

Afmp 2023

18èmes Rencontres
Cardio-Pulmonaire



2023
SÉVILLE



Focus sur l'imagerie des lobes supérieurs

G. DURAND

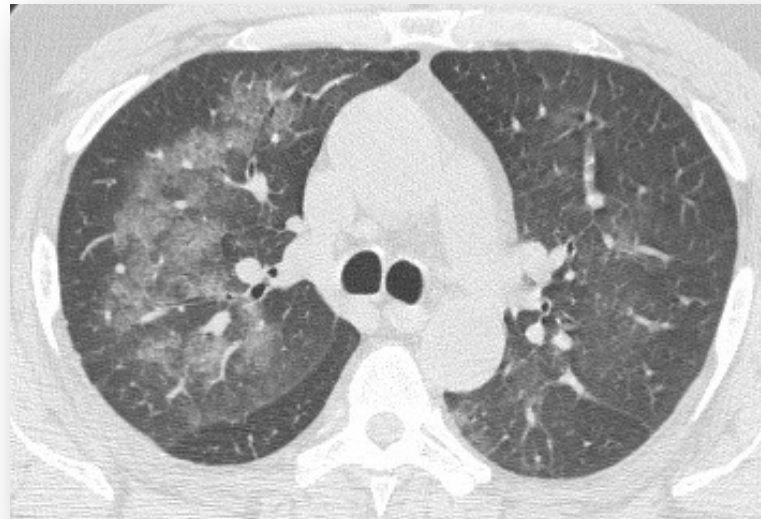
et
qq amis du
Club Thorax



Les poumons sont des organes hétérogènes

- Facteurs multiples
- Facteurs intriqués
- Potentialisation des effets

Originalité des lobes supérieurs

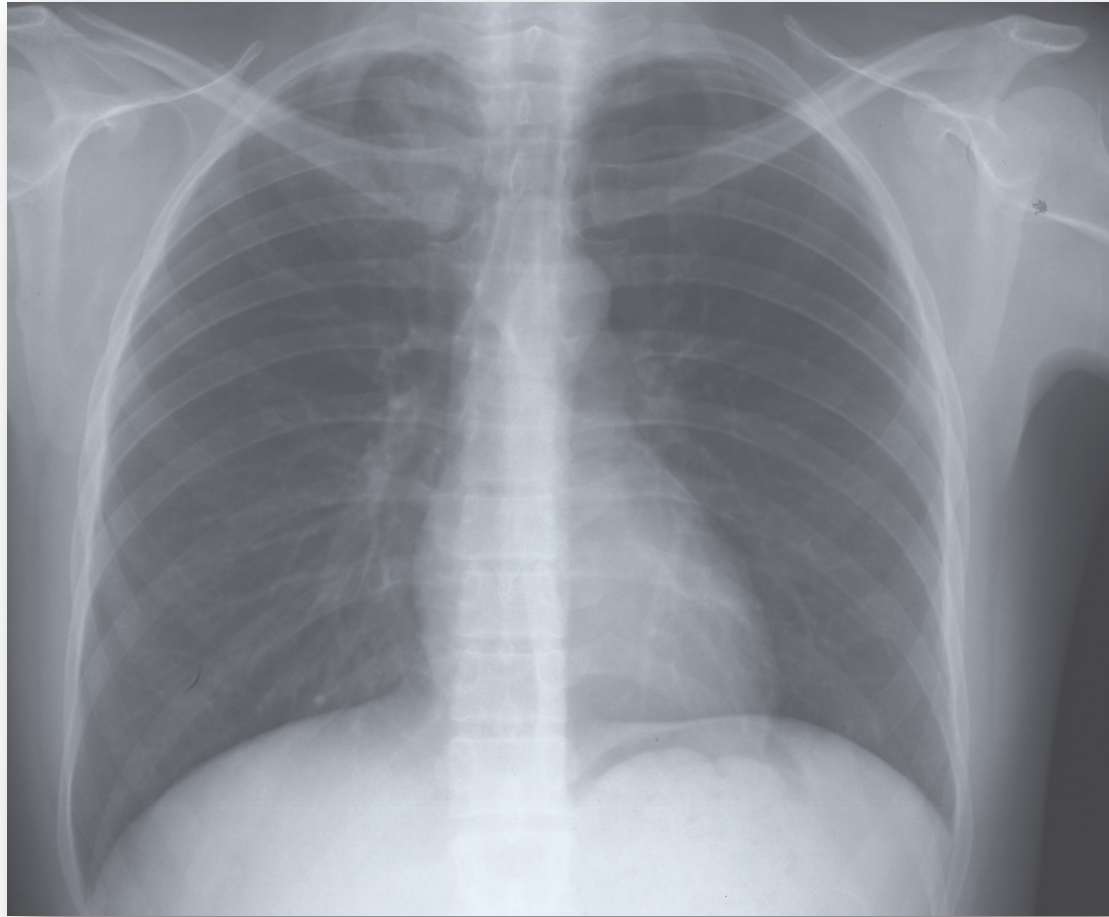


Dyspnée, toux, souffle cardiaque !!!

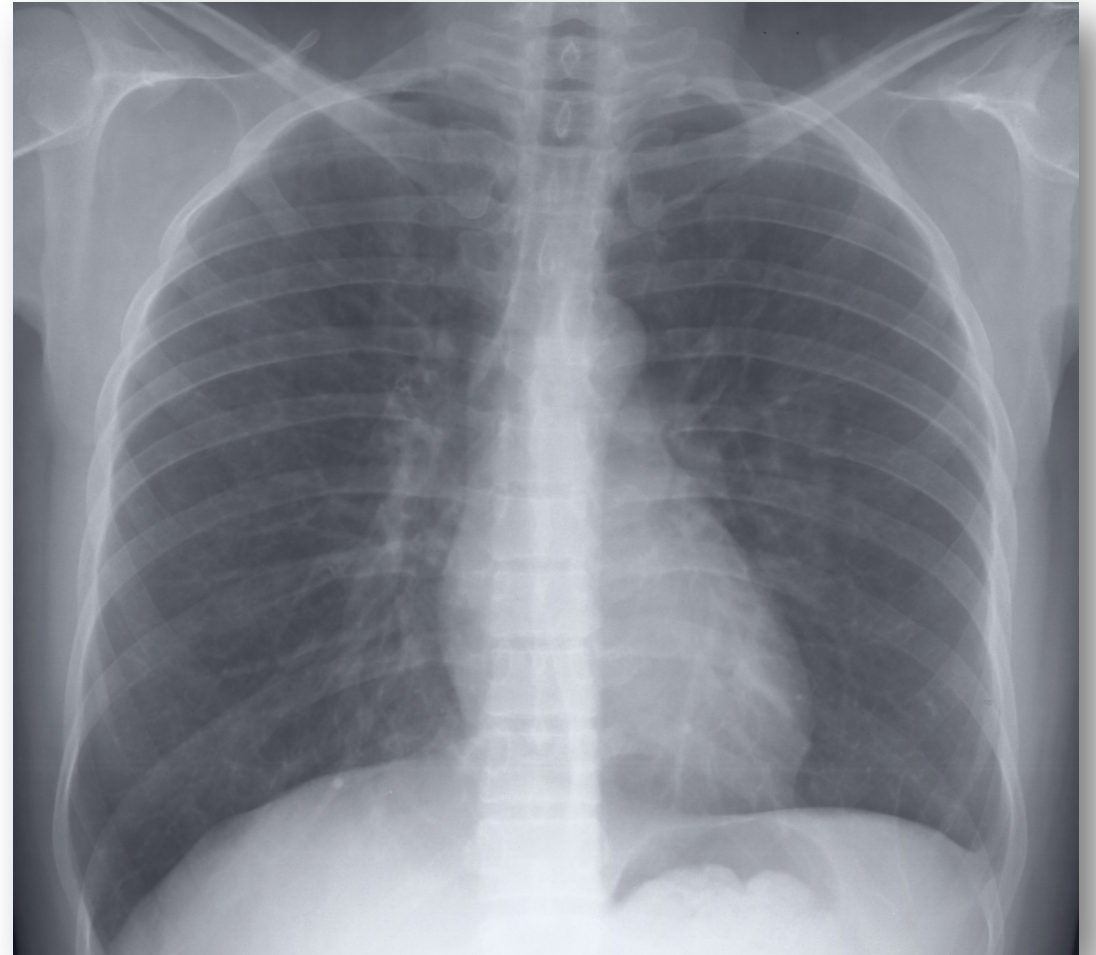
- Non seulement les classiques

- artéfact lié aux cheveux
- la coiffe apicale
- le méso azygos
- la bronche trachéale
- le cancer et le syndrome de Pancoast Tobias
- l'atteinte radique
- le poumon hémodynamique et la position en décubitus dorsal
- la destruction des lobes inférieurs

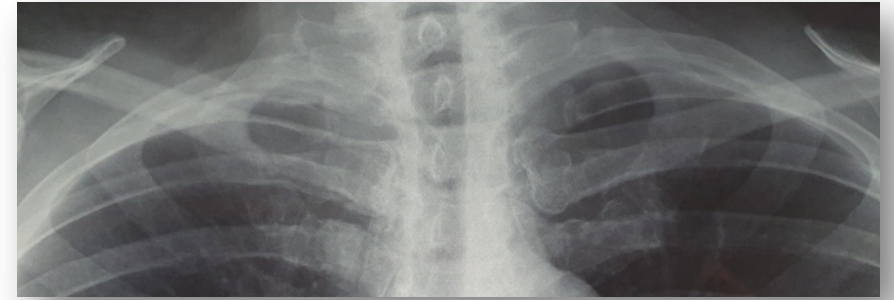
- Pathologies liées aux conditions anatomiques, mécaniques, biochimiques et physiologiques du poumon



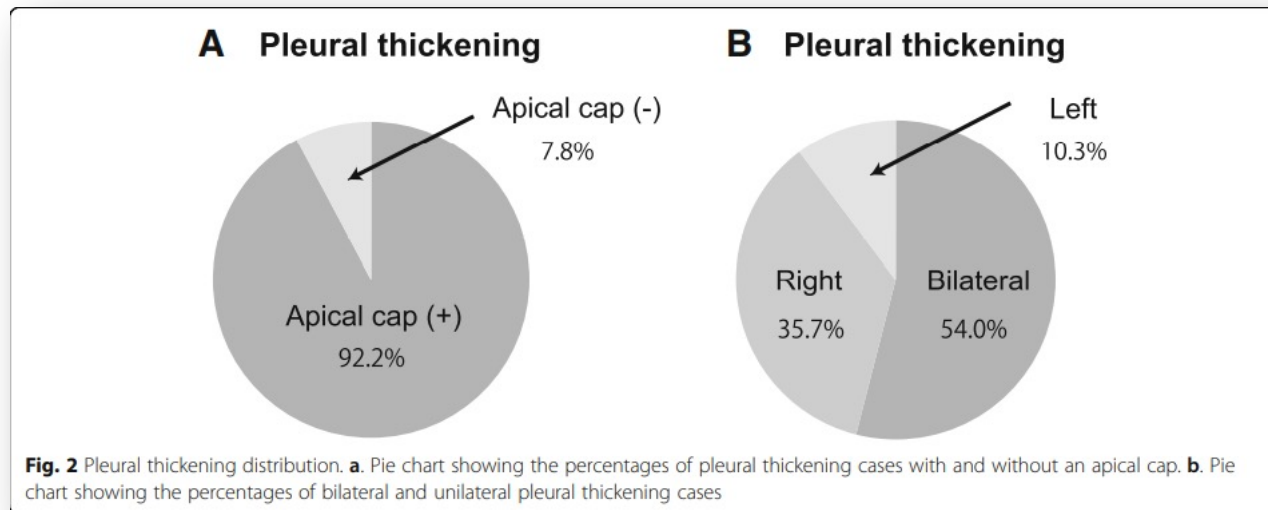
cheveux



Coiffe apicale



En radiologie thoracique, opacité uni ou bilatérale qui "coiffe" l'apex pulmonaire. *Elle correspond à un épaississement localisé de la plèvre ($\leq 5\text{mm}$) auquel s'associe souvent une cicatrice fibreuse du poumon sous-jacent.*

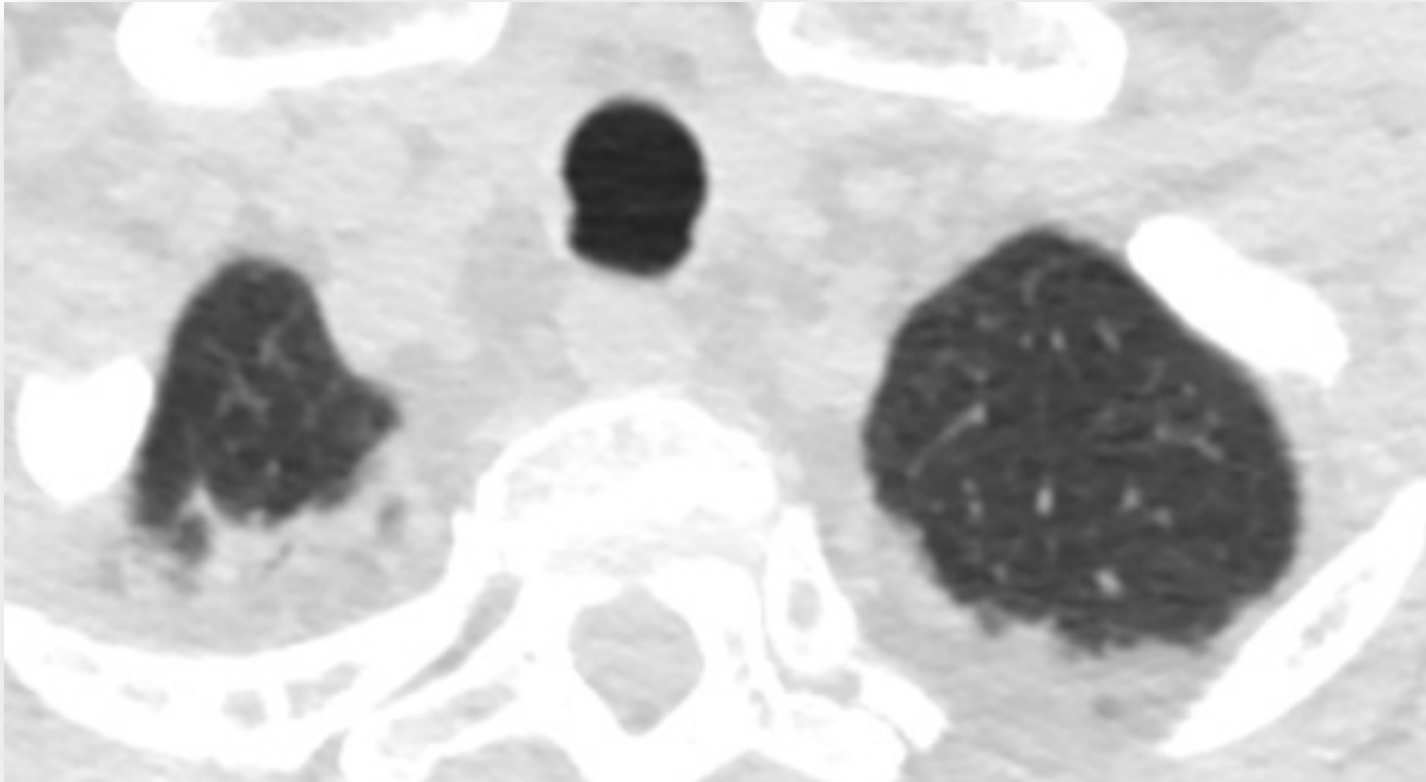


Augmente avec âge
Sexe masculin
Fumeur ou ancien fumeur
Grande taille avec IMC bas

Pulmonary Apical Cap—What's Old Is New Again

Amir Lagstein, MD

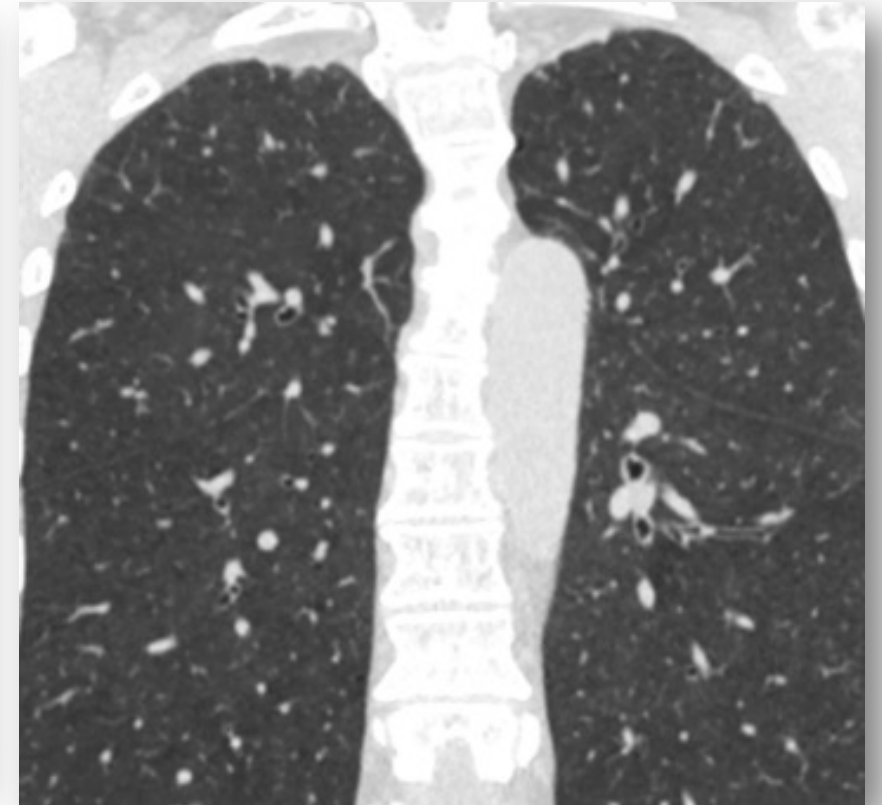
Arch Pathol Lab Med—Vol 139, October 2015



> [AJR Am J Roentgenol. 1981 Aug;137\(2\):299-306. doi: 10.2214/ajr.137.2.299.](#)

The apical cap

T C McCloud, R J Isler, R A Novelline, C E Putman, J Simeone, P Stark



Pleural thickening on screening chest X-rays: a single institutional study

Saito *et al. Respiratory Research* (2019) 20:138

Pathologies pouvant donner une coiffe pleurale

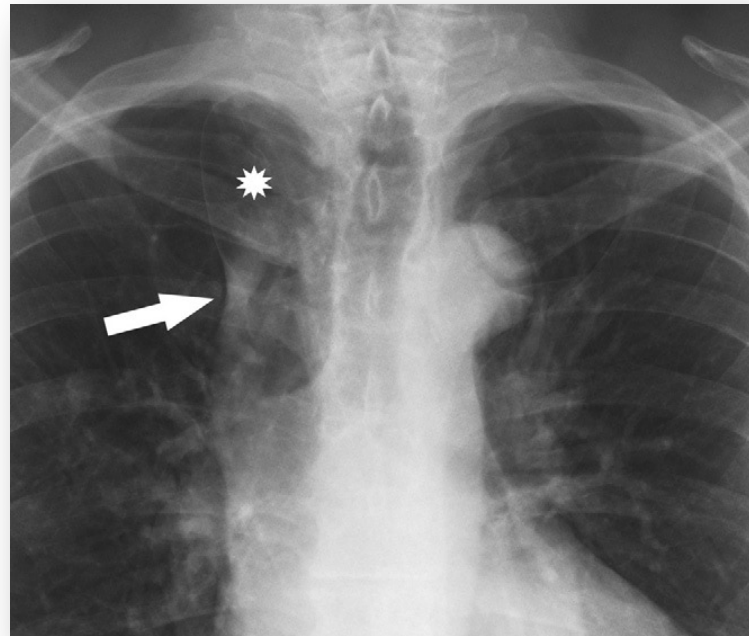
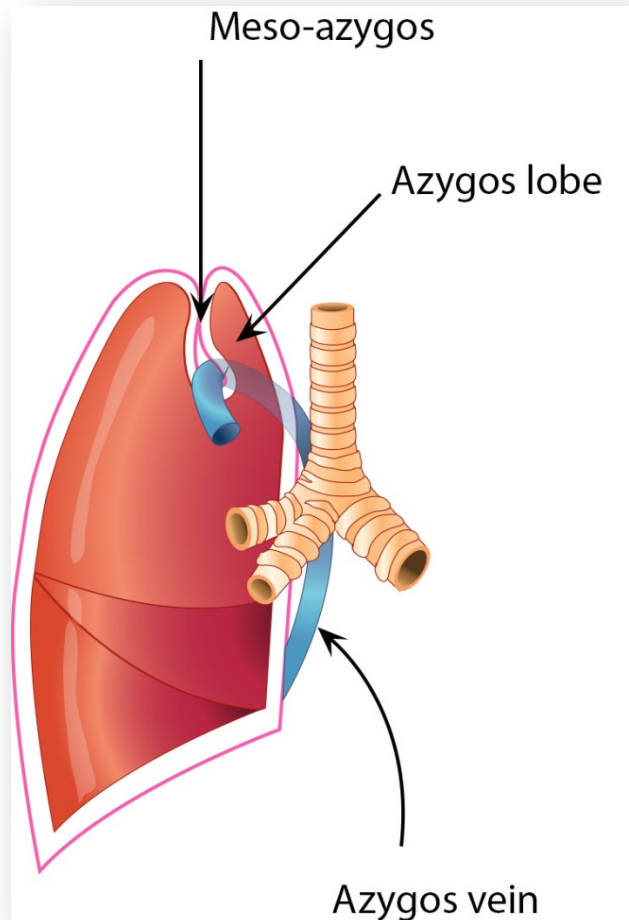
- Origine infectieuse:
 - tuberculose
 - aspergillose
 - actinomyose
- Origine inflammatoire :
 - post radique
 - fibroélastose pleuro pulmonaire
- Origine maligne:
 - lymphome
 - néoplasie bronchique
 - mésothéliome
- Origine vasculaire
 - dissection Ao et artère sous clavière
 - coarctation Ao
 - syndrome cave sup

« Contexte clinique, évolutif, douleur, largeur »

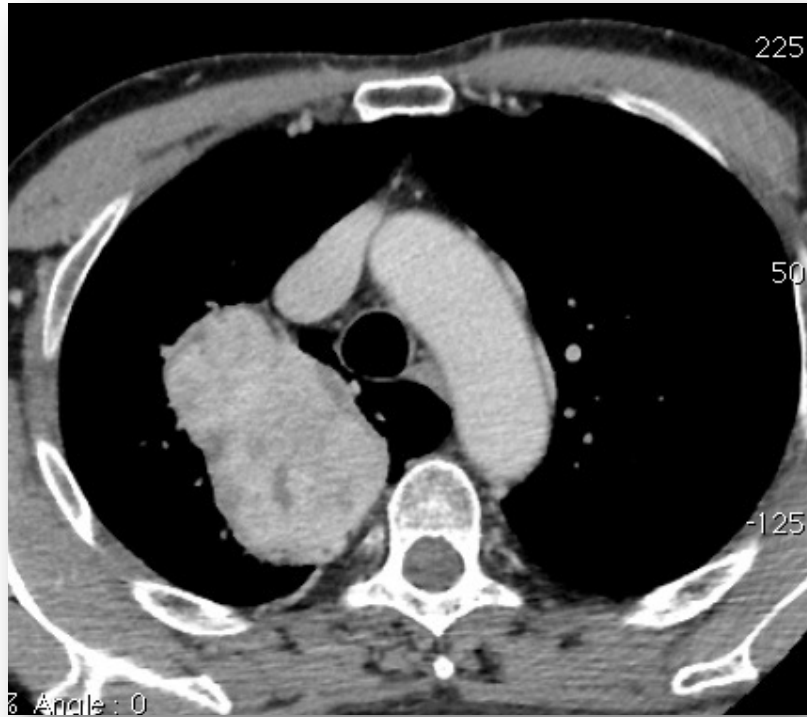
Pulmonary Apical Cap as a Potential Risk Factor for
Pleuroparenchymal Fibroelastosis

Daniel-Costin Marinescu¹, John English², Tony Sedlic³, Agnes Kliber⁴, Christopher J Ryerson¹,
Alyson W Wong⁵ CHEST 2021

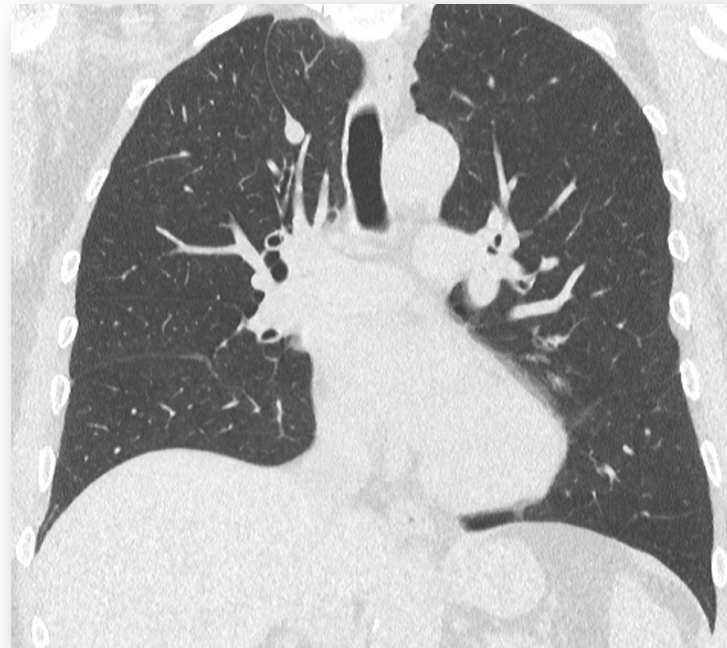
Méso azygos



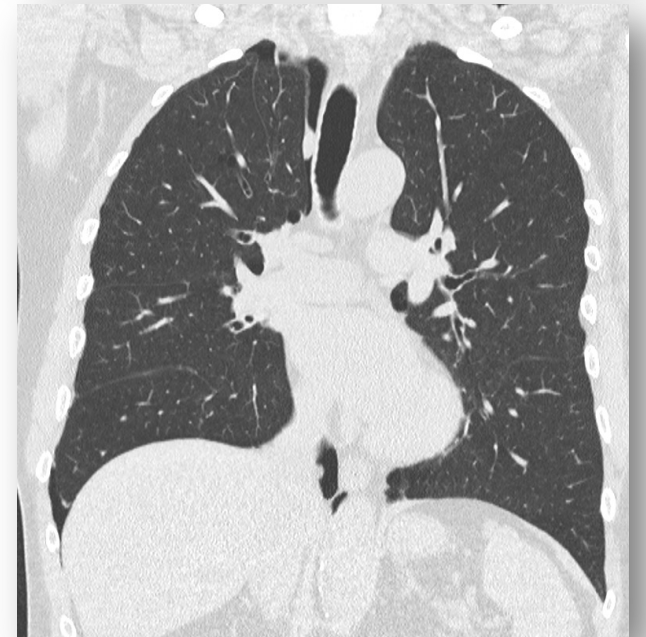
asymptomatique

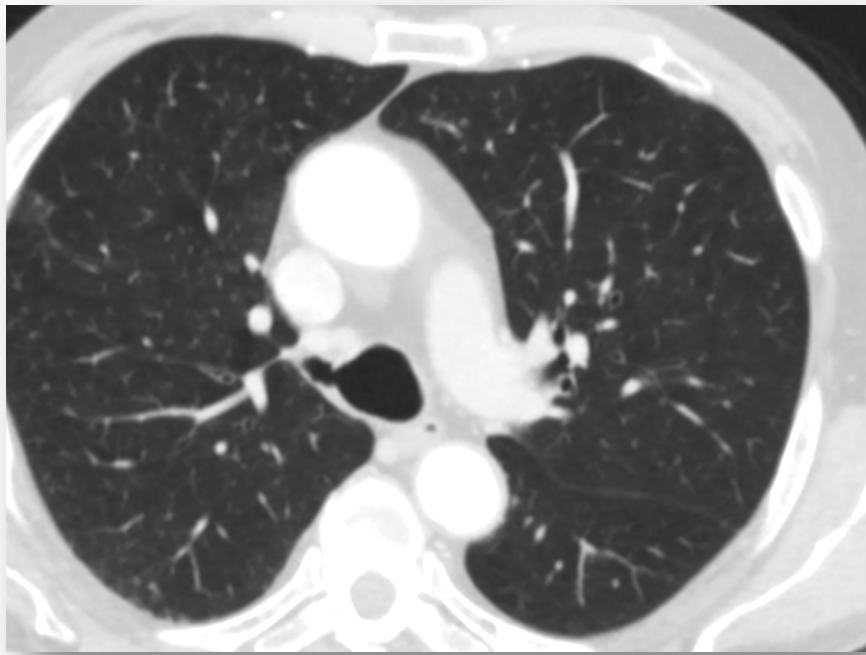


Fibrome pleural



Déplacement de la crosse après
pneumothorax



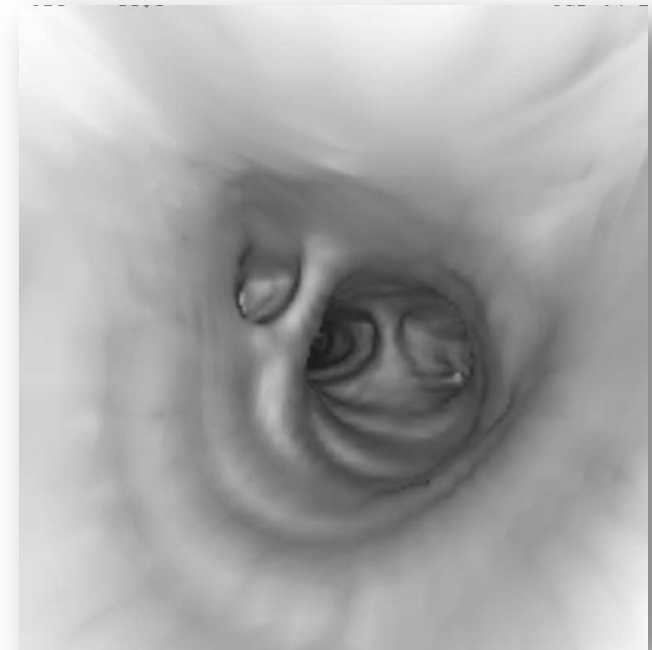


Bronche trachéale

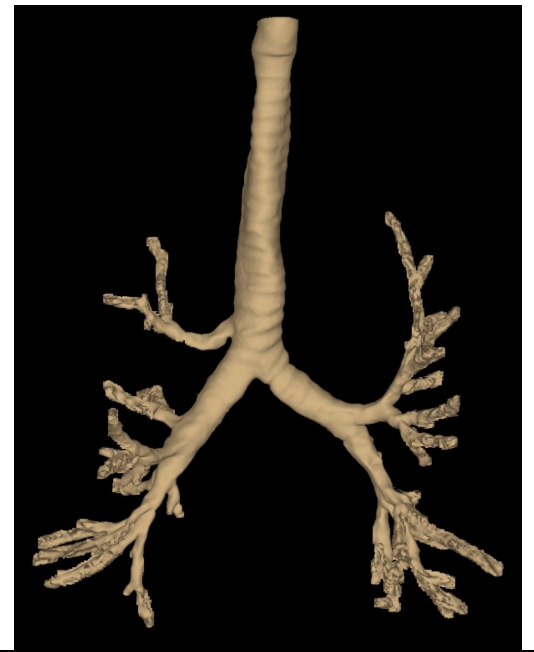
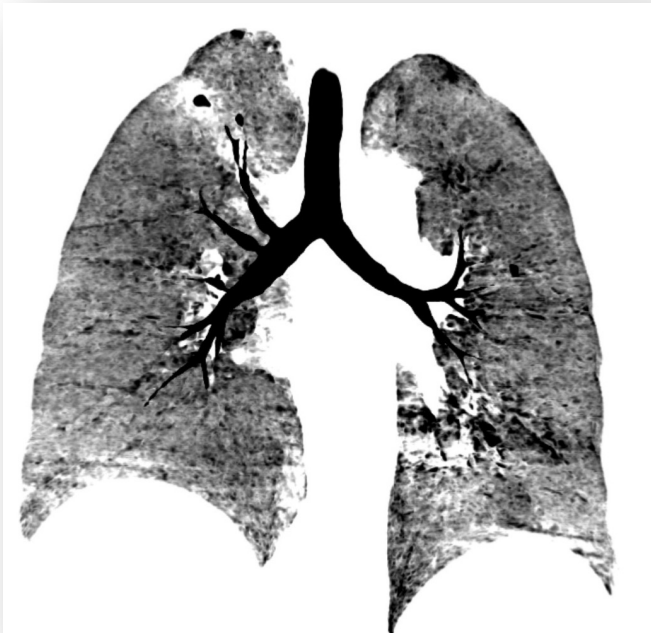
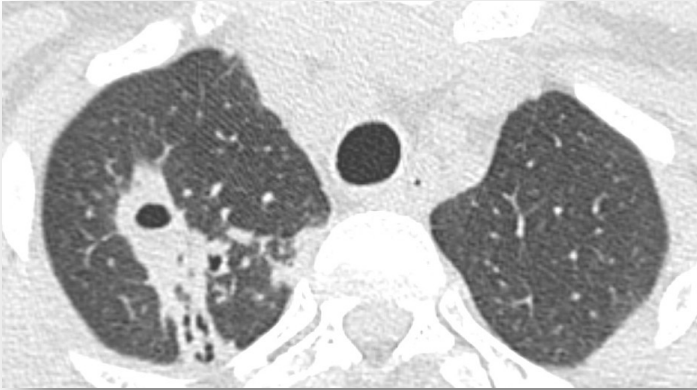
- Localisation variable:
Bronche trachéale vraie = bronche lobaire supérieure
naissant de la trachée (2 à 6 cm de la carène)

Le terme « bronche trachéale » tend actuellement à rassembler un spectre d'anomalies d'origine des bronches à destinée des lobes supérieurs

- Facile à voir sur les coupes coronales



Intérêt: connaitre le territoire ventilé:



Remy J, et al. J Radiol Electrol 1977; 58: 621-630.82

Ritsema GH. AJR Am J Roentgenol 1983; 140: 671-674

Ghaye B, et al. Radiographics 2001; 21: 105-119

Le cancer et le Syndrome de Pancoast-Tobias:

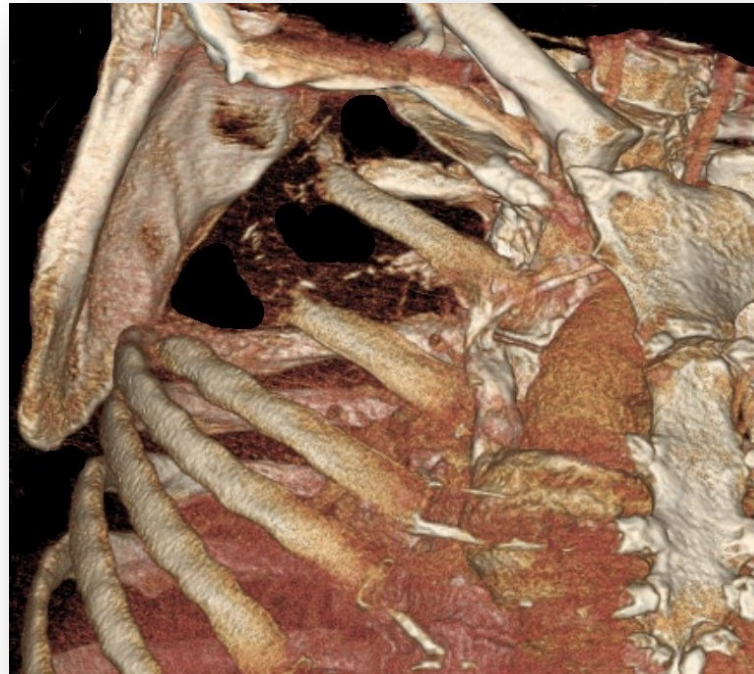
Névralgie C8-D1

Amyotrophie main

Syndrome de Claude Bernard Horner



Secondaire a une tumeur de l'apex pulmonaire avec lyse osseuse (costale et/ou vertébrale), parfois extension vasculaire



Superior Sulcus Tumors
Do They Really Exist?

Paul E. Van Schil, MD, PhD, Anne Sigal-Cinqualbre, MD, PhD,†
Philippe Dartevielle, MD, PhD,‡ and Joaquín Jose Pac-Ferrer, MD, PhD§*

Journal of Thoracic Oncology • Volume 7, Number 5, May 2012

TABLE 1. CAUSES OF PANCOAST'S SYNDROME.

Neoplasms

Primary bronchogenic carcinoma³

Other primary thoracic neoplasms

Adenoid cystic carcinoma,²⁴ hemangiopericytoma,²⁵
mesothelioma²⁶

Metastatic neoplasms

Carcinoma of the larynx,²⁶ cervix,²⁷ urinary bladder,²⁸ and
thyroid gland²⁹

Hematologic neoplasms

Plasmacytoma,³⁰ lymphomatoid granulomatosis,³¹
lymphoma³²

Infectious processes

Bacterial

Staphylococcal³³ and pseudomonal pneumonia,³⁴ thoracic
actinomycosis³⁵

Fungal

Aspergillosis,³⁶ coccidioidomycosis,³⁷ cryptococcosis³⁸

Tuberculosis³⁹

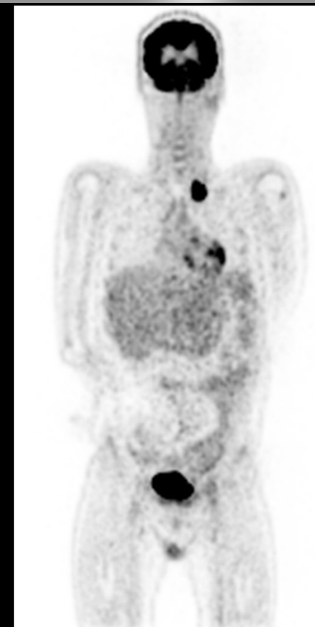
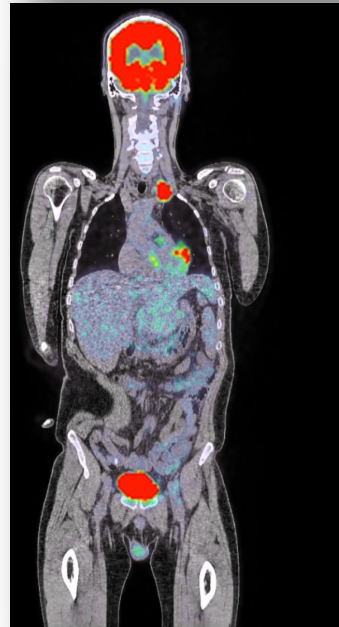
Parasitic

Hydatid cyst⁴⁰

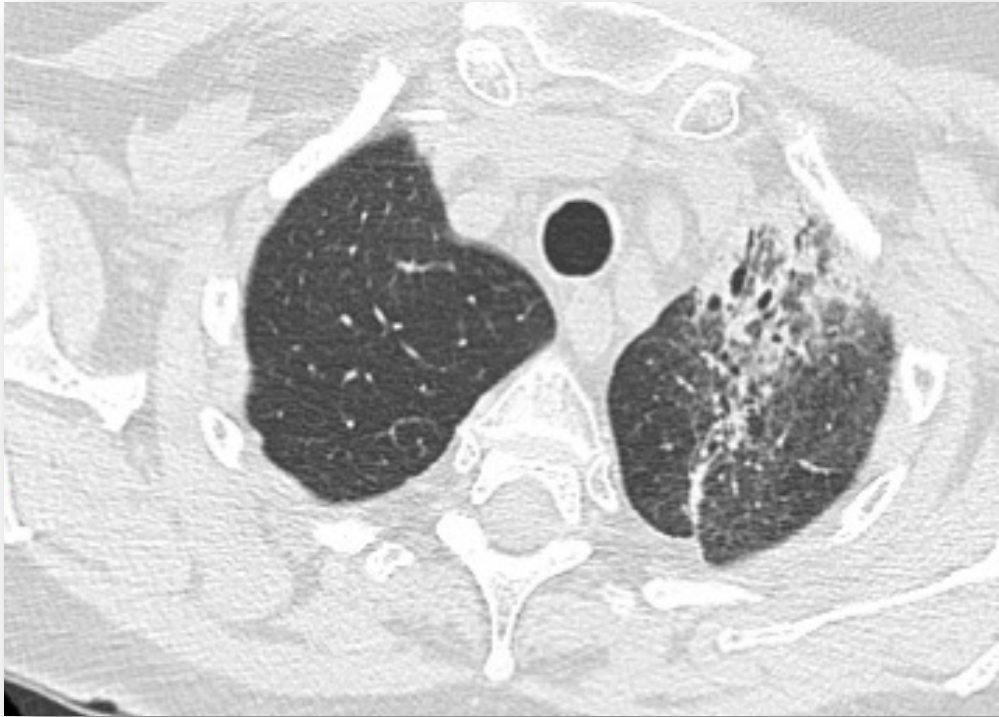
Miscellaneous causes

Cervical rib syndrome⁴¹

Pulmonary amyloidoma⁴²



infection par *Aspergillus Fumigatus*
chez un patient HIV, tabagique a 40PA
(révélée par des douleurs du MS gauche depuis 2 ans)



Atteinte radique

secondaire a un cancer du sein ou
ORL

Le poumon hémodynamique

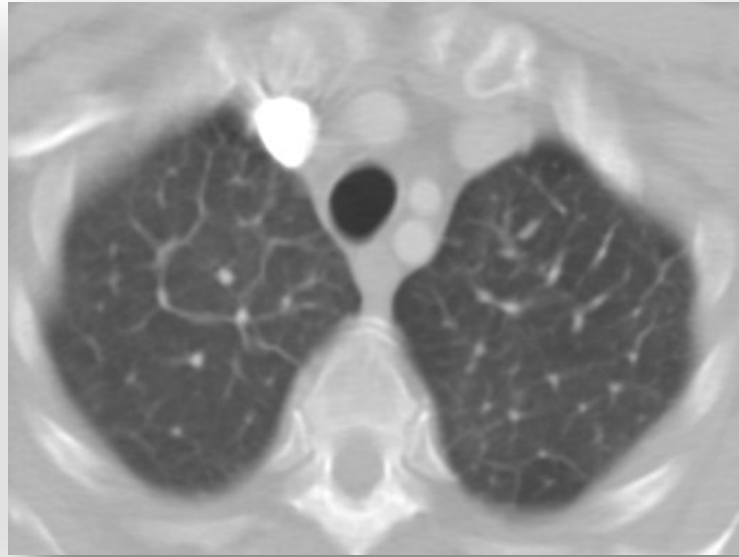
Céphalisation des vaisseaux pulmonaires:
Redistribution de la trame vasculaire
vers les sommets

Dilatation et contours flous des pédicules

Pression veineuse pulmonaire
comprise entre 15 et 20 mm Hg



**Lecture physiologique de la radiographie thoracique.
Applications pathologiques**



femme , 75 ans , insuffisance mitrale

Le décubitus dorsal

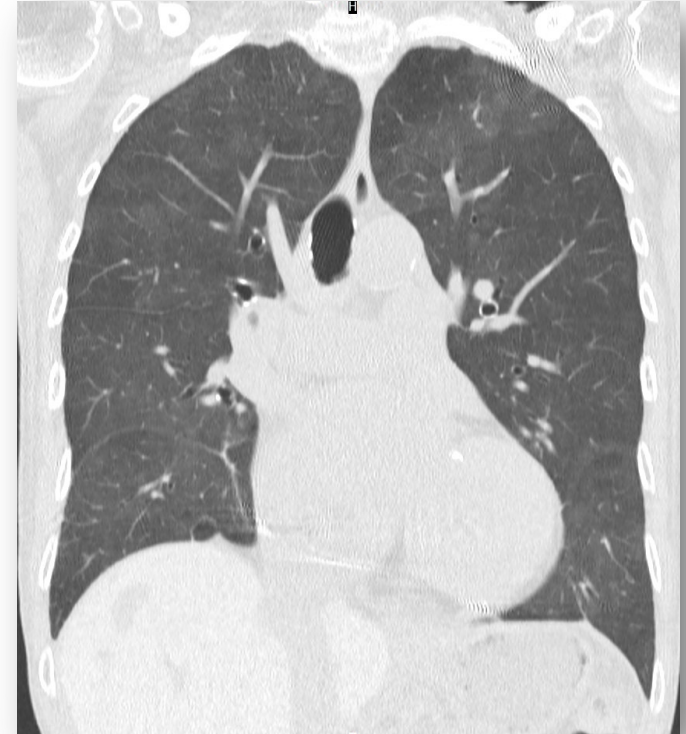
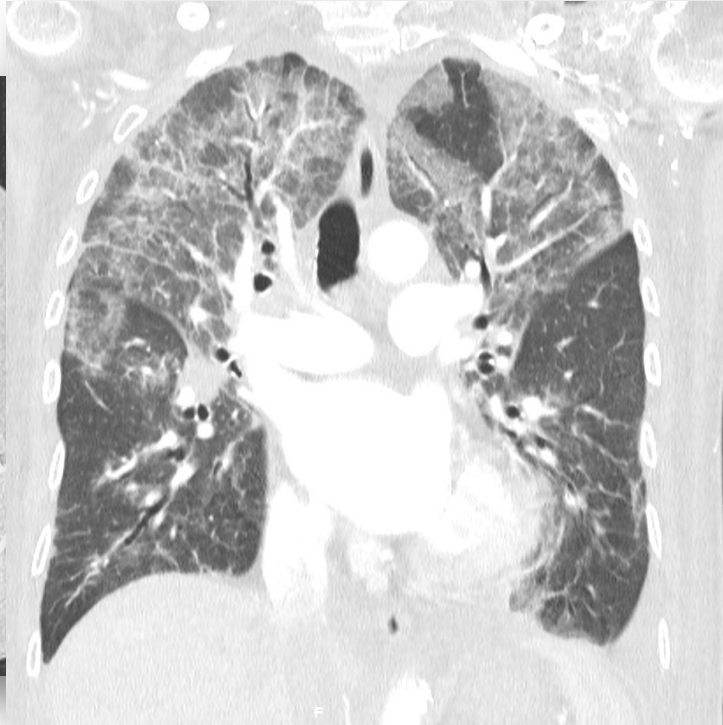
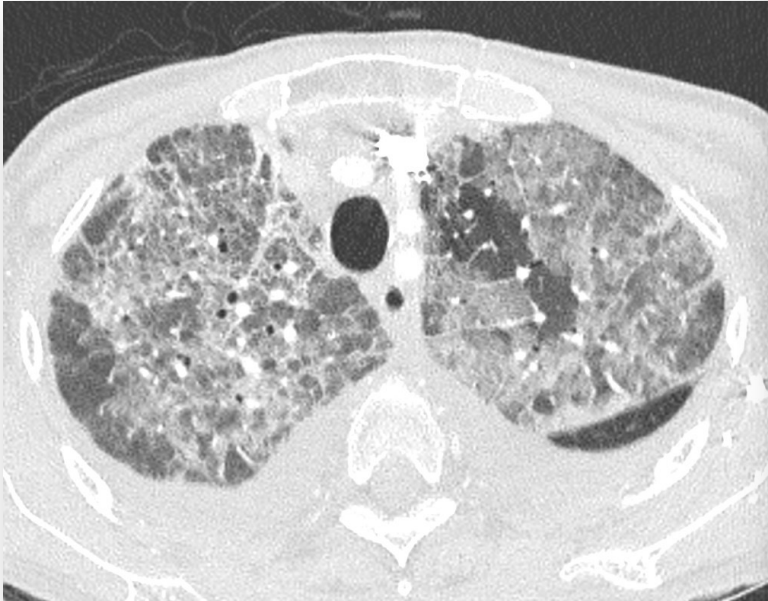
Homme, 44 ans , passage en FA



Differences in Lung and Lobe Volumes between
Supine and Standing Positions Scanned
with Conventional and Newly Developed
320-Detector-Row Upright CT: Intra-Individual
Comparison

Yoshitake Yamada^a Minoru Yamada^a Yoichi Yokoyama^a Akiko Tanabe^b
Shiho Matsuoka^a Yuki Nijima^c Kelichi Narita^a Takehiro Nakahara^a
Mitsuru Murata^d Koichi Fukunaga^a Shotaro Chubachi^e Masahiro Jinzaki^a

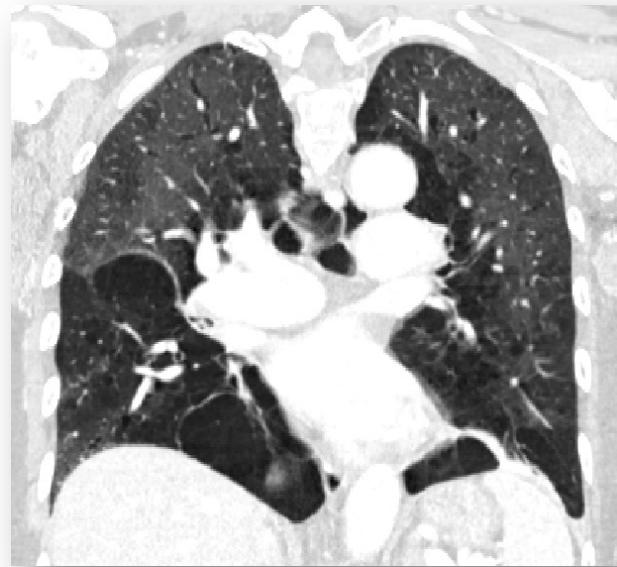
Œdème pulmonaire des lobes supérieurs chez un patient alité



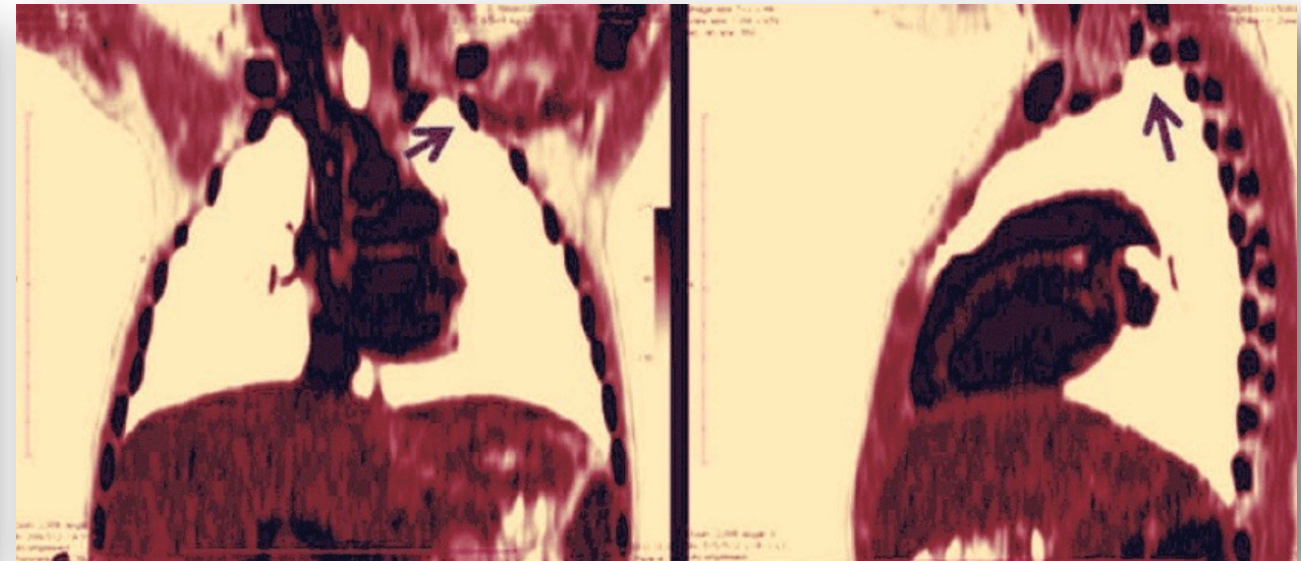
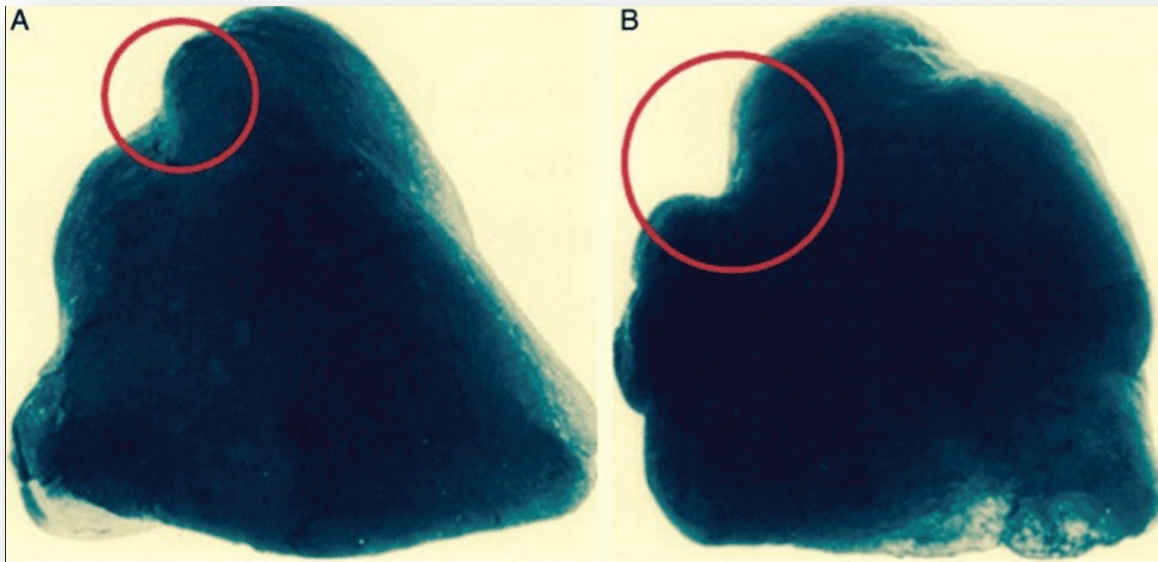
Après traitement diurétique

....OAP neurogénique: même tableau

Redistribution apicale en cas d'emphysème des lobes inférieurs



Caractéristiques anatomiques: le sillon costal



1° cote: apex pulmonaire

REVIEW ARTICLE

Common Pathophysiological Pathways for Apical and Upper Lobe Lung Disease

Casha et al. J Infect Dis Epidemiol 2018, 4:053

DOI: [10.23937/2474-3658/1510053](https://doi.org/10.23937/2474-3658/1510053)

Volume 4 | Issue 3

Caractéristiques anatomiques: le ratio base/sommet

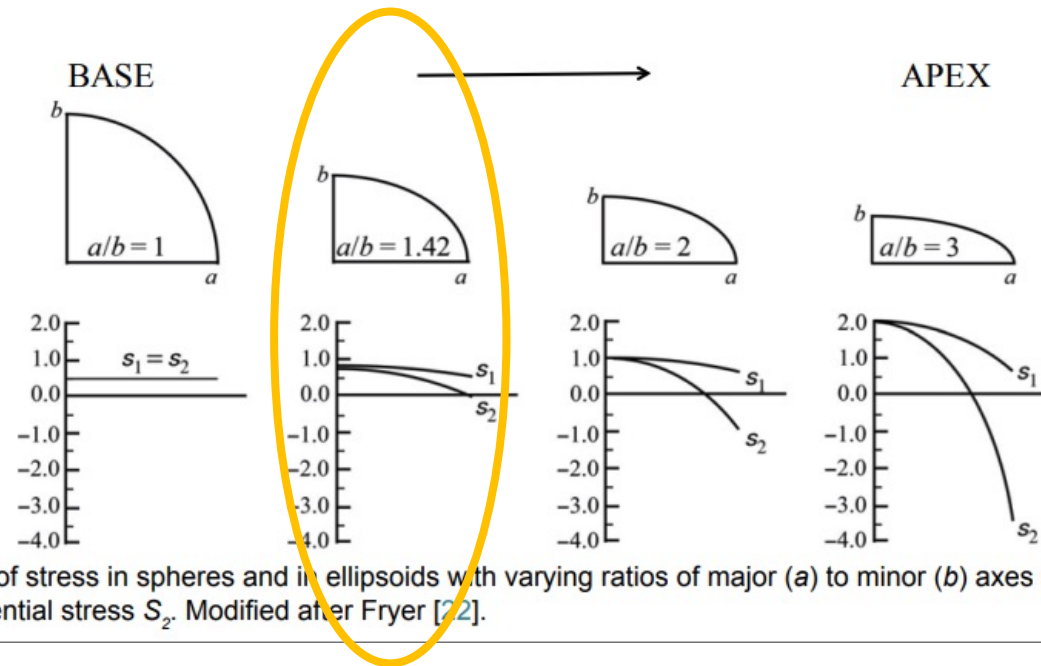
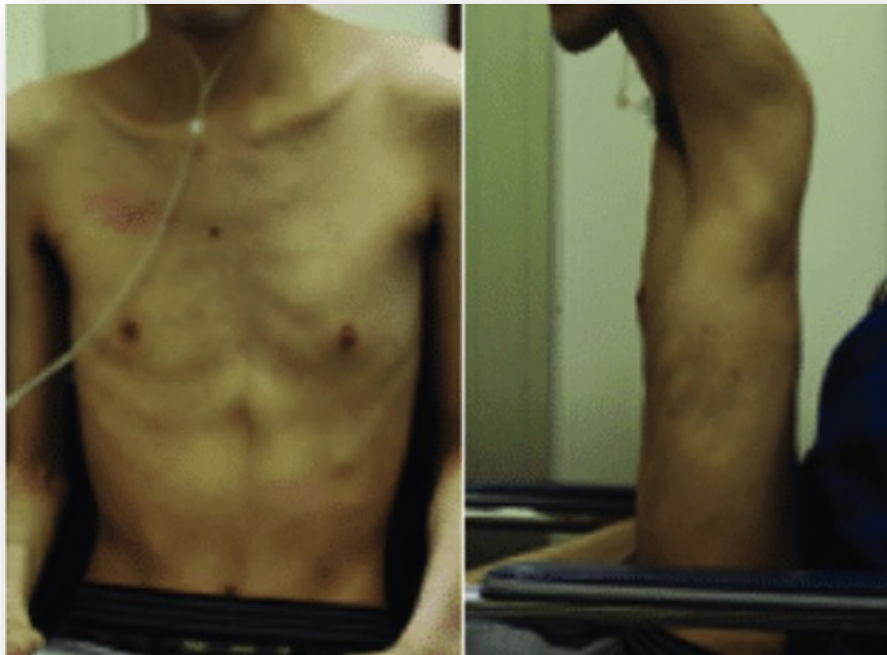


Figure 3: Ratios of stress in spheres and ellipsoids with varying ratios of major (a) to minor (b) axes showing axial stress S_1 and circumferential stress S_2 . Modified after Fryer [22].

Caractéristiques anatomiques:

index thoracique bas, longiligne, IMC bas



platythorax

Hurley JF, Maclaren WM, Alexander WP, Cowie AJ, Collins HPR, et al. (2018) Factors influencing the occurrence of progressive massive fibrosis in British coalminers. Research Report TM/84/02. 1984. Institute of Occupational Medicine, Edinburgh.

A biomechanical hypothesis for the pathophysiology of apical lung disease

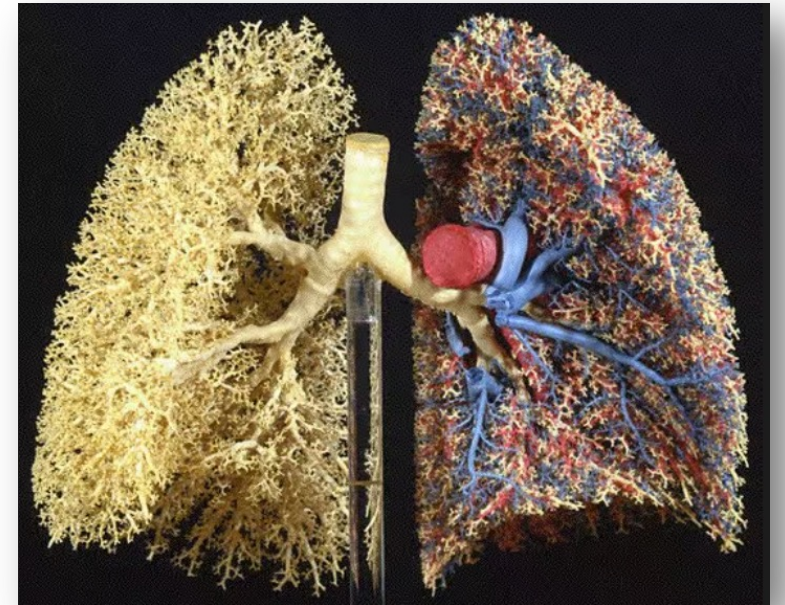
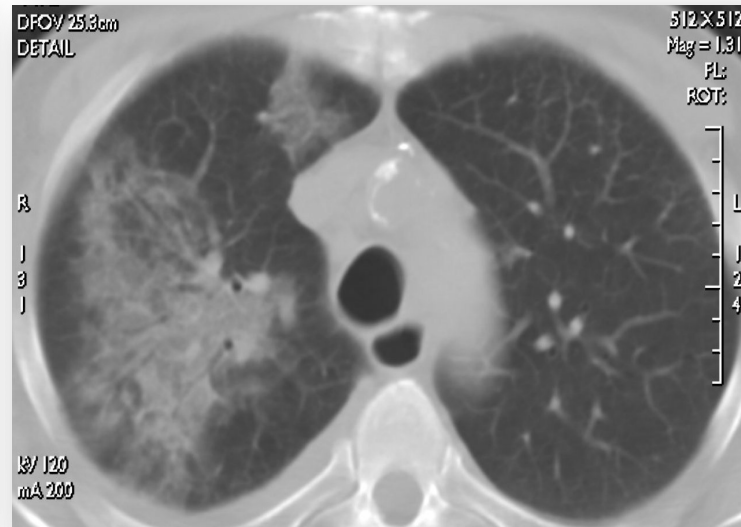
Aaron R. Casha^{a,b,*}, Alexander Manché^a, Liberato Camilleri^c, Ruben Gatt^d, Krzysztof Dudek^e, Michael Pace-Bardon^f, Marilyn Gauci^g, Joseph N. Grima^d

Medical Hypotheses 92 (2016) 88–93

Caractéristiques anatomiques:

hasard

ramification fractale des VA et vasculaire



Le jet de régurgitation vient bloquer de plein fouet le retour veineux supérieur droit

Insuffisance mitrale aigue

Une pneumopathie infiltrative du lobe supérieur droit

Revue des Maladies Respiratoires 38 (2021) 304–307

R. Sermet^{a,*,b}, F. Arbib^{a,b}, G. Ferretti

caractéristiques physiologiques

- Rapport ventilation /perfusion
- Pression artérielle
- Flux lymphatique
- pH
- Taux d'oxygène
- Stress pleural
- Taille des alvéoles

Upper Lobe–Predominant Diseases of the Lung

Stefan F. Nemec¹
Alexander A. Bankier
Ronald L. Eisenberg

AJR:200, March 2013

Common Pathophysiological Pathways for Apical and Upper Lobe Lung Disease

Casha et al. J Infect Dis Epidemiol 2018, 4:053

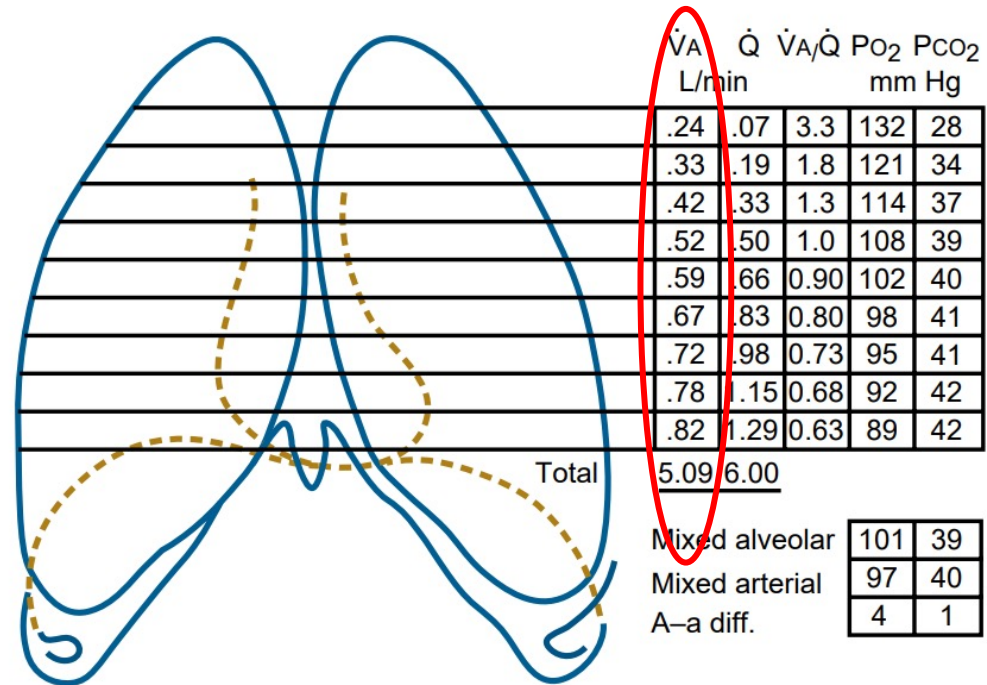


Figure 10.19 Regional differences of gas exchange down the upright normal lung. The lung is divided into nine imaginary slices. $\dot{Q}$, blood flow; $\dot{V}_A$, alveolar ventilation. A-a diff, alveolar-arterial difference. (Modified from West JB. *Respiratory Physiology: The Essentials*. 9th ed. Baltimore: Lippincott Williams & Wilkins; 2012.)

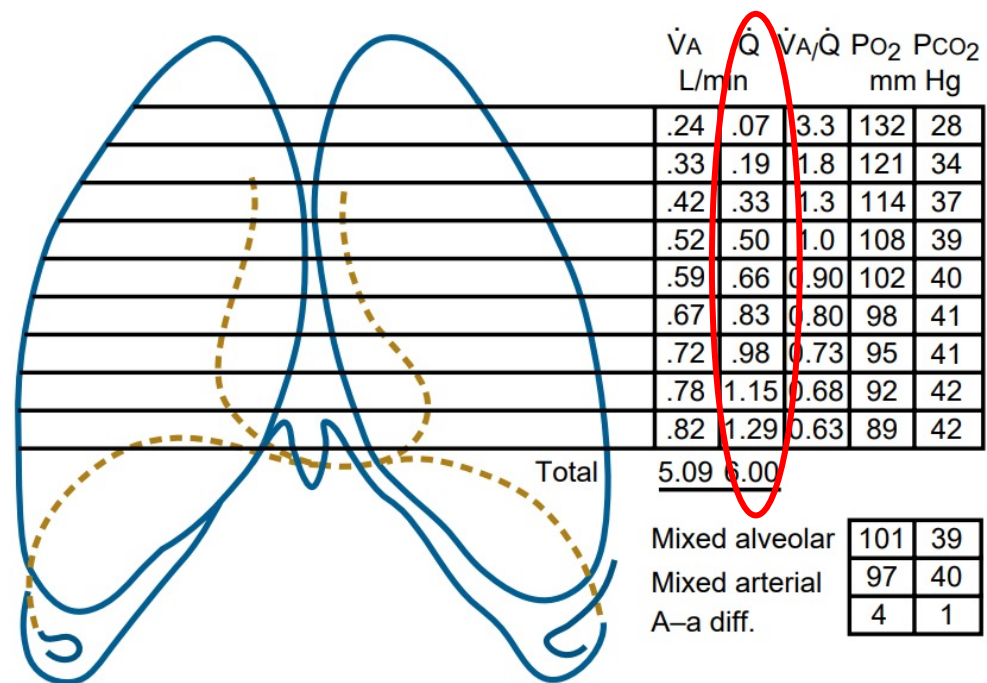


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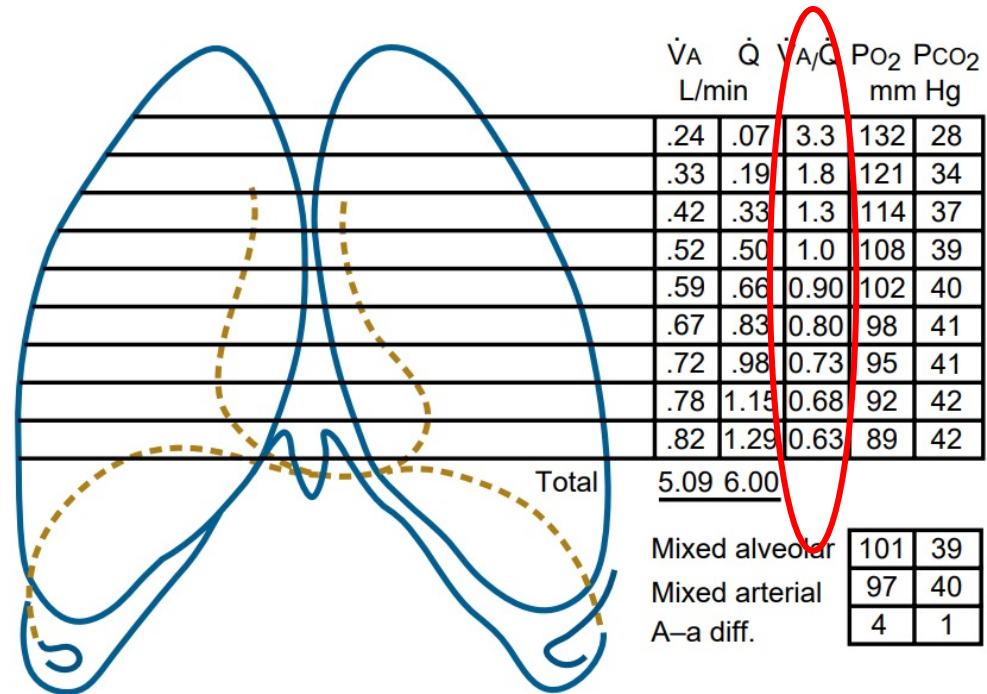


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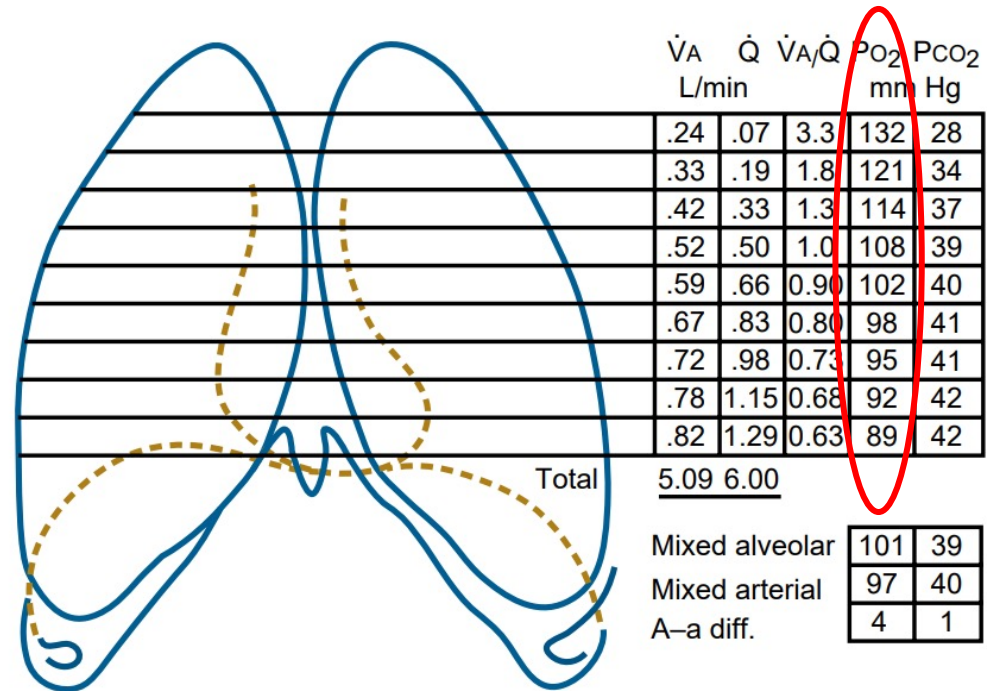


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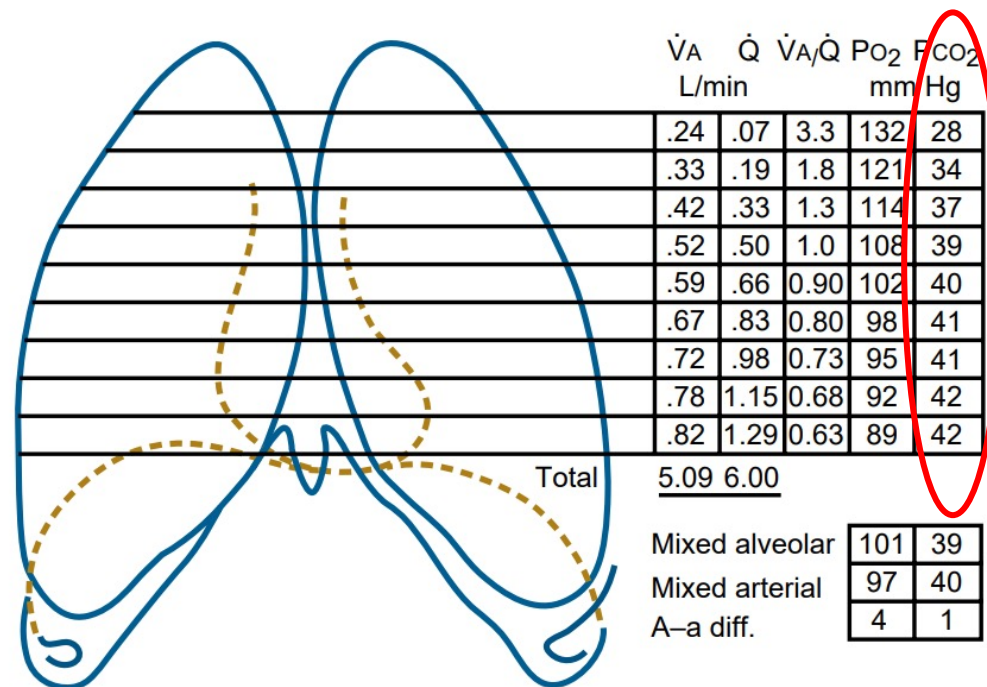
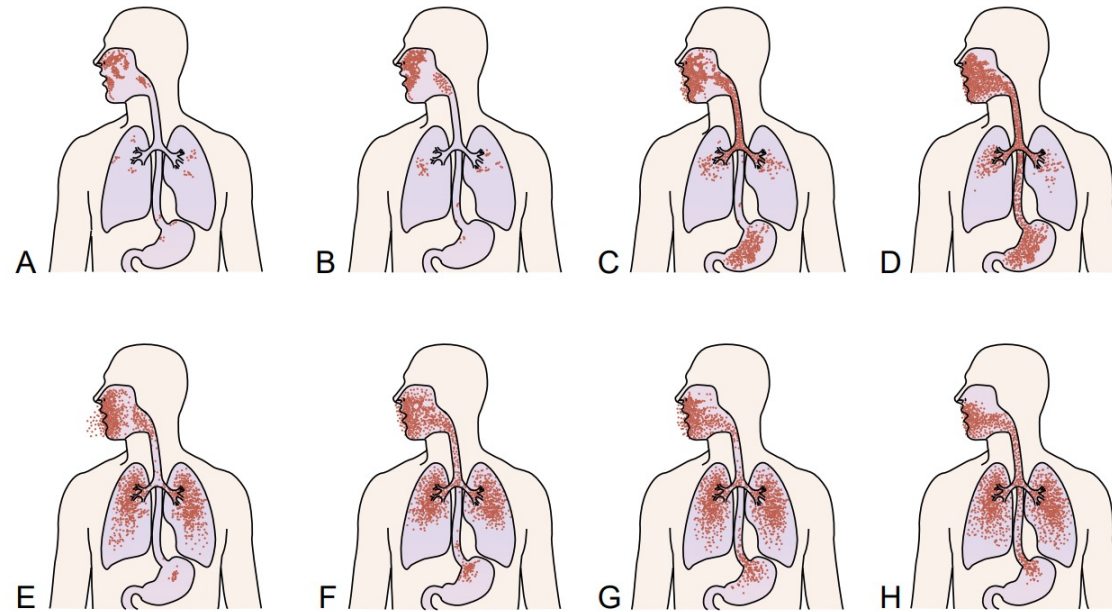


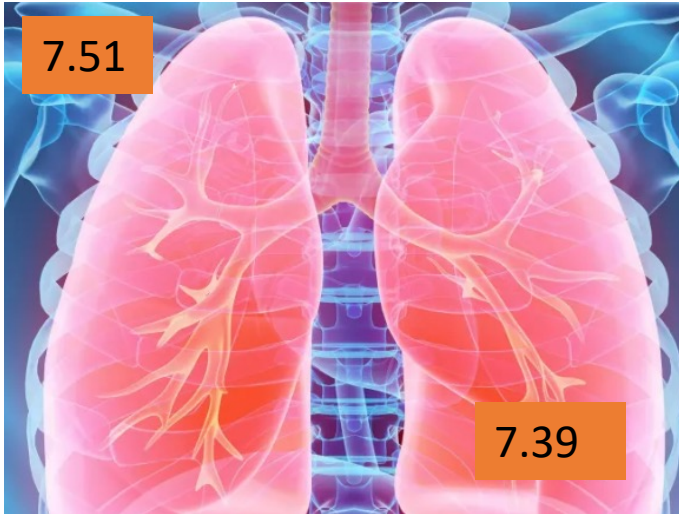
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Les lobes supérieurs sont surventilés les lobes inférieurs sont survascularisés



eFigure 13.4 Drug deposition of radiolabeled salbutamol in young children. For all combinations of devices and face masks, the images clearly show facial deposition. This figure illustrates in vivo the important principles demonstrated in the manikin study described in [eFig. 13.4](#). Efficient lung delivery requires quiet breathing. Coaching is an important part of nebulized therapy. (A) Inhaling from a pressurized *metered-dose inhaler* (MDI)/spacer through a non-tightly fitted face mask. (B) Inhaling from a nebulizer through a non-tightly fitted face mask. (C) Inhaling from a pressurized MDI/spacer through a tightly fitted face mask, crying during inhalation. (D) Inhaling from a nebulizer through a tightly fitted face mask, crying during inhalation. (E–F) Inhaling from a pressurized MDI/spacer through a tightly fitted face mask, quietly inhaling. (G–H) Inhaling from a nebulizer through a tightly fitted face mask, quietly inhaling. Deposition on the face is apparent, especially for the tight-fitting masks (C–H). These principles apply to all patients treated with face masks. (Modified from Erzinger S, Schuepp KG, Brooks-Wildhaber J, et al. Face masks and aerosol delivery in vivo. *J Aerosol Med*. 2007;20[suppl]:S78–S84.)

pH



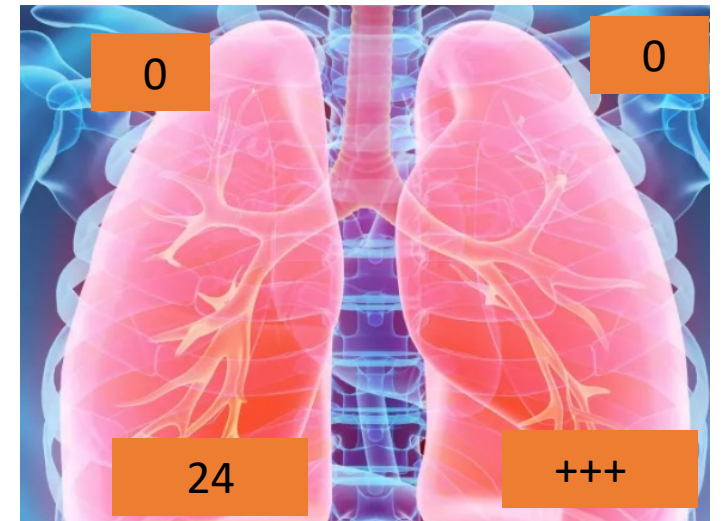
stress pleural

taille alvéolaire

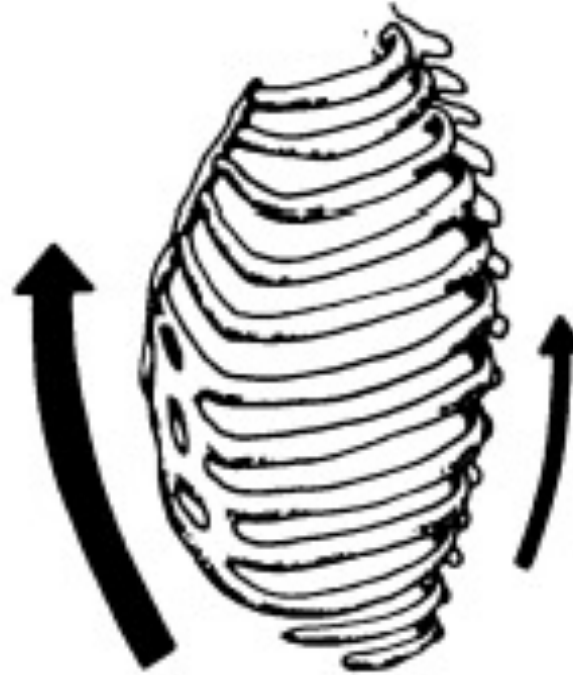
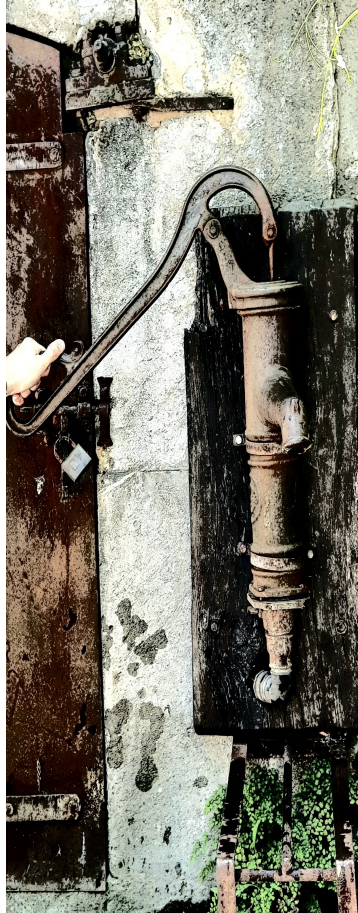


Pression artérielle(mmHg)

flux lymphatique



caractéristiques mécaniques: « effet pompe »



Jud W. Gurney, MD • Bruce A. Schroeder, MD

Radiology 1988; 167:359-366

Upper Lobe Lung Disease: Physiologic Correlates

Upper Lobe–Predominant Diseases of the Lung

Stefan F. Nemec¹

Alexander A. Bankier

Ronald L. Eisenberg

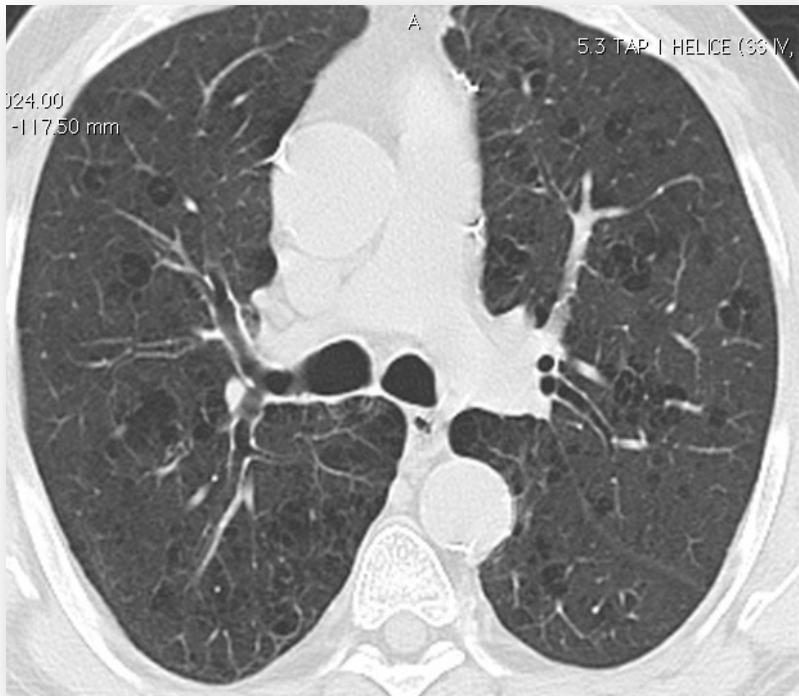
AJR:200, March 2013

**Common Pathophysiological Pathways for Apical and Upper Lobe
Lung Disease**

Casha et al. *J Infect Dis Epidemiol* 2018, 4:053

Pathologie liée au tabac

✓ L'emphysème centrolobulaire



Zone de destruction parenchymateuse au centre du Lobule de Miller de quelques millimètres de diamètre, lacunes multiples, sans paroi, prédominant aux Lobes Supérieurs
L'artère centro-lobulaire est parfois visible au centre du Lobule de Miller

Pathologie liée au tabac

✓ L'emphysème paraseptal



Vanishing lung

Sujet jeune, tabac++, EPS bulleux ,extensif a partir des lobes sup, parfois unilatéral



Vanishing lung syndrome (giant bullous emphysema): CT findings in 7 patients and a literature review [J Thorac Imaging](#). 2009 Aug;24(3):227-30.

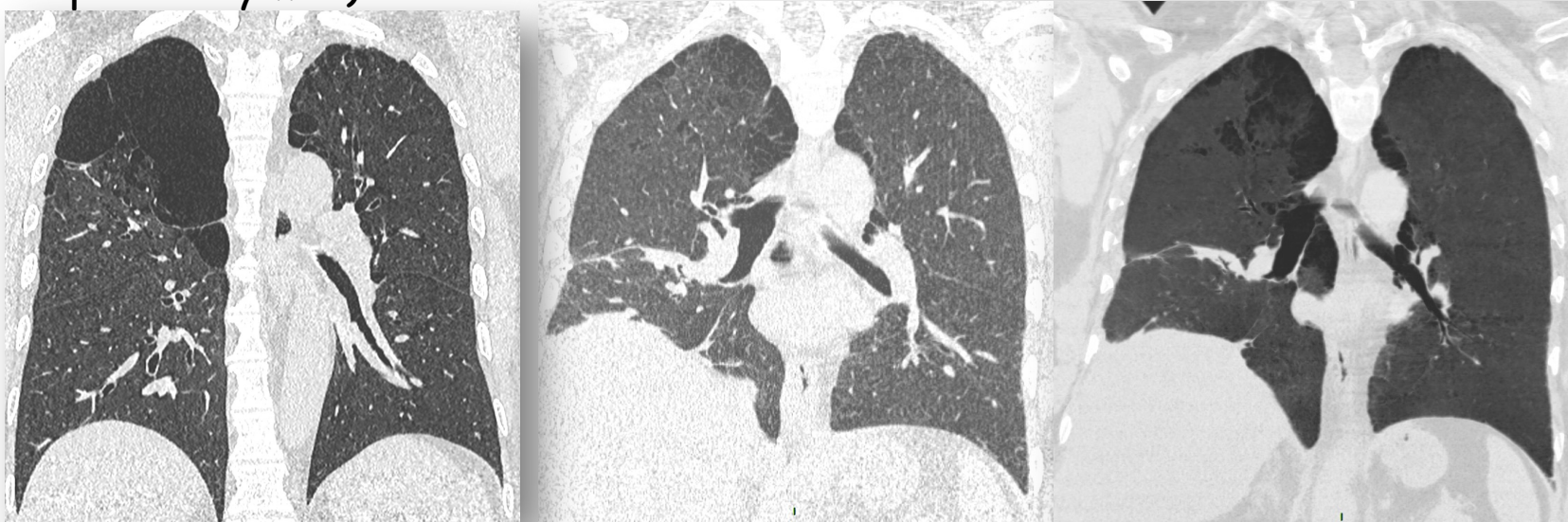
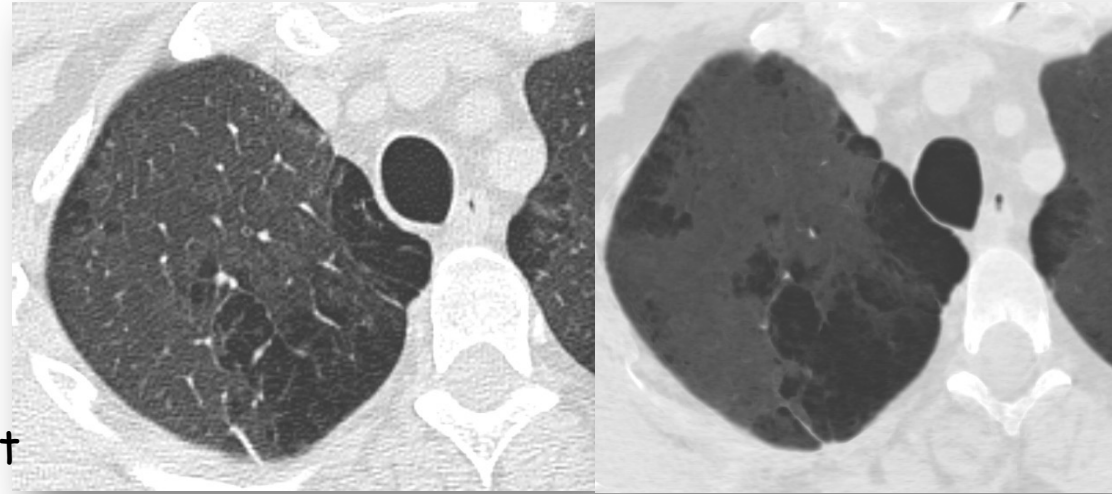
Nidhi Sharma¹, Al Mamoon Justaniah, Jeffrey P Kanne, Jud W Gurney, Tan-Lucien H Mohammed

et si on rajoute du cannabis...

Emphysème bulleux: plus important dans le groupe cannabis-tabac Vs tabac isolé

Prédominance des lésions à l'apex

Zones d'hypodensité du parenchyme pulmonaire
apicales mal limitées (bronchiolite avec piégeage et destruction du parenchyme?)



Cannabis inhalé et poumon, une liaison dangereuse ?

Inhaled marijuana and the lung, a toxic cocktail?

P. Pradère^{a,*}, A.M. Ruppert^b, G. Peiffer^c, J. Perriot^d,
M. Adler^e, M. Underner^f

Revue des Maladies Respiratoires 39 (2022) 708–718

Poumon de l'usager de drogues

A Khalil

CLUB THORAX septembre 2022

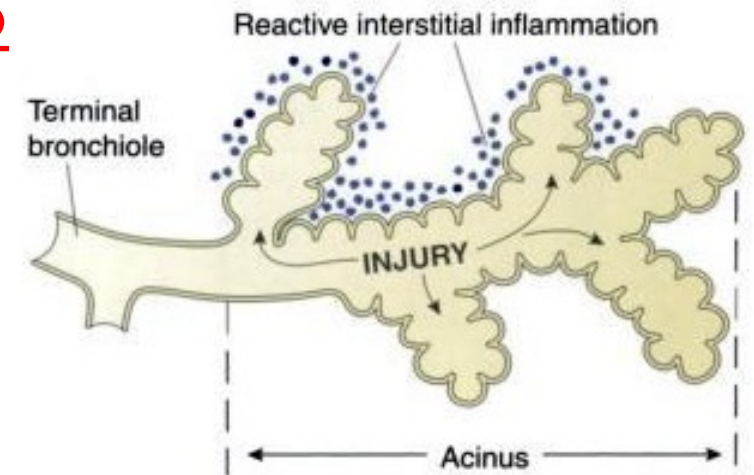
EDUCATION EXHIBIT

Radiology of Recreational Drug Abuse¹

1 Ian G. Hagan, BM, BCh, MRCP, FRCP • Kashif Burney, MB, BS, MRCS, FRCP

Pathologie liée au tabac

- ✓ Bronchiolite du fumeur (RB): Constatation très fréquente voire systématique sur les pièces anatomiques chez le fumeur
- ✓ Comblement bronchiolaire et alvéolaire par macrophages pigmentés sans atteinte interstitielle
- ✓ La bronchiolite du fumeur est en général asymptomatique ce qui la distingue de la bronchiolite associée à une atteinte interstitielle (RB-ILD)





- ✓ Plages focales de verre dépoli
- ✓ Micronodules centrolobulaires peu denses, mal limités
- ✓ Les lésions prédominent dans les lobes supérieurs
- ✓ Souvent associé dans le contexte à de l'emphysème et des épaissements bronchiques

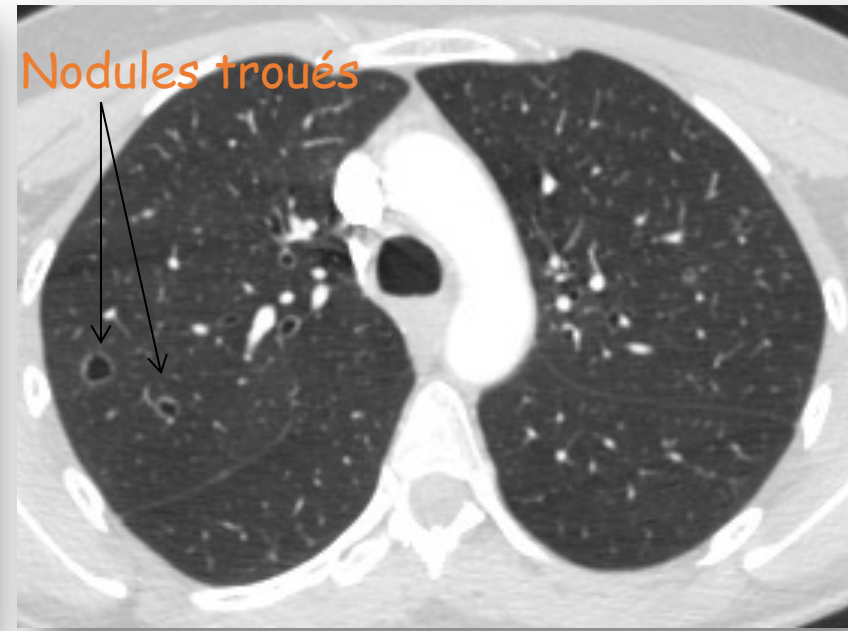
Pathologie liée au tabac

Histiocytose Langerhansienne (Histiocytose X)

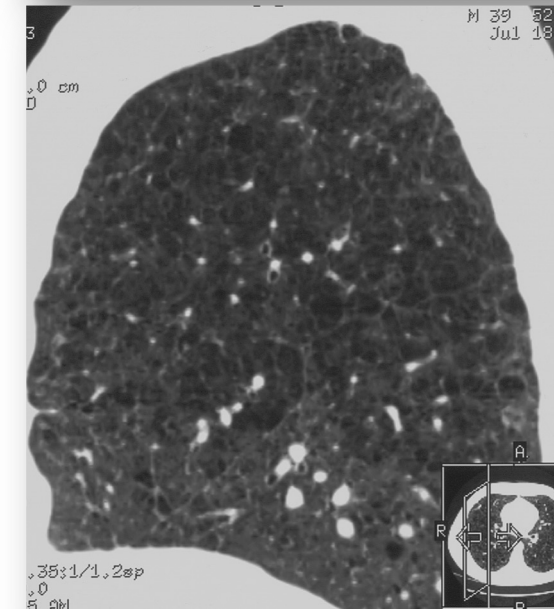
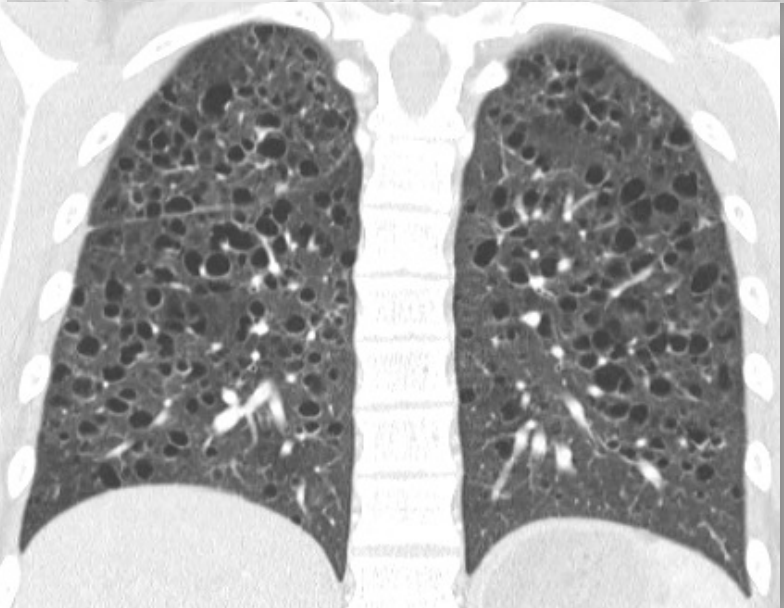
TDM sensible et spécifique

1. Nodules mal limités de 1 à 10 mm bronchiocentrés qui évoluent vers la formation de nodules troués souvent cerclés de fines images radiaires puis de kystes, souvent de forme irrégulière, parfois prenant un aspect branché (« *bizarre shaped* »)
2. Zone préférentielle = Territoires supérieurs et moyen
3. Respect des languettes antérieures et des bases

Forme précoce d'histiocytose



Forme kystique d'histiocytose

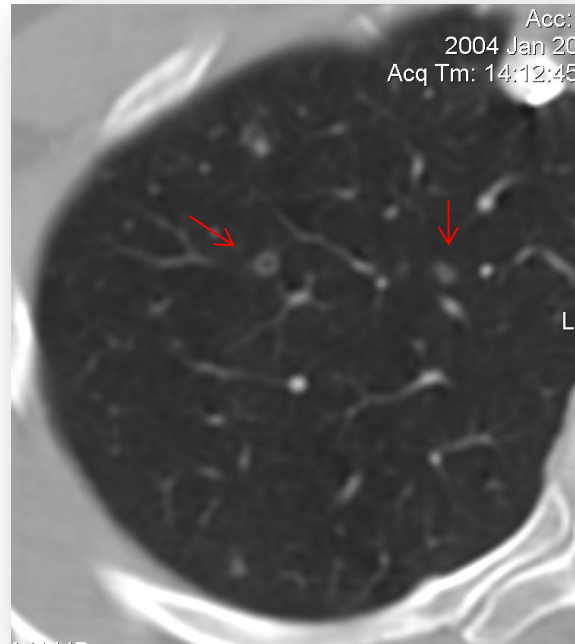
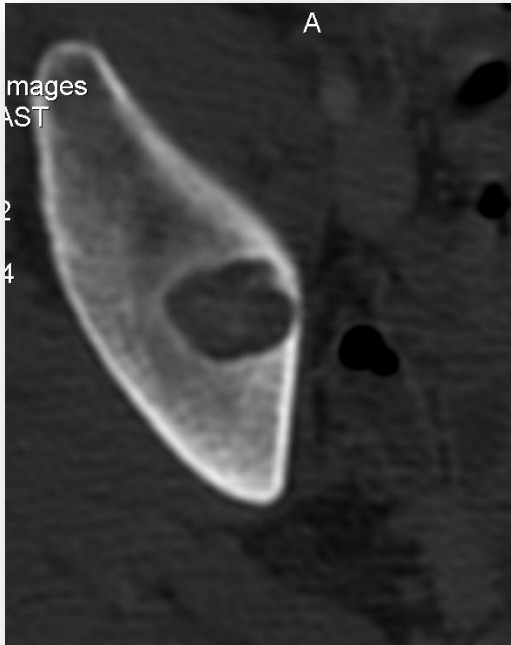


Forme nodulaire pure d'histiocytose

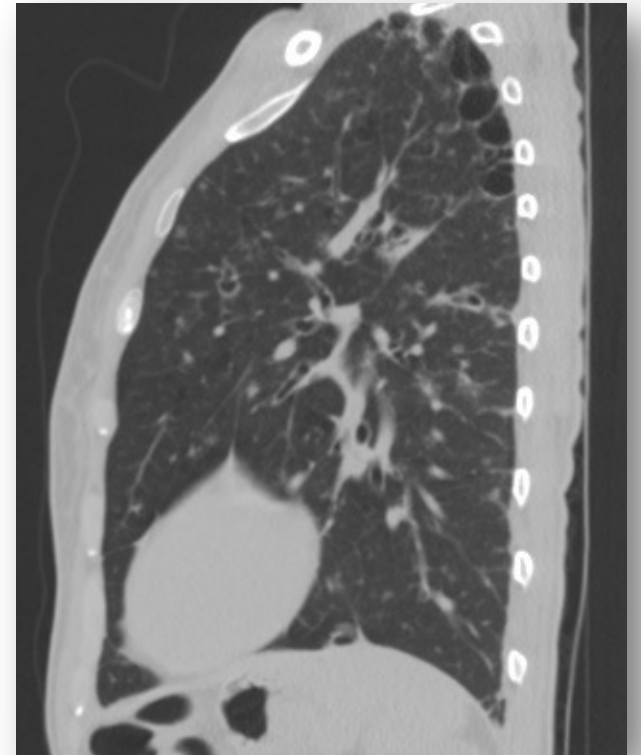




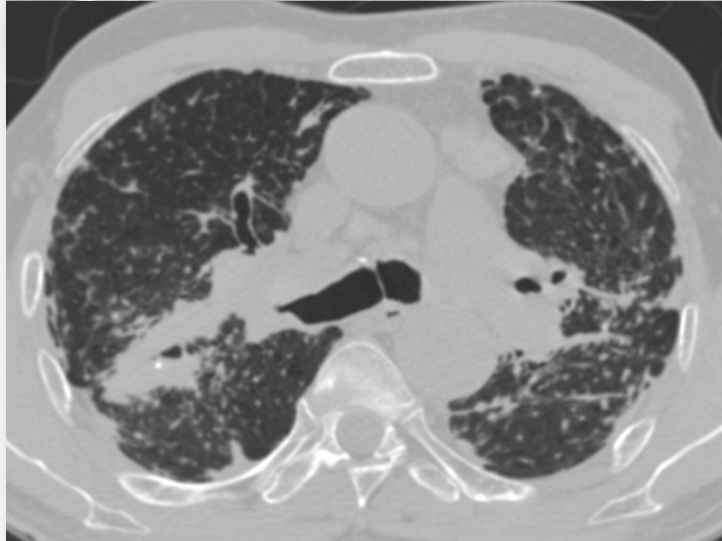
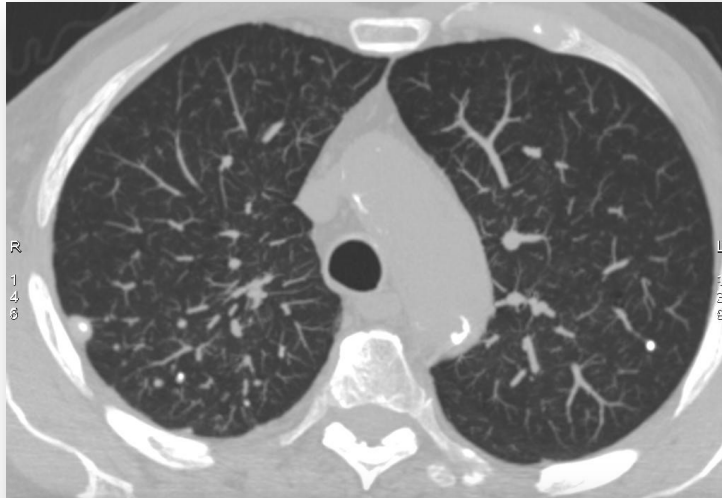
forme subtile diagnostiquée par biopsie osseuse



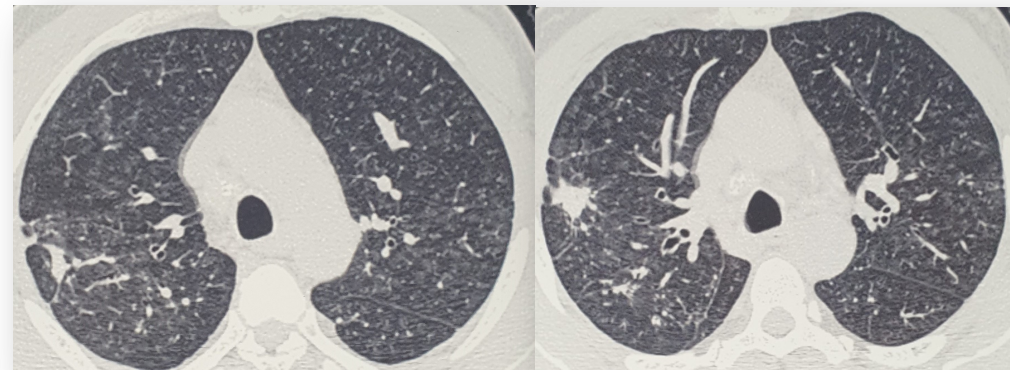
forme associée a de l'emphysème



Inhalation de particules minérales



silicose



Pneumoconiose des prothésistes dentaires

Tableau I.

Produits incriminés et pathologies pulmonaires chez les prothésistes dentaires.

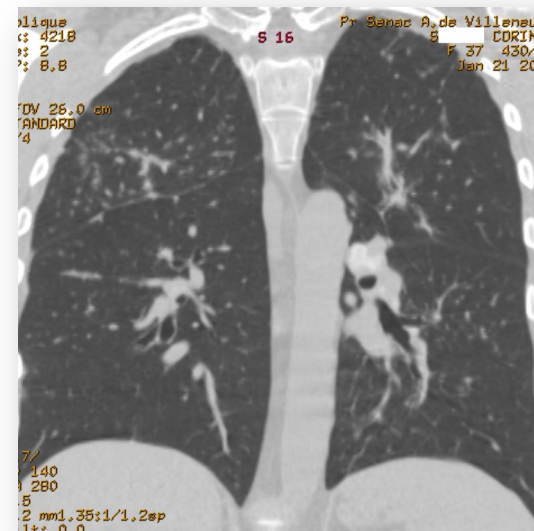
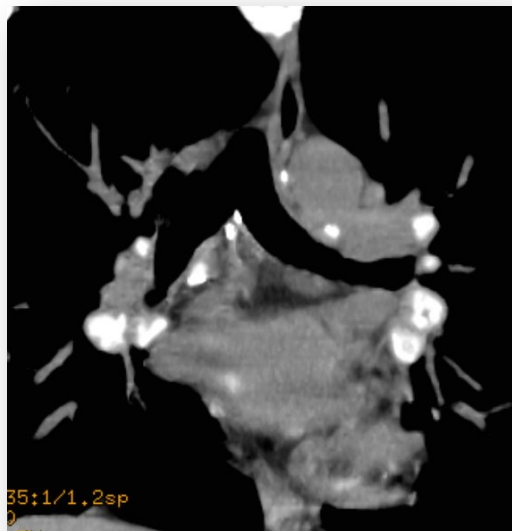
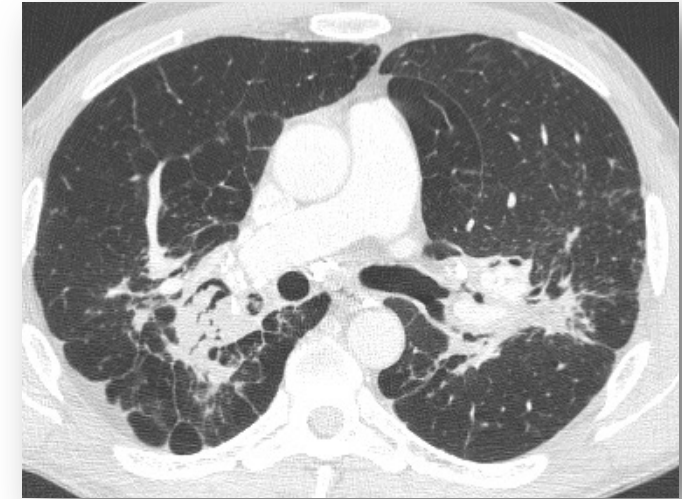
Produits incriminés	Pathologies pulmonaires	Références
amiante	plaques pleurales, asbestose, mésothéliome	20, 28-30
béryllium	béryllose	34, 36- 38
chrome	pneumoconiose aux alliages métalliques	13-15
cobalt	asthme	39,44
	pneumopathie d'hypersensibilité	13-15
	pneumoconiose aux alliages métalliques	34, 35
gallium	pneumopathie d'hypersensibilité	39
indium	pneumopathie d'hypersensibilité	39
latex	asthme	
méthacrylate de méthyle	asthme	31, 43
	pneumopathie d'hypersensibilité	32
molybdène	pneumoconiose aux alliages métalliques	15
palladium	pneumopathie d'hypersensibilité	41
silice	silicose chronique	11, 12, 16-20, 21-28
titane	pneumopathie d'hypersensibilité	39, 40

Upper lobe–dominant pulmonary fibrosis showing deposits of hard metal component in the fibrotic lesions

Yoshiko Kaneko ¹, Nonhiro Kikuchi, Yukio Ishii, Yoshinori Kawabata, Hiroshi Moriyama, Masaki Terada, Eiichi Suzuki, Masayoshi Kobayashi, Kouichi Watanabe, Nobuyuki Hizawa

[Intern Med.](#) 2010;49(19):2143-5.

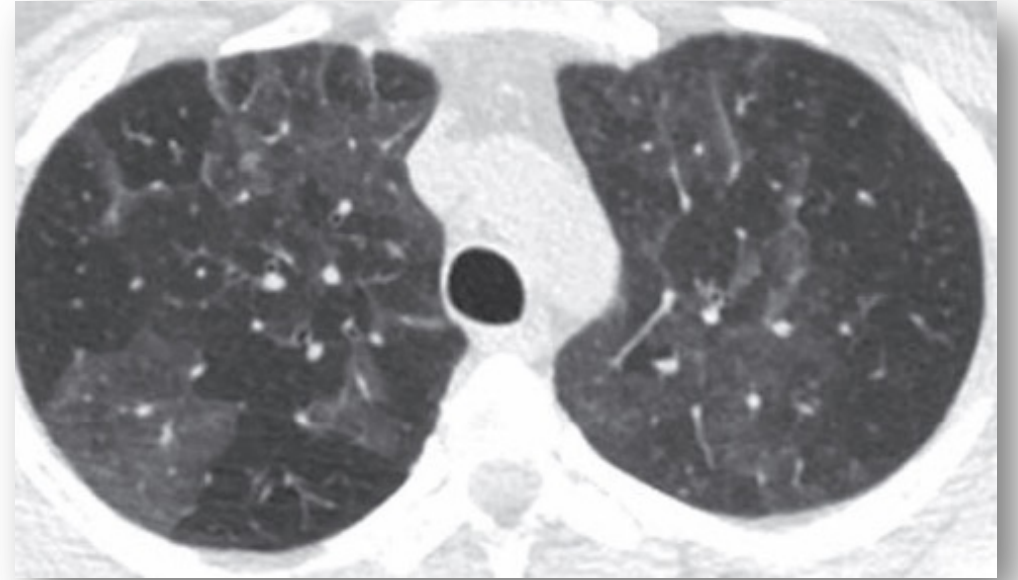
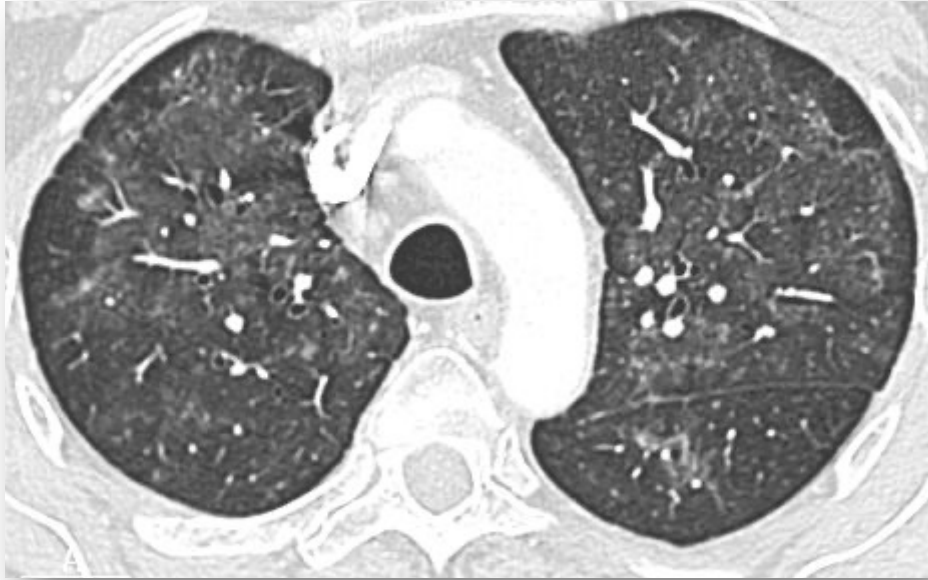
Inhalation d'antigène

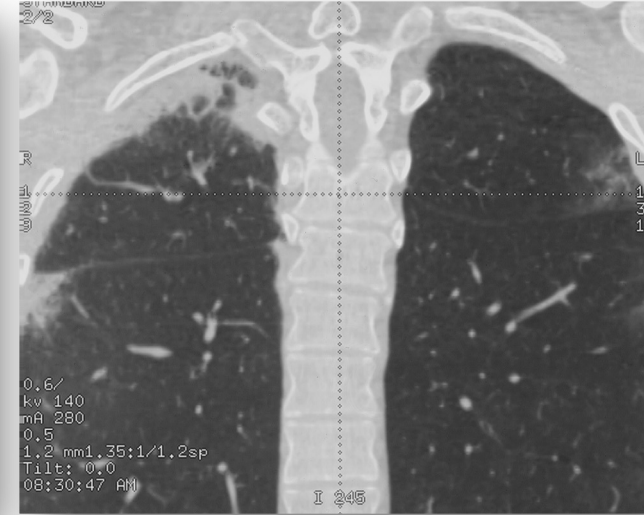


sarcoidose



PHS



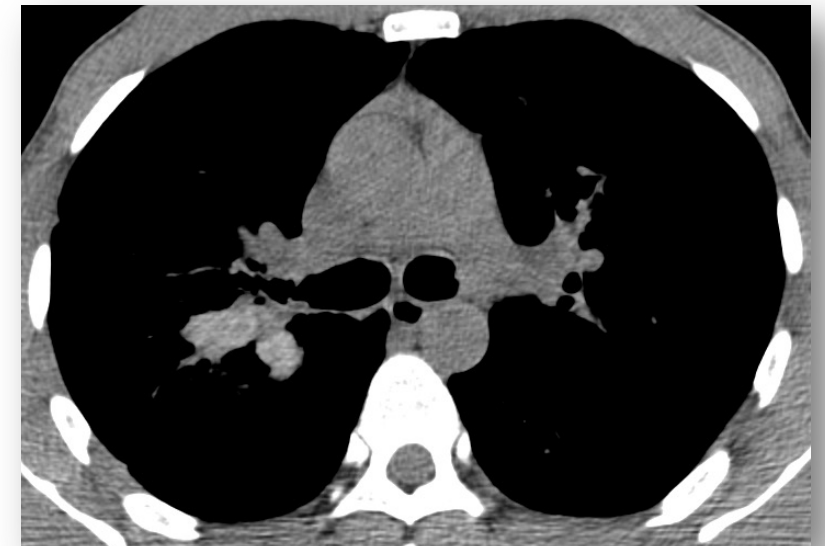


Pneumonie chronique a éosinophiles



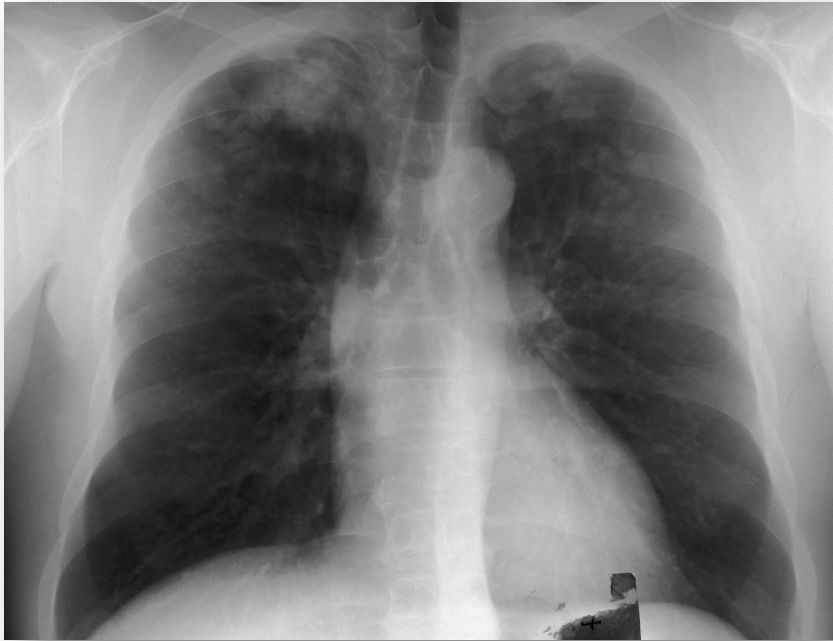
Pneumopathies a éosinophile avec asthme

Granulomatose éosinophilique avec polyangéite



ABPA

Ph alcalin des sommets

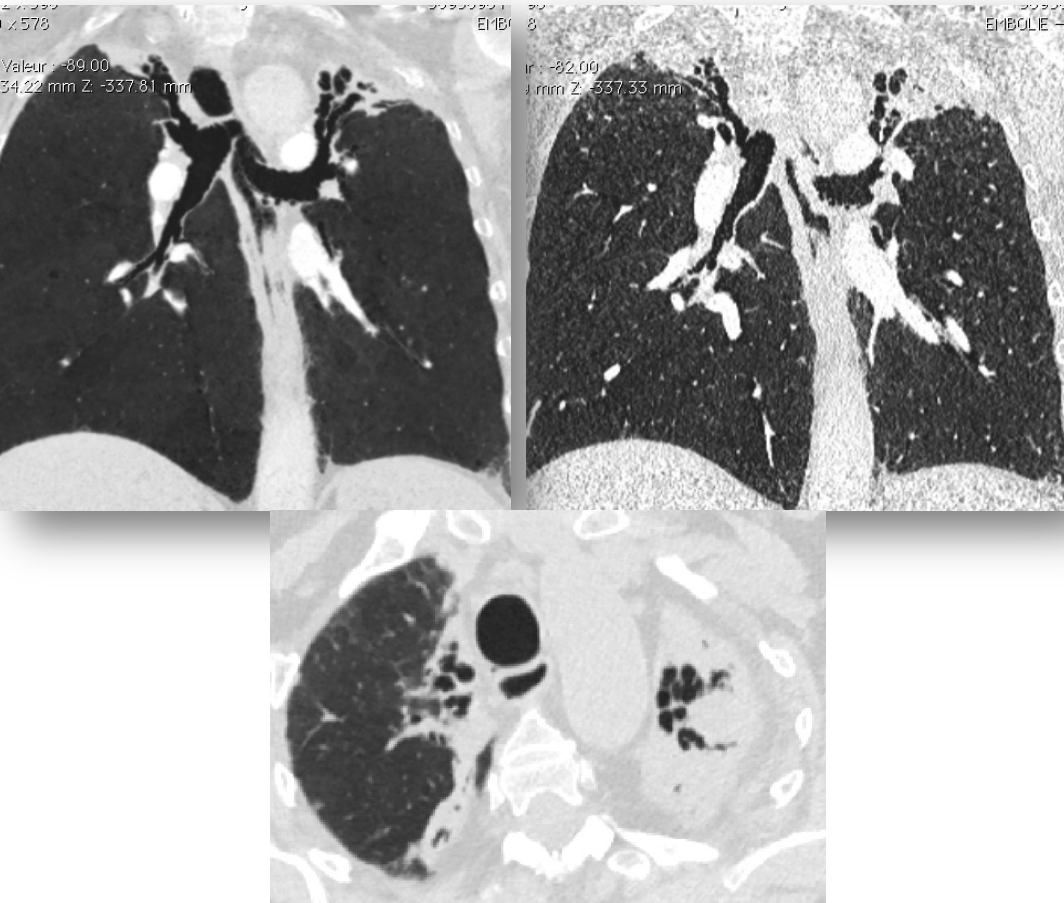


Calcinose pulmonaire



- Infiltration lobulaire en verre dépoli
- Respect des septa
- Localisation apicale initiale, puis plus diffuse
- Densité variable des opacités plutôt dense
- Pas de fibrose
- Calcifications trachéo-bronchiques

Facteurs mécaniques



Fibro élastose pleuro pulmonaire

Platythorax progresses with lung involvement in pleuroparenchymal fibroelastosis

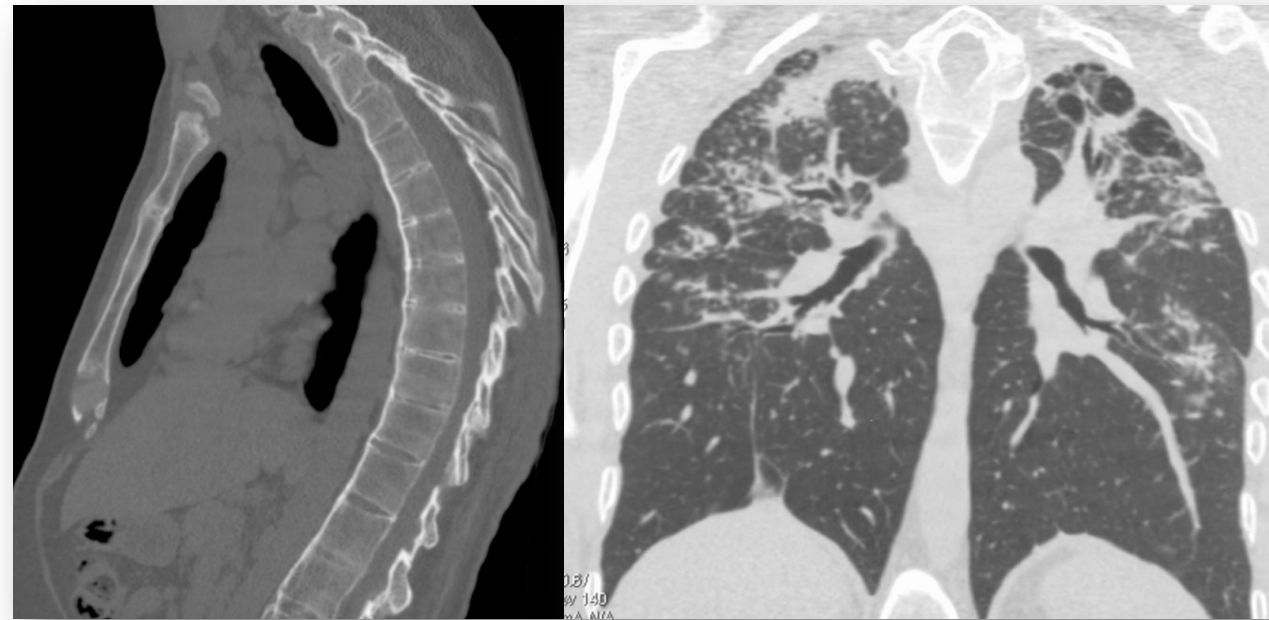
Takato Ikeda ¹, Yoshiaki Kinoshita ², Takuto Miyamura ³, Yusuke Ueda ⁴, Yuji Yoshida ⁵, Hisako Kuchima ⁶, Hiroshi Ishii ⁷

Respir Investig. 2022 Mar;60(2):293-299.

Pleuroparenchymal Fibroelastosis. A Review of Clinical, Radiological, and Pathological Characteristics

Felix Chua ¹, Sujal R Desai ², Andrew G Nicholson ³, Anand Devaraj ⁴, Elisabetta Renzoni ⁵, Alexandra Rice ⁶, Athol U Wells ⁷

Ann Am Thorac Soc. 2019 Nov;16(11):1351-1359.



Spondylarthrite ankylosante

[Study of bullous fibrosis of the **upper lobes** in ankylosing spondylitis with high-resolution computerized tomography].

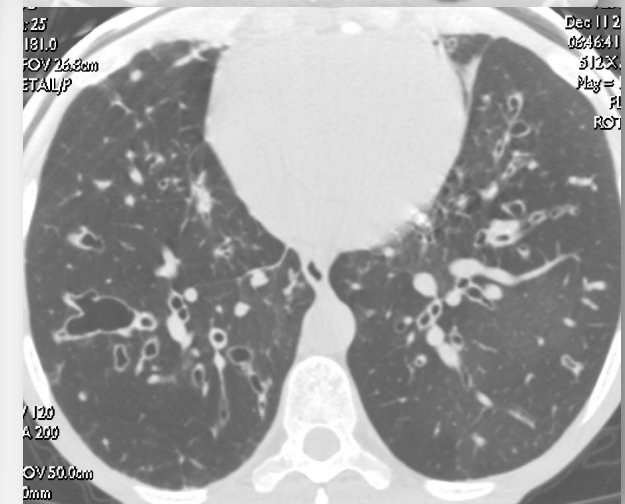
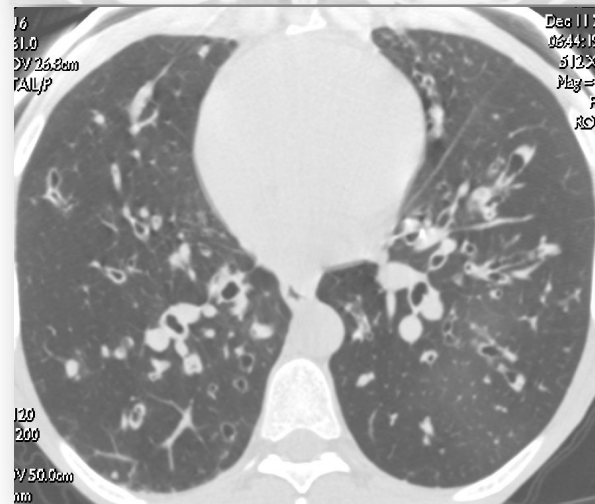
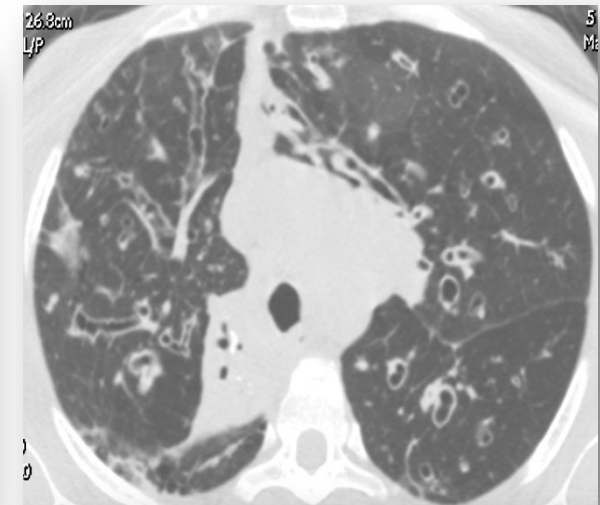
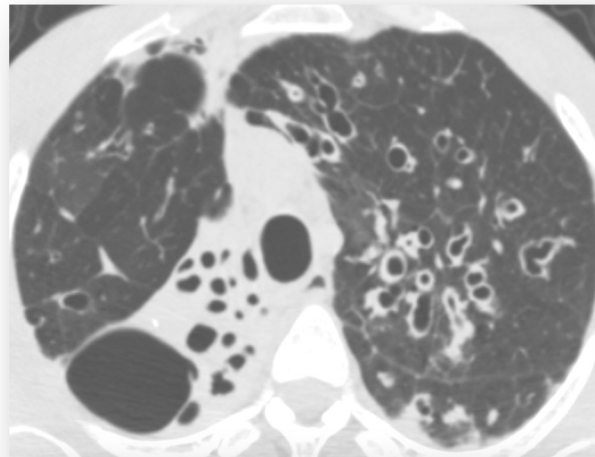
Falaschi F, Sbragia P, Trippi D, Neri E, Cambi L, Federiconi E.

Radiol Med. 1996 Oct;92(4):358-62.

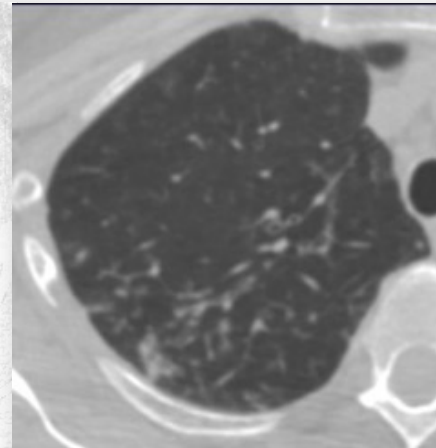
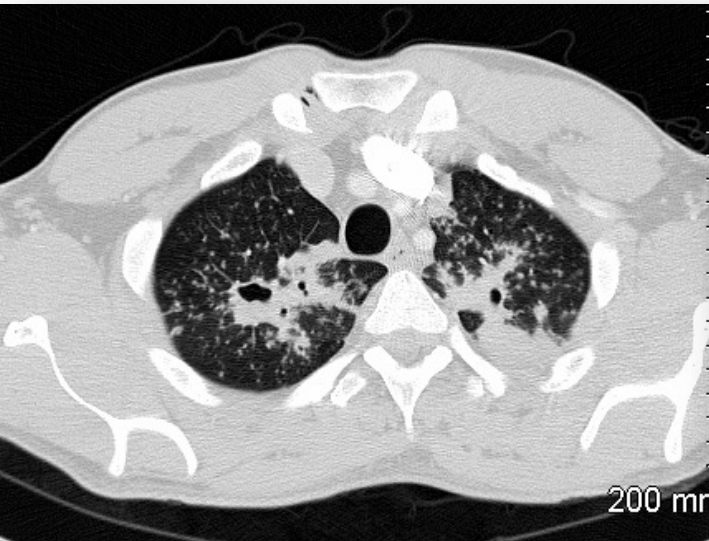
Troubles de la clearance mucociliaire

Femme de 20 ans atteinte de mucoviscidose:

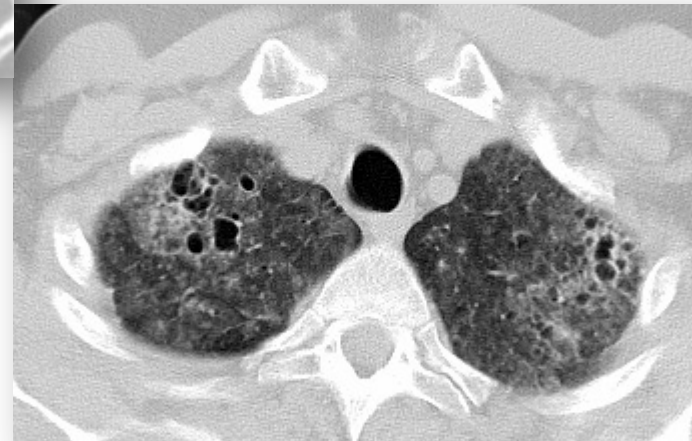
Bronchectasies cylindriques et kystiques proximales prédominant dans les lobes supérieurs, avec troubles ventilatoires et bronchomucocèles



infections



tuberculose



Pneumocystose (Hiv)

The Small Breathing Amplitude at the Upper Lobes Favors the Attraction of Polymorphonuclear Neutrophils to *Mycobacterium tuberculosis* Lesions and Helps to Understand the Evolution toward Active Disease in An Individual-Based Model

[Pere-Joan Cardona^{1,*}](#) and [Clara Prats²](#) [Front Microbiol.](#) 2016; 7: 354.

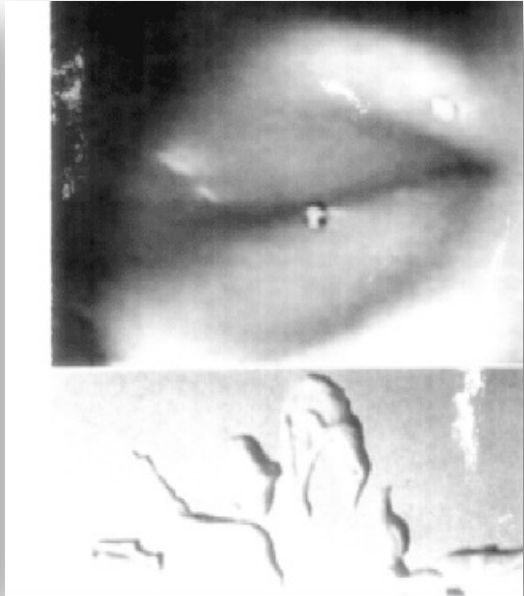
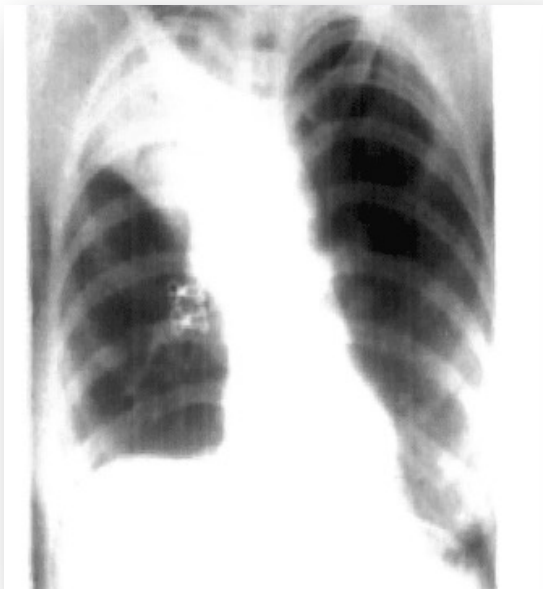
TABLE 1: Pulmonary Diseases With Upper Lobe Predominance

Inhaled injurious gases
Smoke inhalation
Centrilobular emphysema
Impaired mucociliary clearance
Cystic fibrosis
Inhaled particulates: pneumoconiosis
Silicosis
Coal worker pneumoconiosis
Berylliosis
Miscellaneous pneumoconioses (hard metal disease, kaolinosis, bauxite pneumoconiosis, fuller's earth disease)
Inhaled antigens
Hypersensitivity pneumonitis
Allergic bronchopulmonary aspergillosis
Chronic eosinophilic pneumonia
Granulomatous diseases
Tuberculosis
Sarcoidosis
Langerhans cell histiocytosis
Bronchocentric granulomatosis
Abnormal perfusion kinetics
Right-sided localized pulmonary edema in acute mitral regurgitation
Neurogenic pulmonary edema
Metabolic diseases
Metastatic pulmonary calcification
Increased mechanical stress
Ankylosing spondylitis

Upper Lobe–Predominant Diseases of the Lung

TABLE 1: Pulmonary Diseases With Upper Lobe Predominance

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Bronchocentric granulomatosis
Abnormal perfusion kinetics
Right-sided localized pulmonary edema in acute mitral regurgitation
Neurogenic pulmonary edema
Metabolic diseases
Metastatic pulmonary calcification
Increased mechanical stress
Ankylosing spondylitis



**Parfois , c'est le
hasard**

Case Reports > Indian J Chest Dis Allied Sci. Jan-Mar 2004;46(1):55-8.

Accidental condom inhalation

C L Arya ¹, Rajnish Gupta, V K Arora

Merci de votre attention

En hommage a mon ami Jacques Giron

Écouter le temps qui passe dans le patio
des lions de l'Alhambra de Grenade; c'est
une expérience que je vous souhaite, a
tous.....

