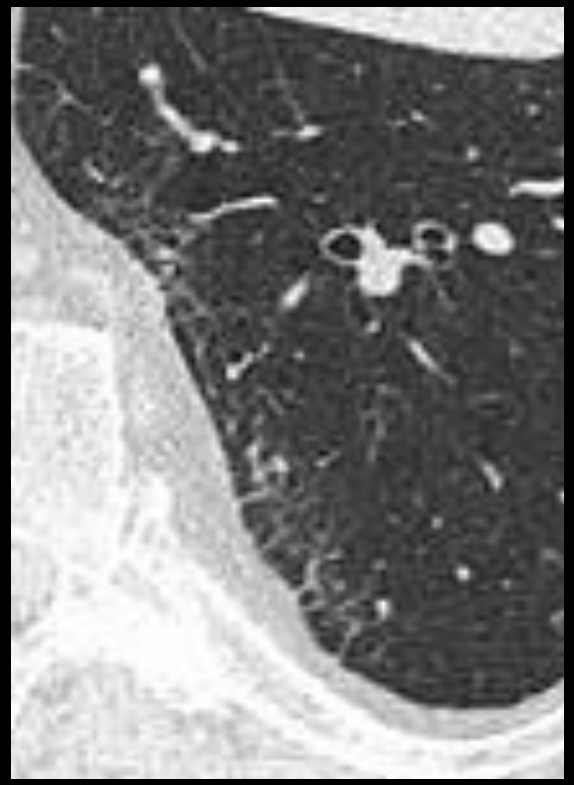


Avec signes de fibrose





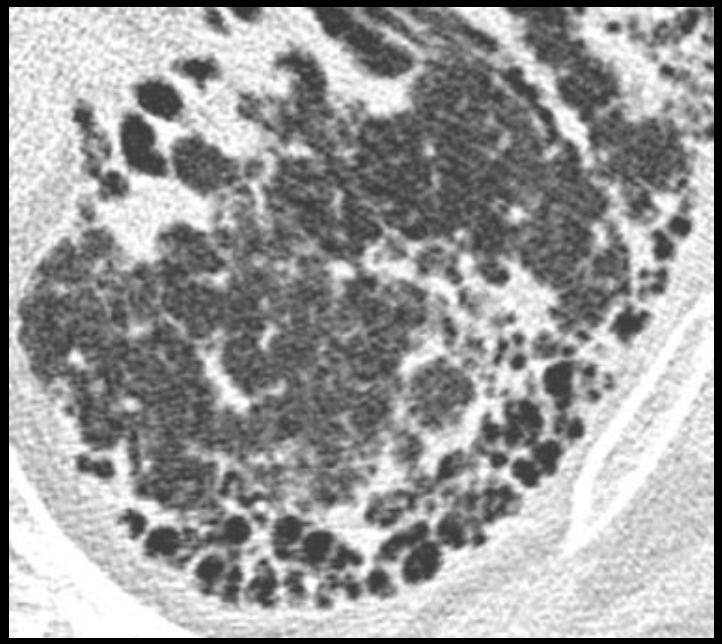
Sans signe de fibrose

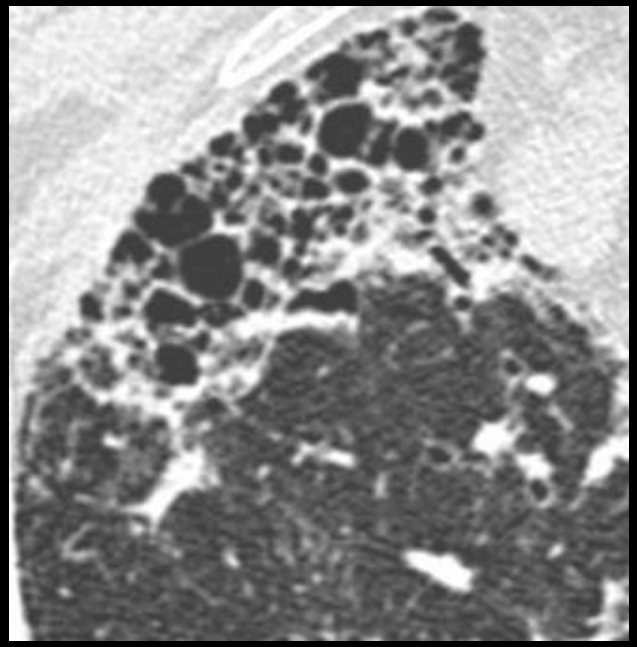


Rayon de miel

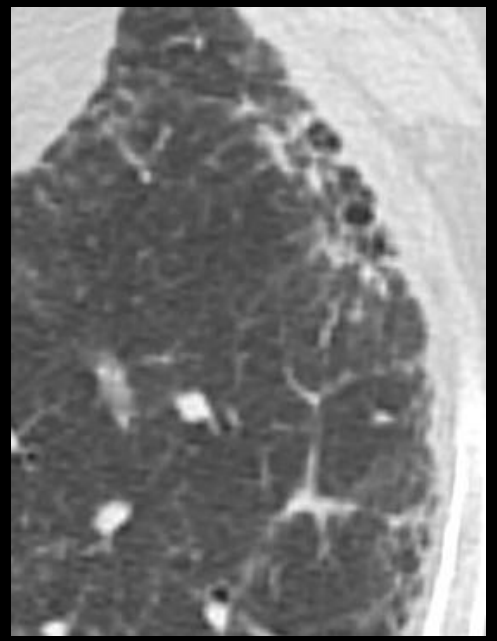
Signe formel de fibrose « end-stage »

Elément pronostique des PID fibrosantes

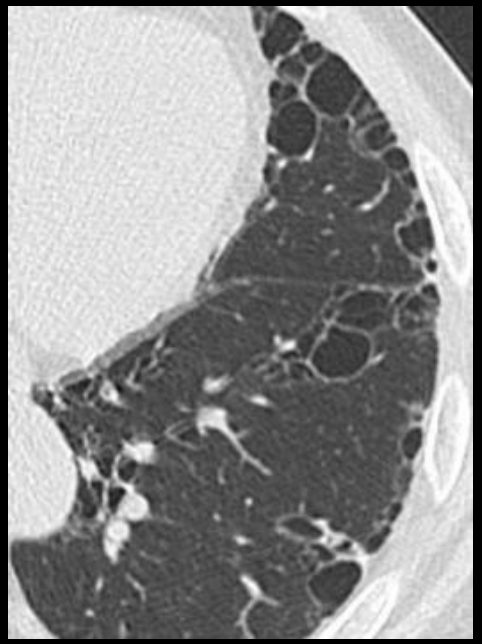




Tailles variables



Mono-couche

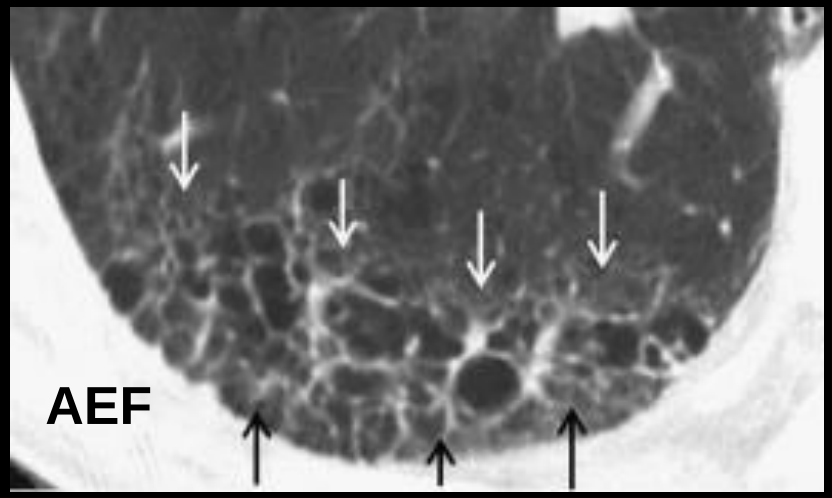


Macrokystique pur

- Regroupement d’espaces aériques
- Parois bien définies 1-3 mm
- Habituellement sous-pleural

Rayon de miel : attention aux pièges

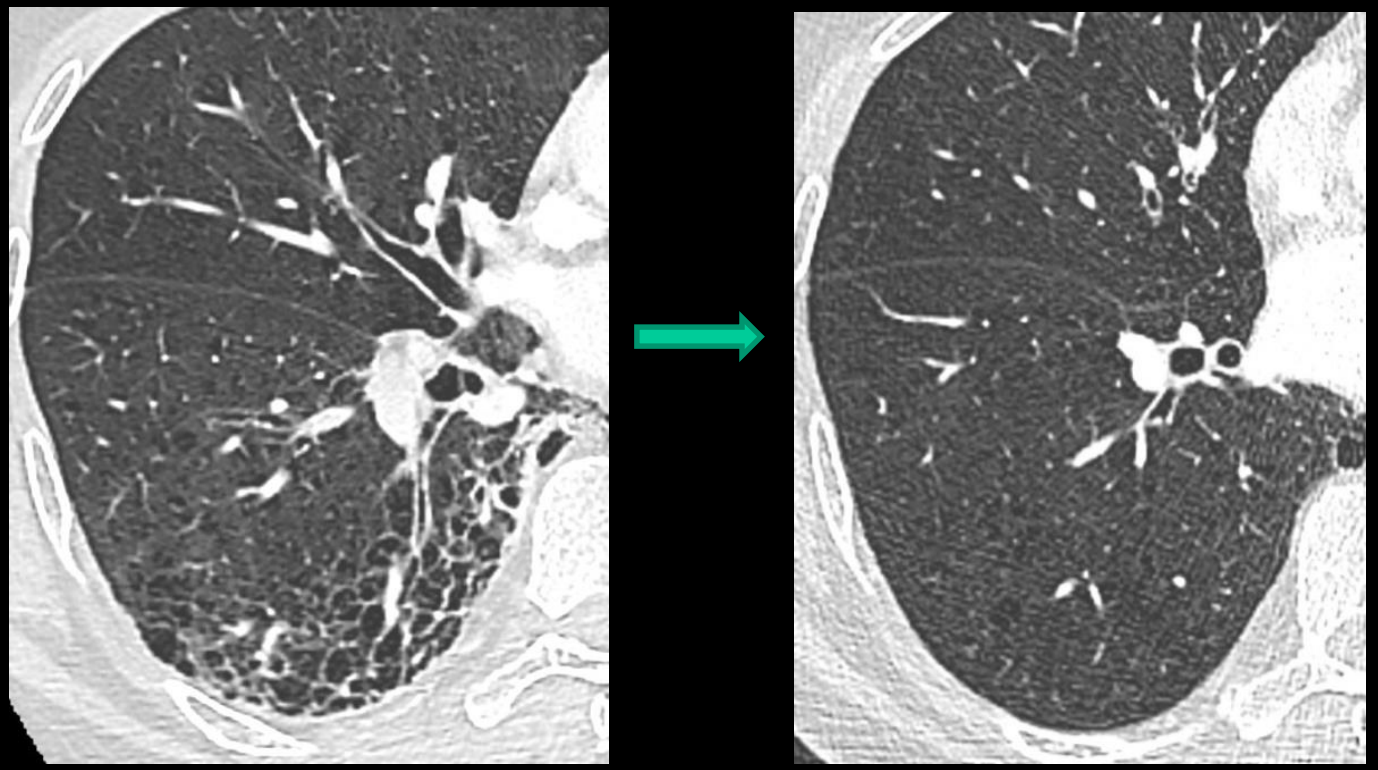
Airspace enlargement with fibrosis



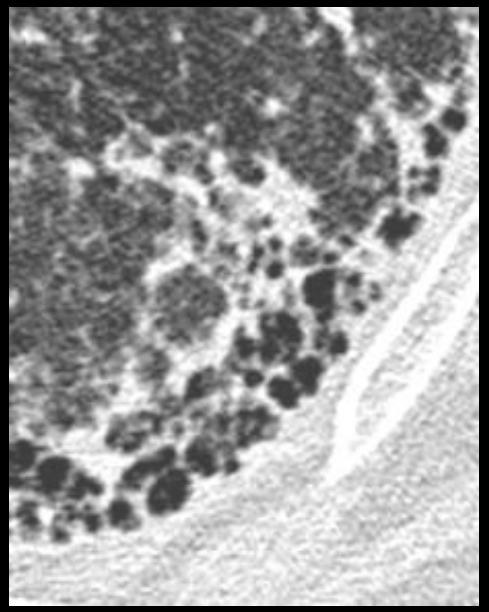
Watanabe Eur J Radiol 2015

- Légèrement à distance de la plèvre
- Parois <1 mm
- Pas de perte de volume

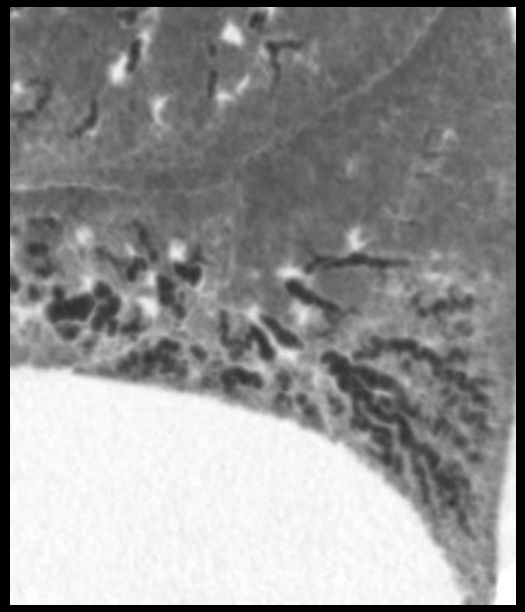
Comblement alvéolaire sur emphysème



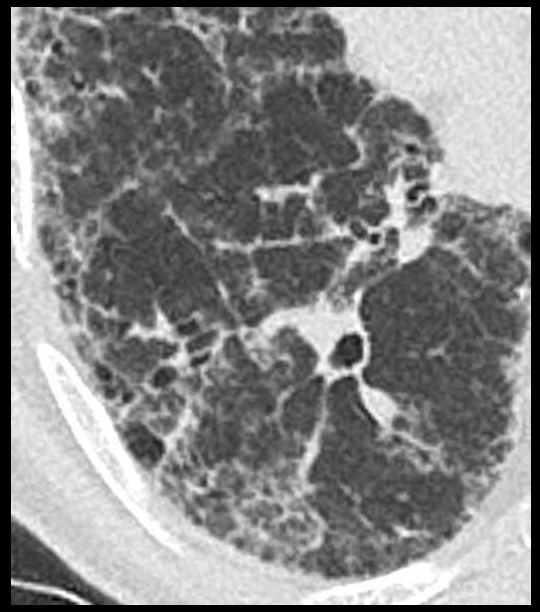
Signes de fibrose



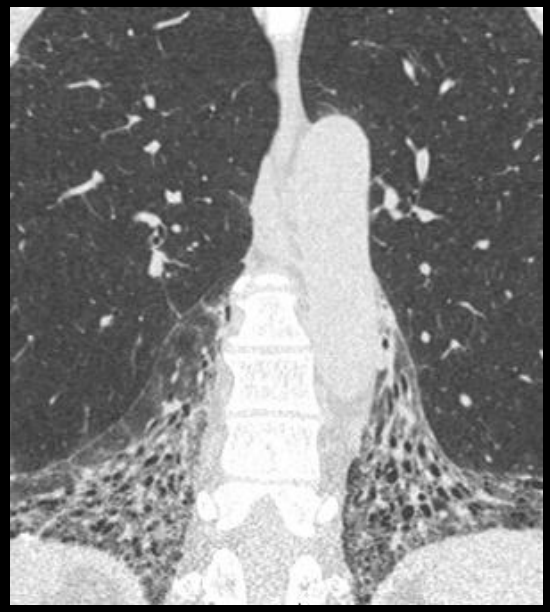
Rayon de miel



Bronchectasies de traction



Réticulations irrégulières



Perte de volume

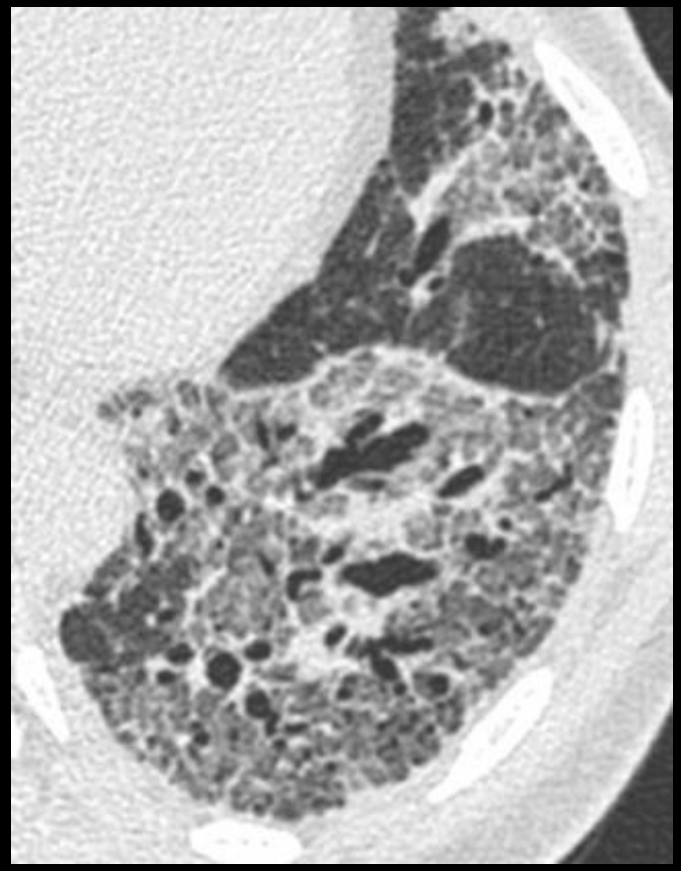
Bronchectasies de traction

Dilatation des lumières bronchiques au sein de zones de verre dépoli / réticulations

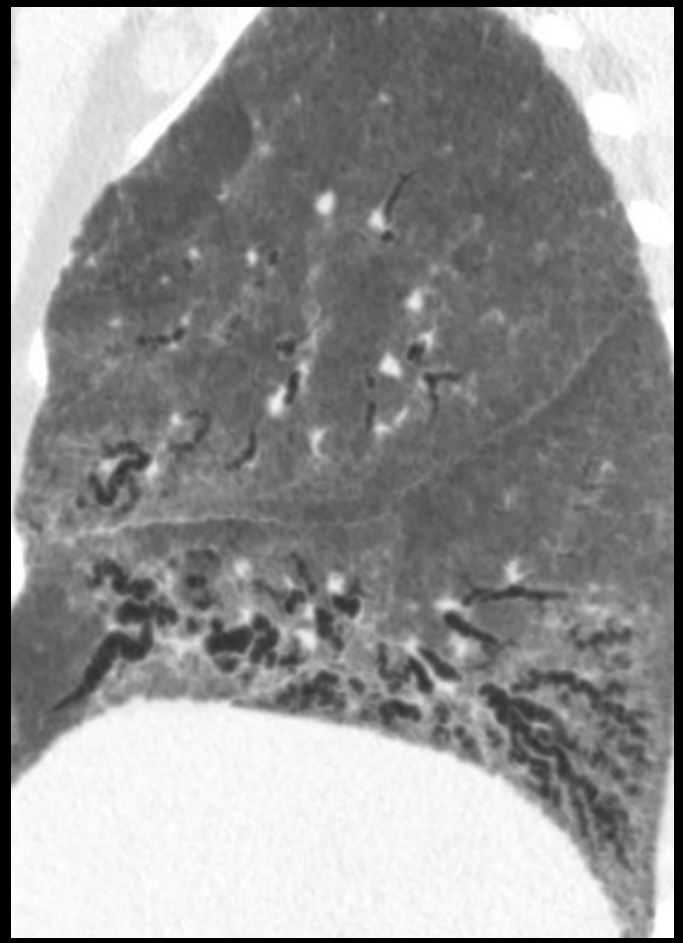
Tortuosité dans les formes évoluées

Elément pronostique des PID fibrosantes

Périphériques



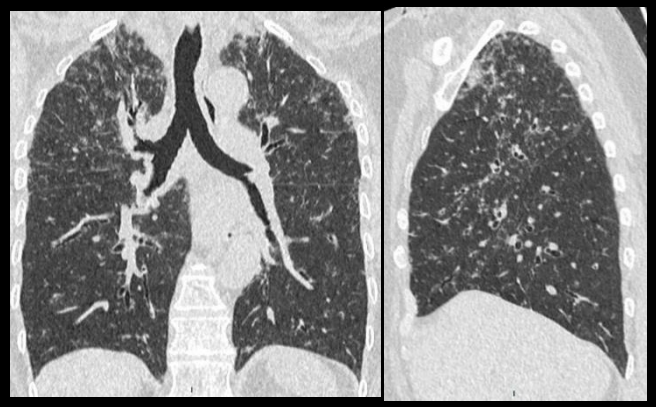
Centrales



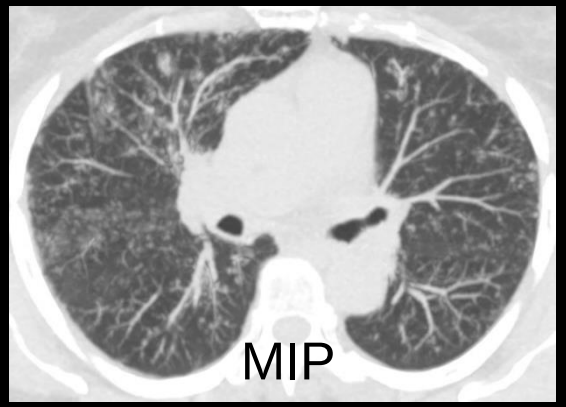
Intérêt du minIP

En conclusion

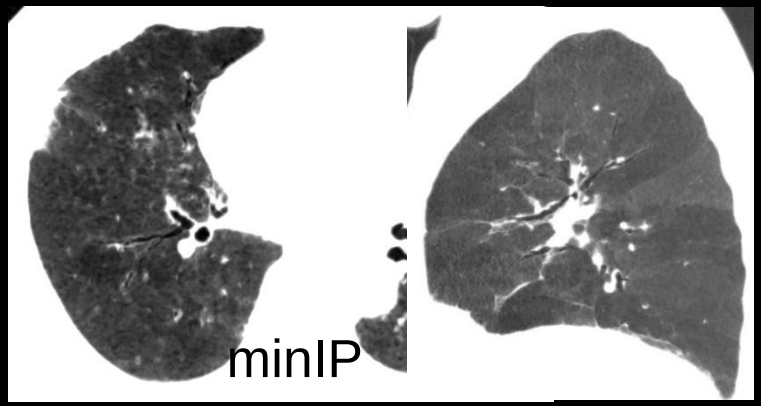
- Analyse sémiologique rigoureuse = étape indispensable de l’interprêtation
- Eviter les pièges de cause technique
- Utilisation en routine des post-traitements de base



Distribution



Nodules



Mosaique
Bronchectasies/rayon de miel
Verre dépoli peu dense

- Intégration des données cliniques, environnementales, biologiques