

肺結節與腫塊病變

台北榮民總醫院

胸腔部

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08/11/2019

Miliary nodule: <2 mm

Pulmonary micronodule: 2-7 mm

Pulmonary nodule: ≤ 30 mm

Pulmonary mass: > 30 mm



Miliary nodule



micronodule



nodule



Mass

鑑別診斷

良性：inflammation, granuloma, hamartoma, fungal infection, TB, etc.

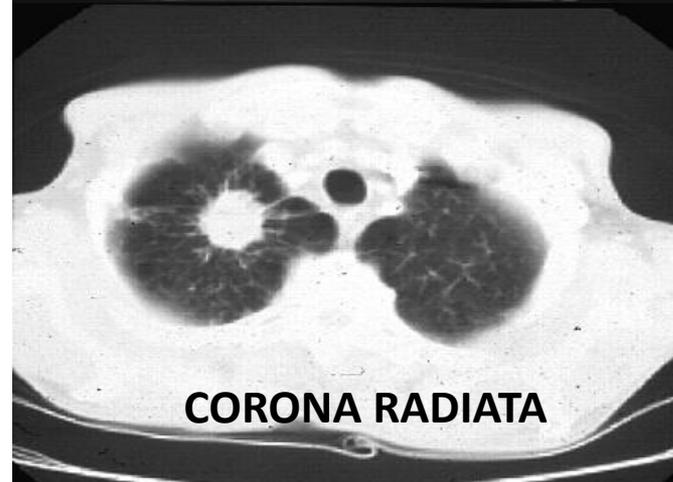
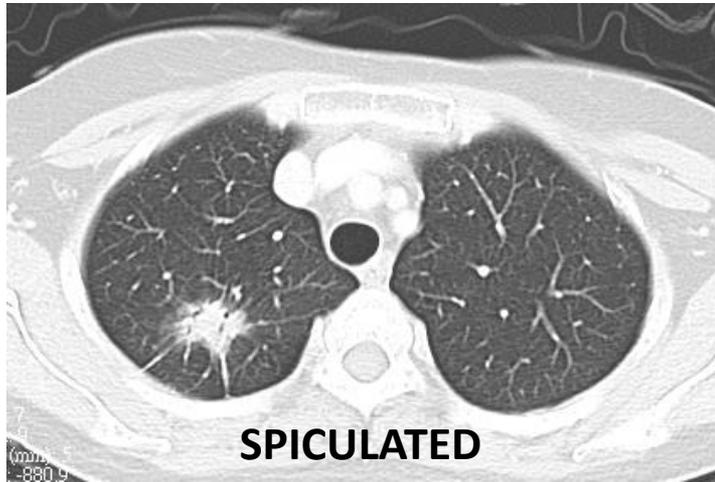
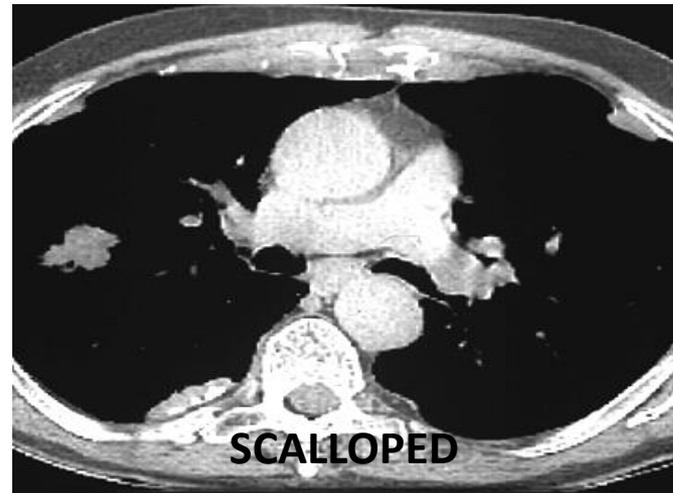
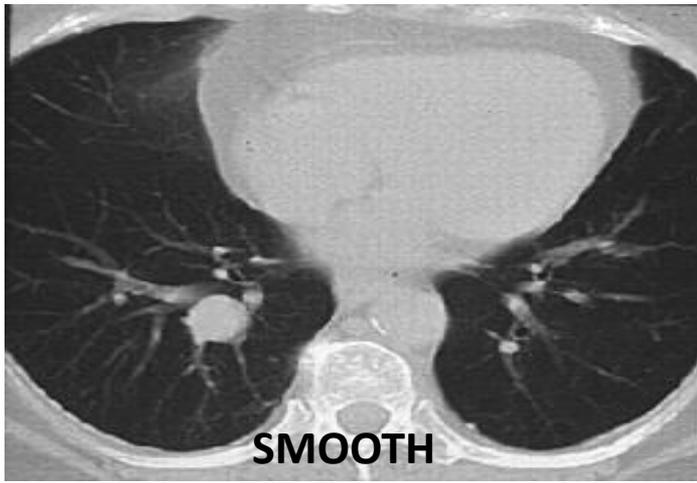
惡性：carcinoma, sarcoma, lymphoma, etc.

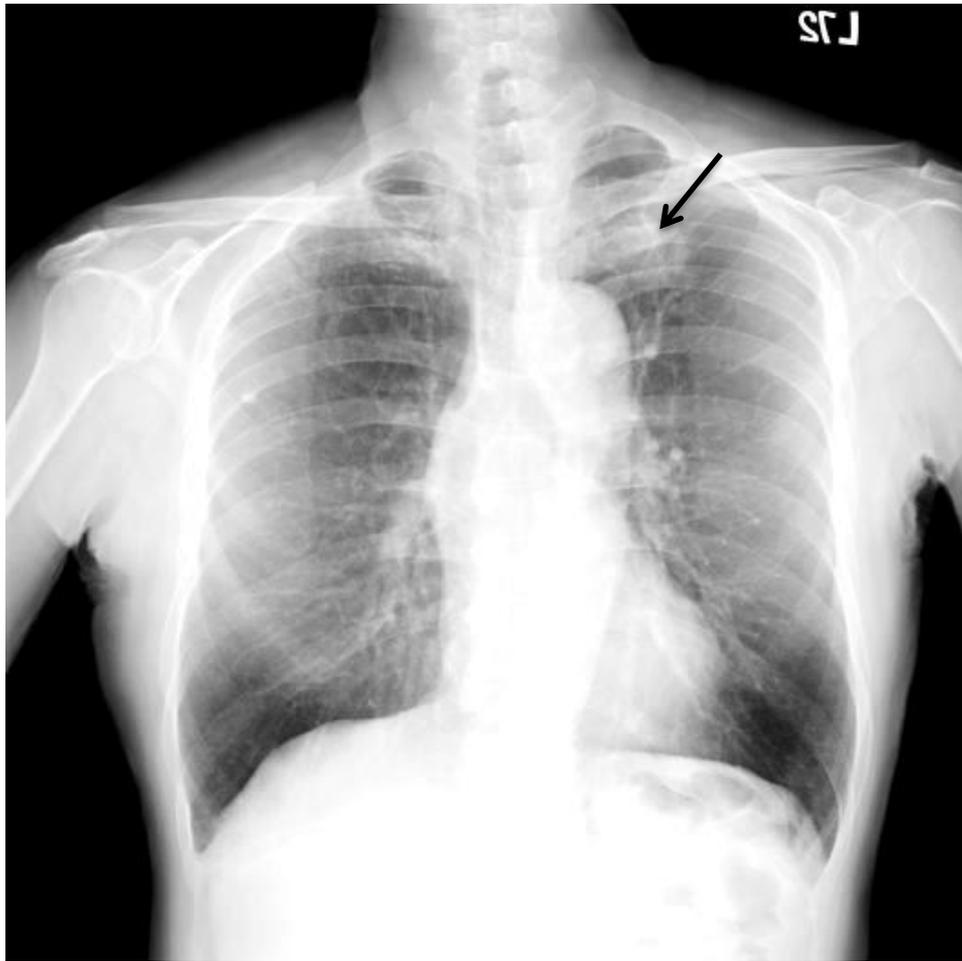
Tissue is the Issue

1. Shape and margin of pulmonary nodule /mass

Malignant nodule

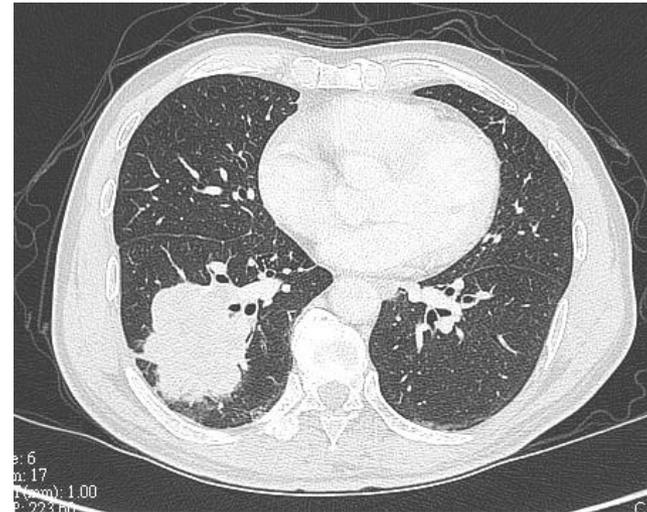
- smooth border: 20% malignancy
- scalloped border: 60% malignancy
- spiculation border: 80% malignancy
- corona radiata: 95% malignancy





82/M smoker, progressive enlarged LUL nodule
CT: spiculation pattern in pul. nodule
Dx: adenocarcinoma of lung, LUL

lobulated Mass shadow with spiculation



Mass: Lobulated and irregular margin associated with spiculation

Corona radiata pattern



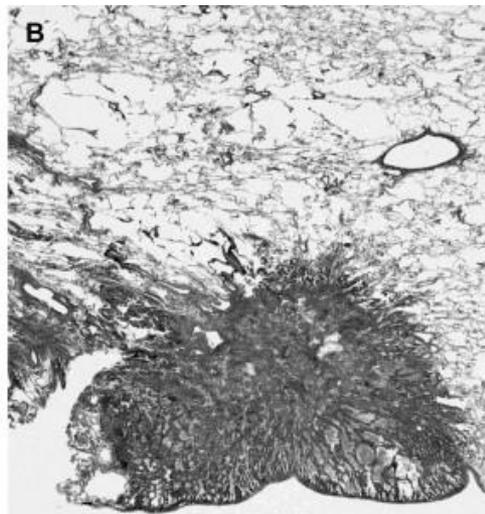
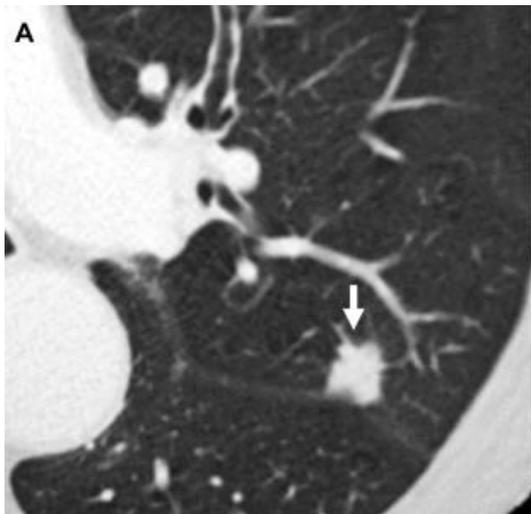


Small nodule on LUL

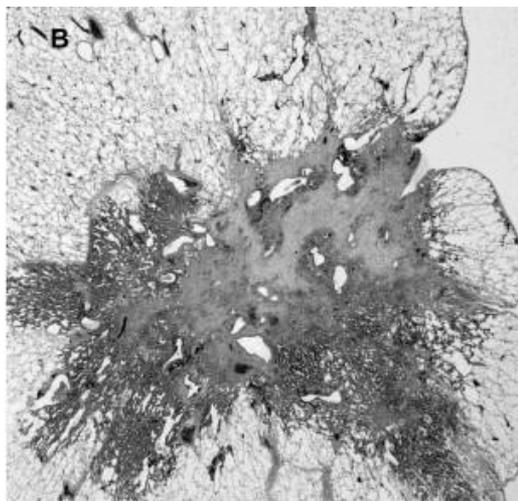
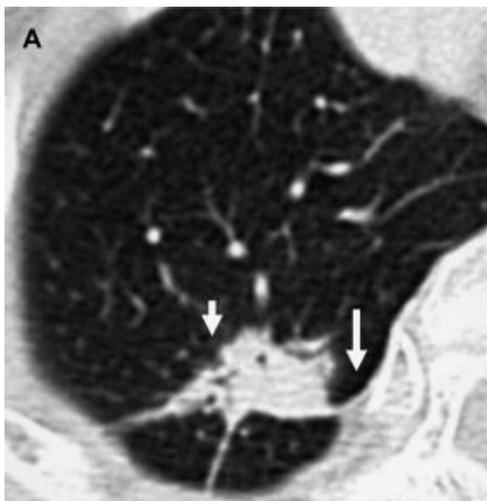
CT: lobulated nodule with spiculation on LUL

Dx: adenocarcinoma of lung, LUL

Malignant sign: Pleural traction sign or notching in pulmonary nodule/mass



Notching nodule



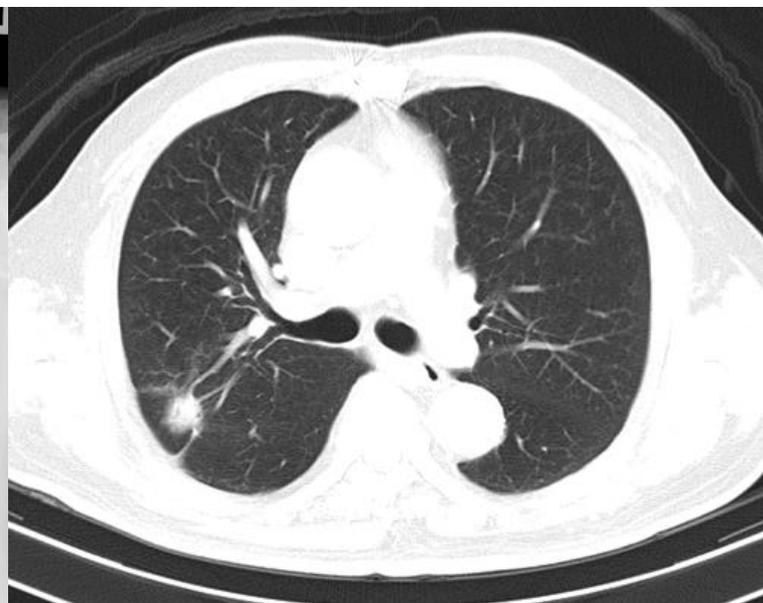
Pleural retraction nodule

Malignant sign: Vessel invasion or feeding artery in nodule/mass



Vessel invasion, lobulated solid nodule

Dx: RUL adenocarcinoma, T1bN0M0, IA

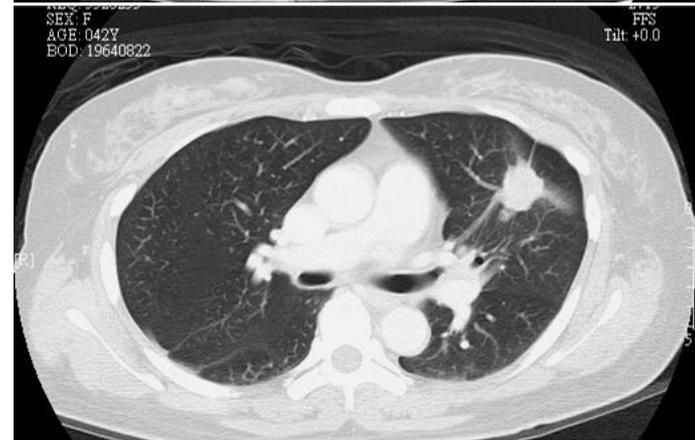
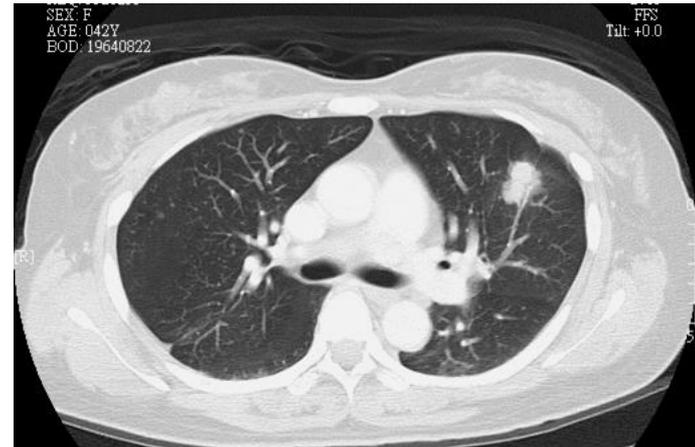
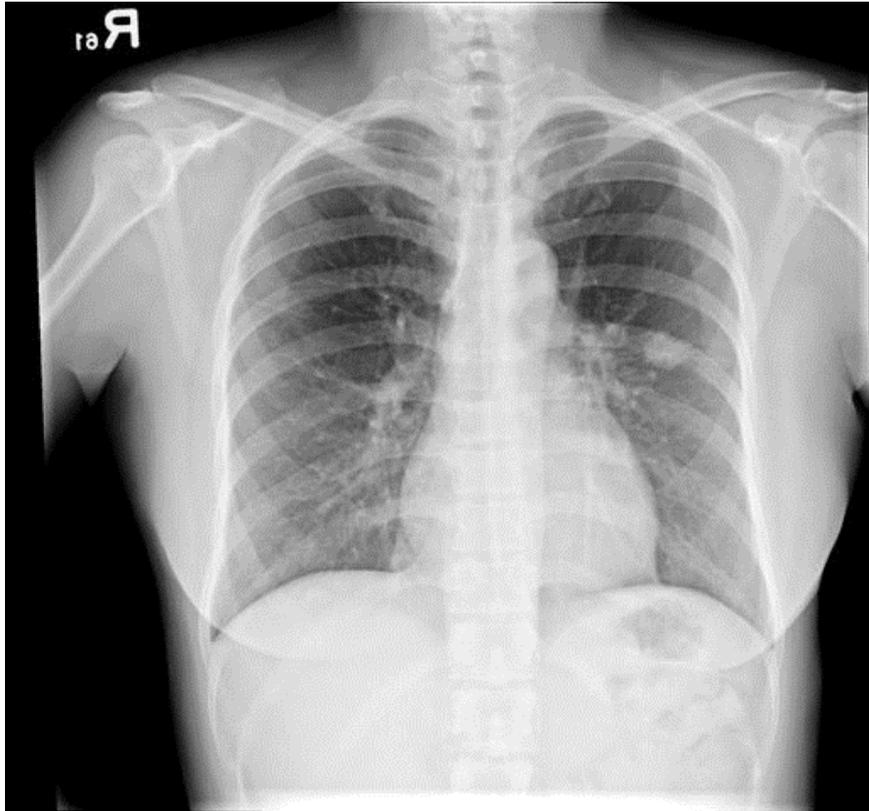


RUL nodular lesion.

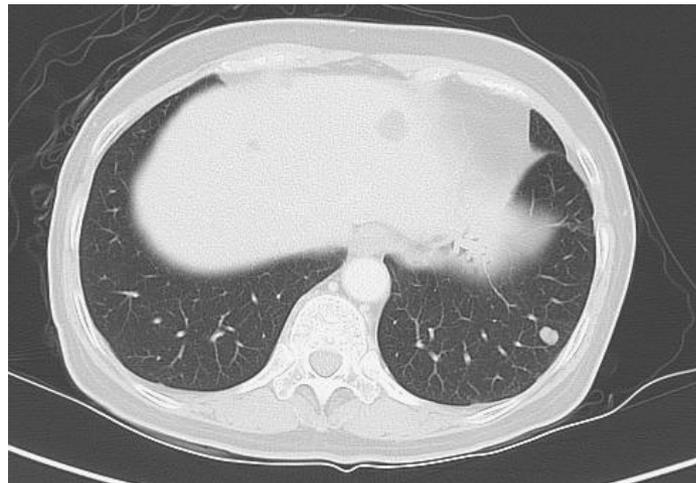
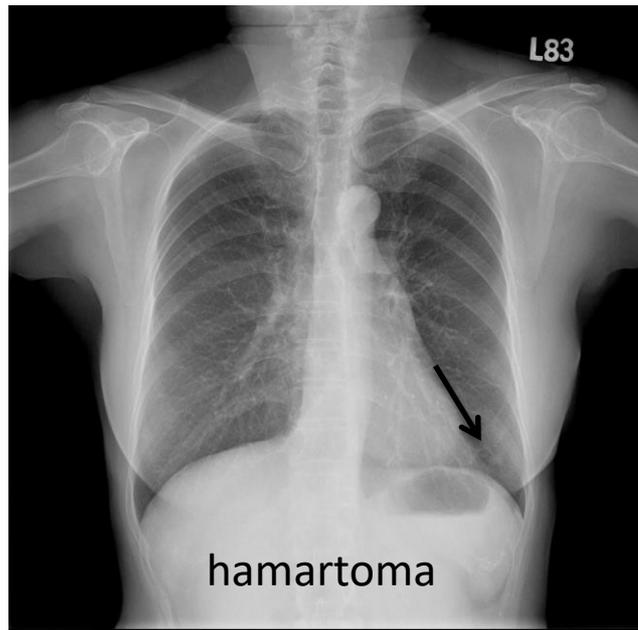
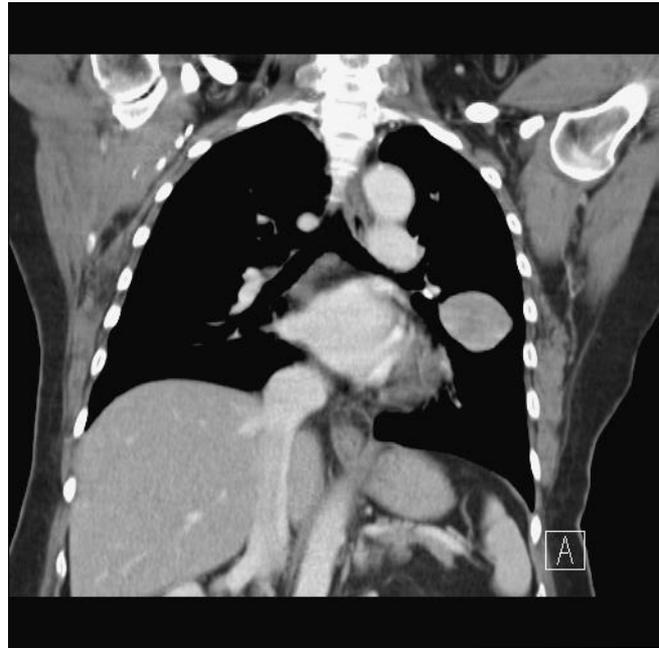
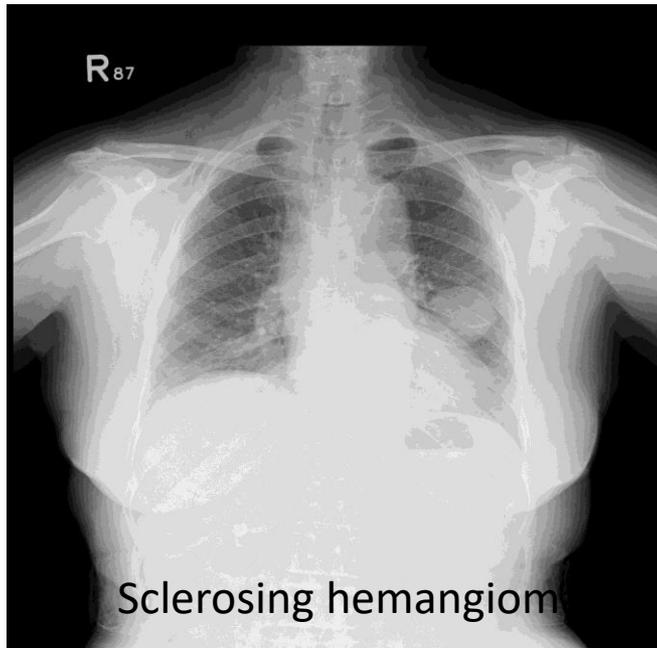
CT: nodule on RUL with feeding artery , pleural traction

Dx: adenocarcinoma of lung, T2aN0M0, stage IB

Tumor growth with feeding artery

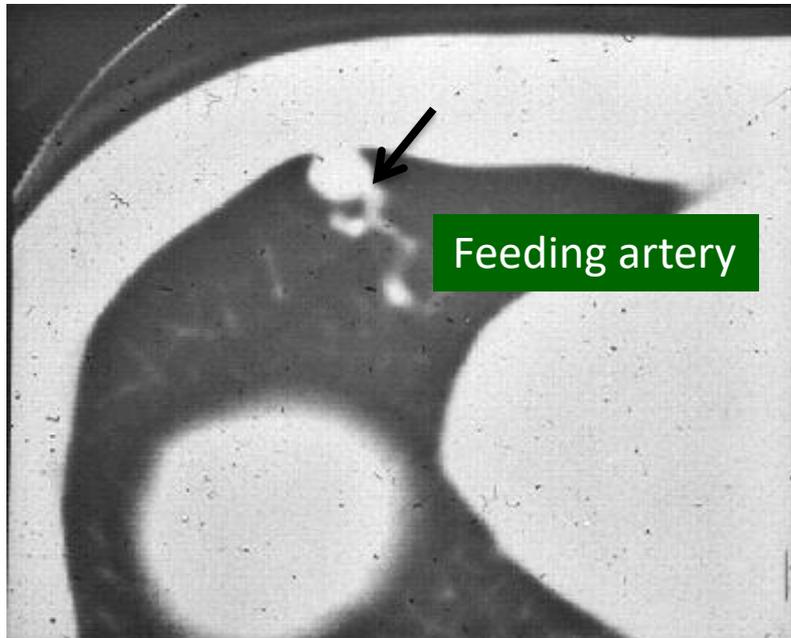


Benign shape: Well-defined, Homogeneous density , Calcification,

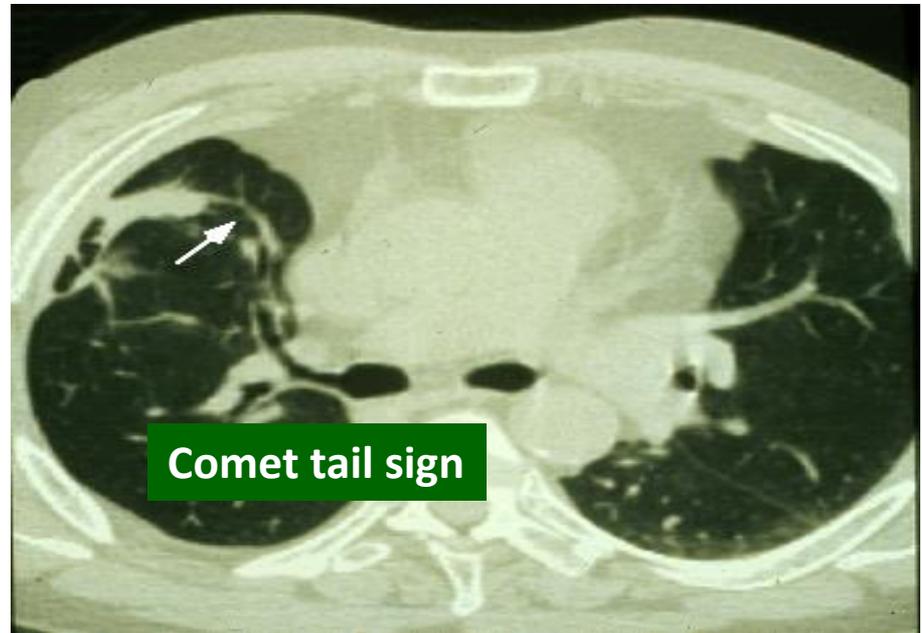


Nodule with tail

1. Pleural tail sign-malignant
2. Feeding artery and draining vein- AV malformation
3. Comet tail sign and pleural thickening- round atelectasis



A-V malformation

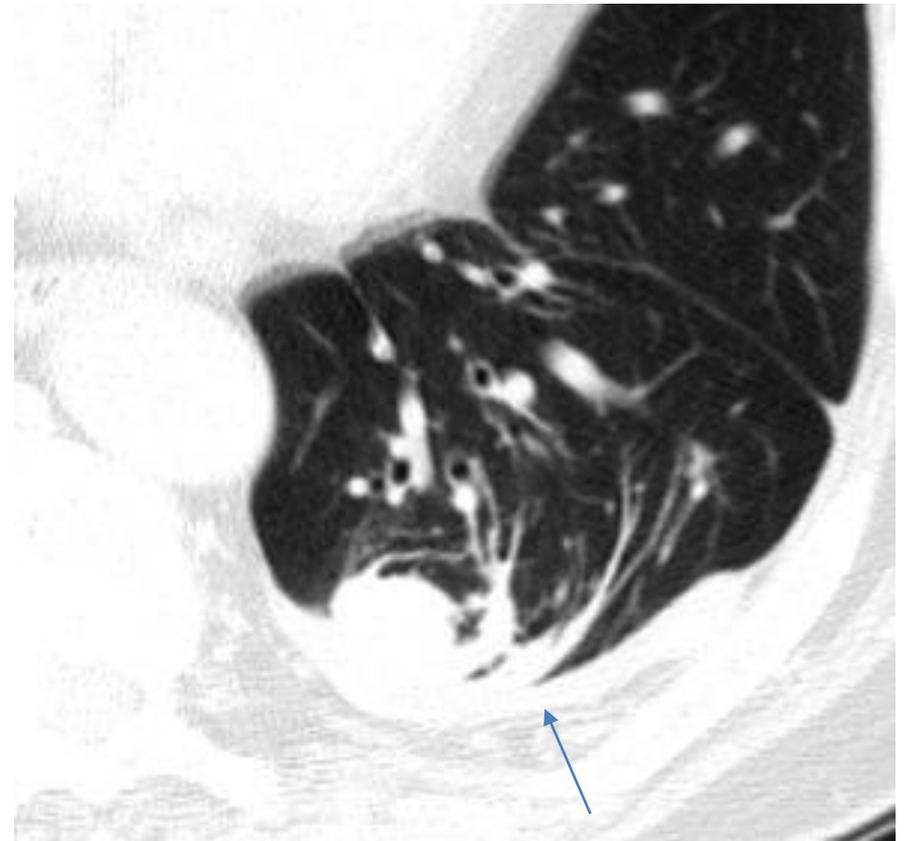


Round atelectasis



Pleural thickening

Asymptomatic mass lesion on LLL



3 weeks later

Pleural-based solid mass on LLL
Dx: Round atelectasis

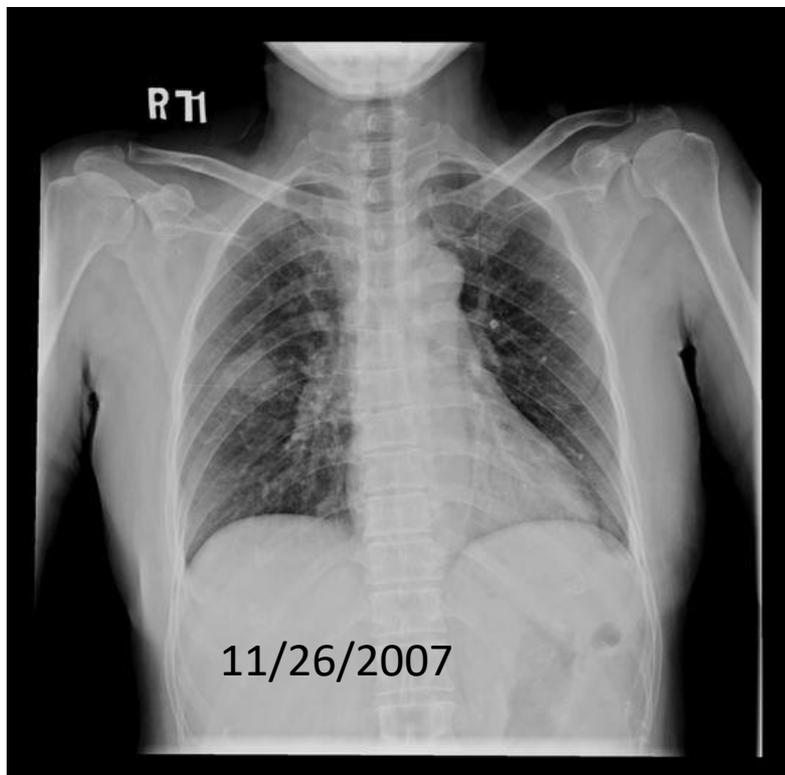
2. Density in pulmonary nodule/mass (1)

Homogeneous density: pneumonia, round pneumonia, organizing pneumonia, fungal infection,

Inhomogeneous density: lung abscess, pneumonia,



Dx: pneumonia, RUL (inhomogeneous density nodule in CT scan)



Vanishing tumor
Round pneumonia

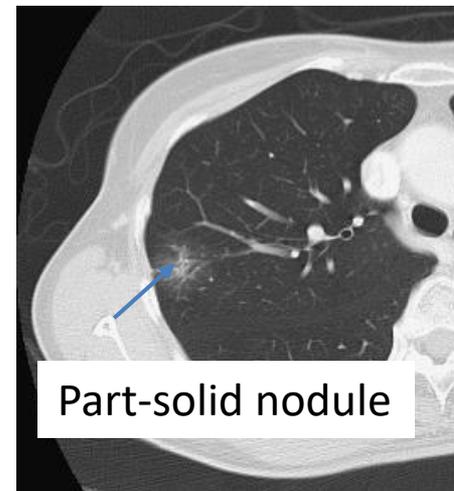
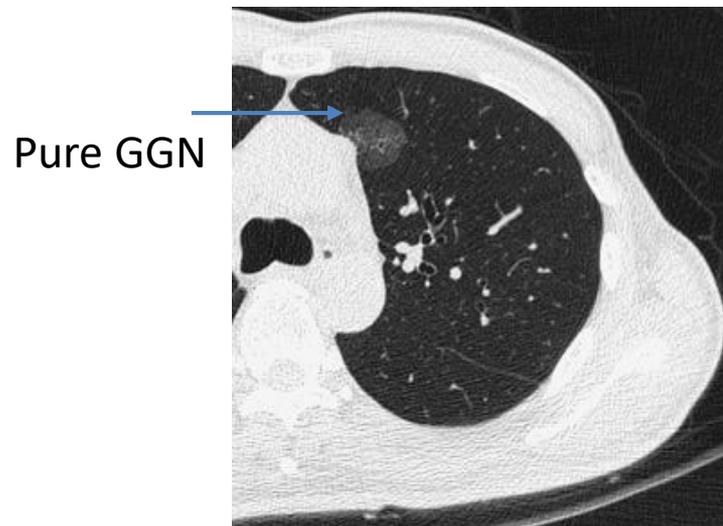
→
Antibiotics x14 days

2. Density of pulmonary nodule/mass (2)

Pulmonary nodule: ground-glass nodule, part-solid nodule, solid nodule

Subsolid nodule (2013 Fleischner Society definition): include

- 1. pure ground glass nodule (GGN):** *Hazy opacity that preserves underlying bronchi and vascular margin*
- 2. Part-solid nodule:** *Ground glass opacity with solid component*



Pure GGN:

Acute inflammation, atypical adenomatous hyperplasia (AAH), adenocarcinoma in situ (AIS), Pulmonary hemorrhage, focal fibrosis

AAH: GGN size < 5 mm,

AIS: pure GGN 5-10 mm



Pathology: AAH



Pathology: AIS

Part solid and halo GGN

invasive aspergillosis, Wegener's granulomatosis

similar pattern as minimally invasive adenocarcinoma (MIA)

MIA: part-solid nodule with solid component < 5 mm



3. Cavitation in pulmonary nodule /mass

thin-walled/thicked-walled

Inner wall smooth/irregular

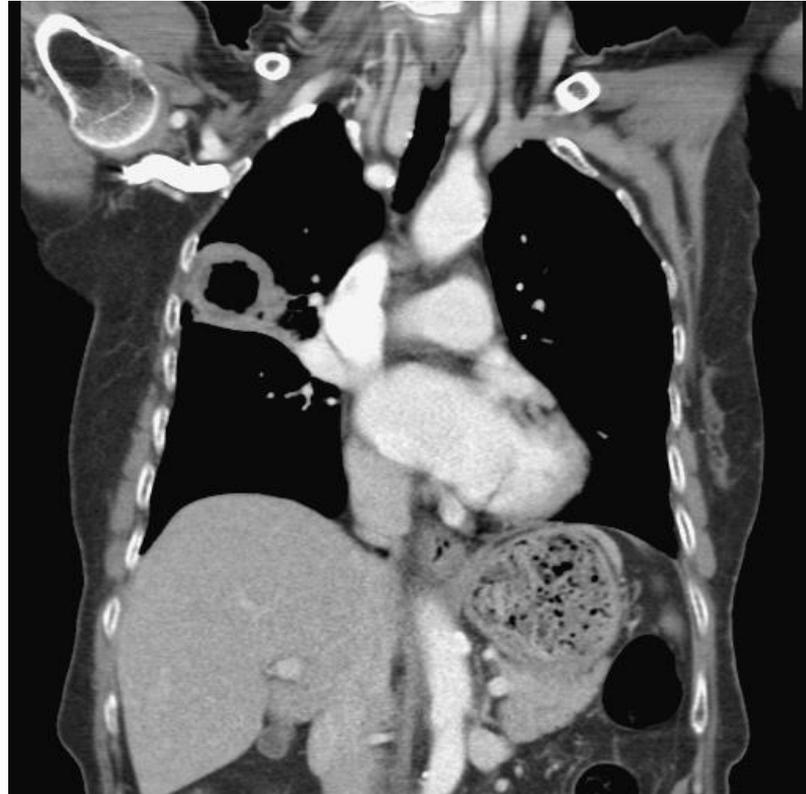
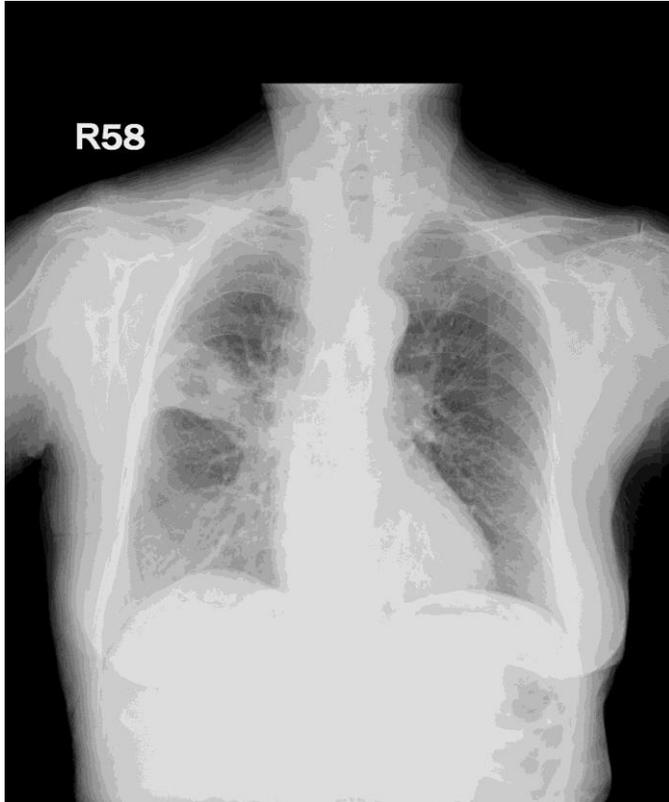
Inflammatory processes?

acute/ chronic

single/multiple cavity

air-crescent sign/ball-in-hole

**Thick-walled cavity in 80/F, dyspnea. Chest pain for three months.
Wall thickness > 15 mm
Favor malignancy or wegener's granulomatosis**



Dx: Squamous cell carcinoma of lung, RUL

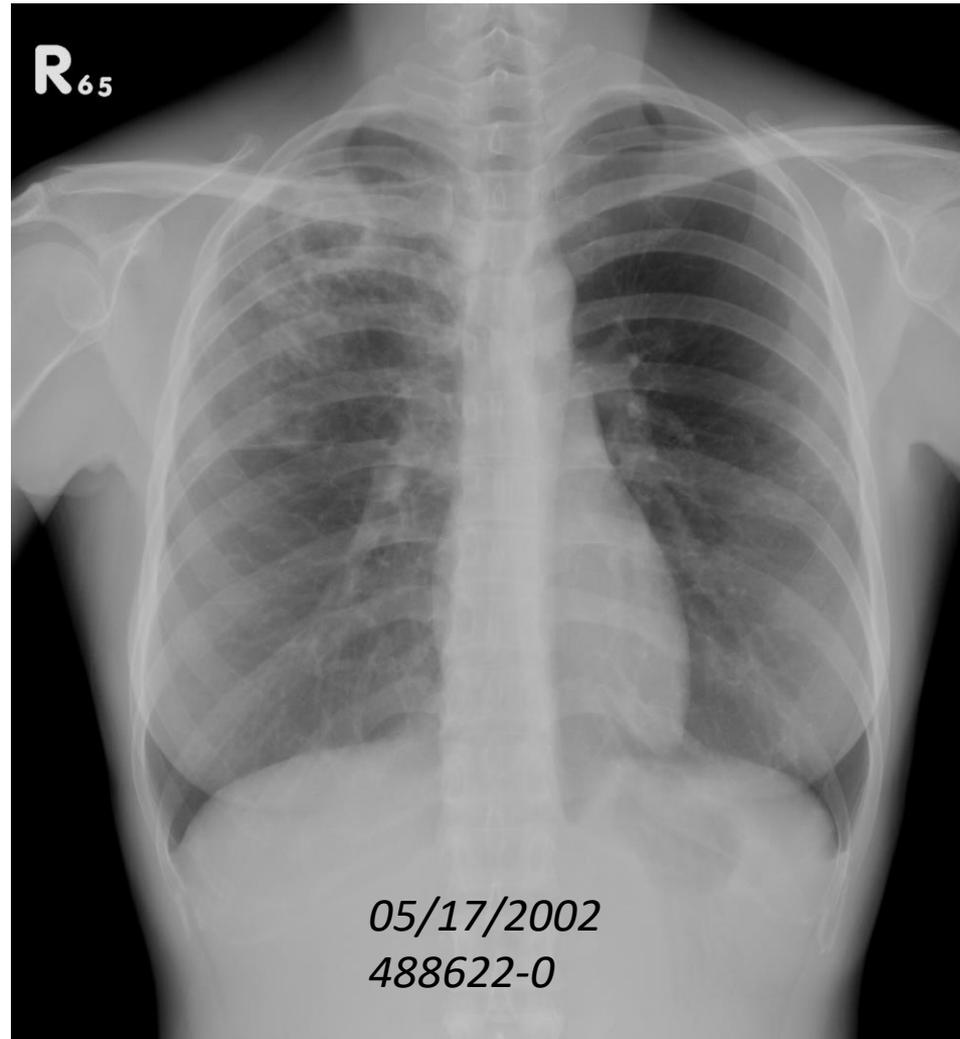
**Irregular inner wall cavity:
wall thickness > 4mm (AJR 1980; 135:1269)
favor malignancy**



**Shaggy walled cavity in pulmonary mass shadow
Favor lung abscess (if leukocytosis and clinical
Correlation)**

32/F, cough with scanty sputum x 3 Ms
Sputum AFB: (++)

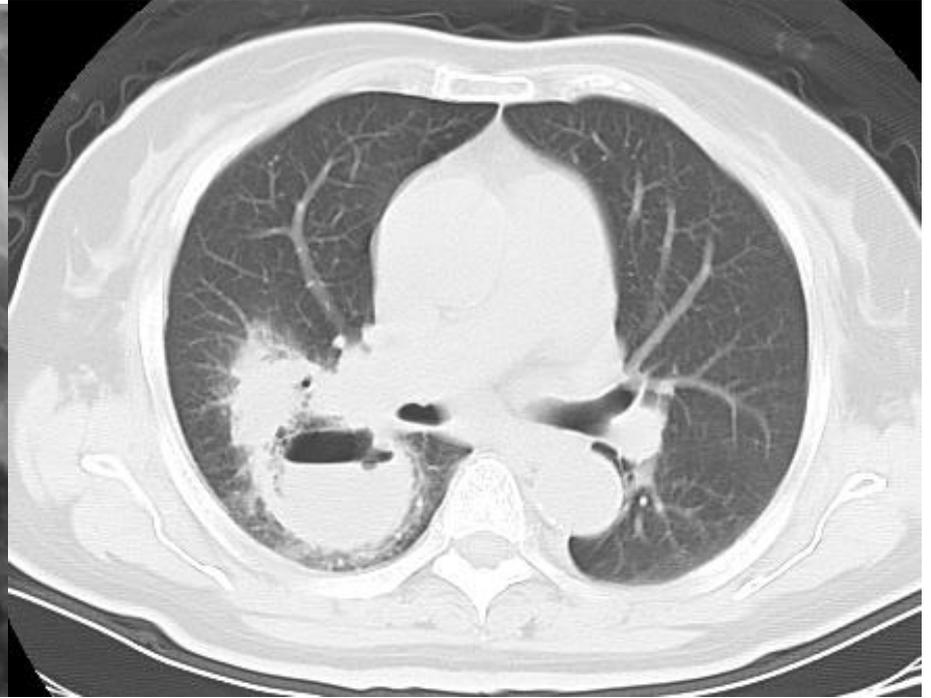
Thin-walled cavity
(< 4 mm in thickness)
With satellite lesion



**Shaggy wall cavity: bronchogenic spreading
Favor aspiration induced lung abscess, TB**



Pneumoconiosis with TB cavity



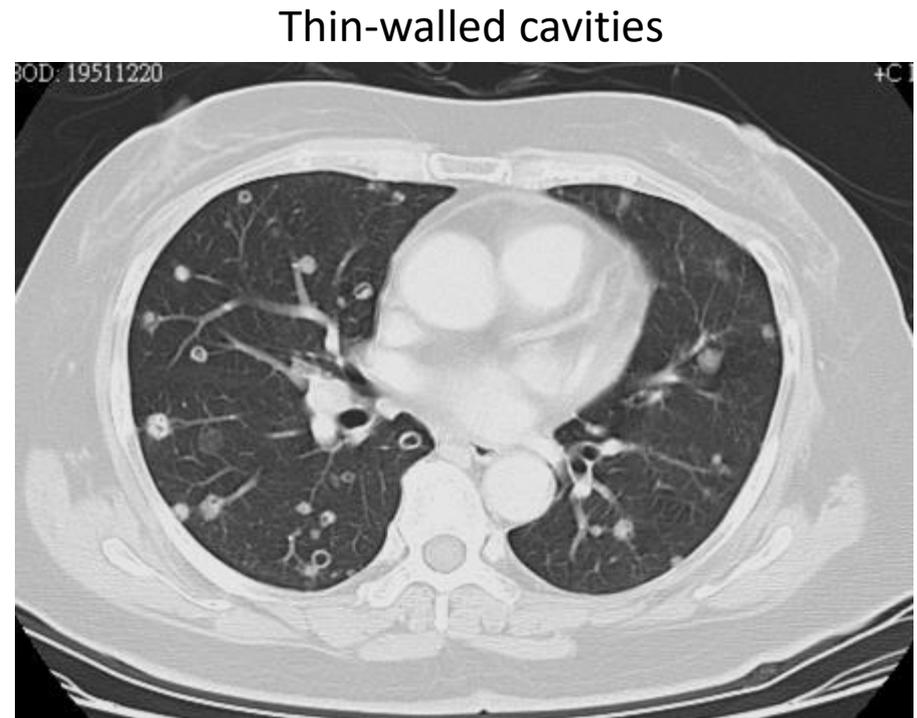
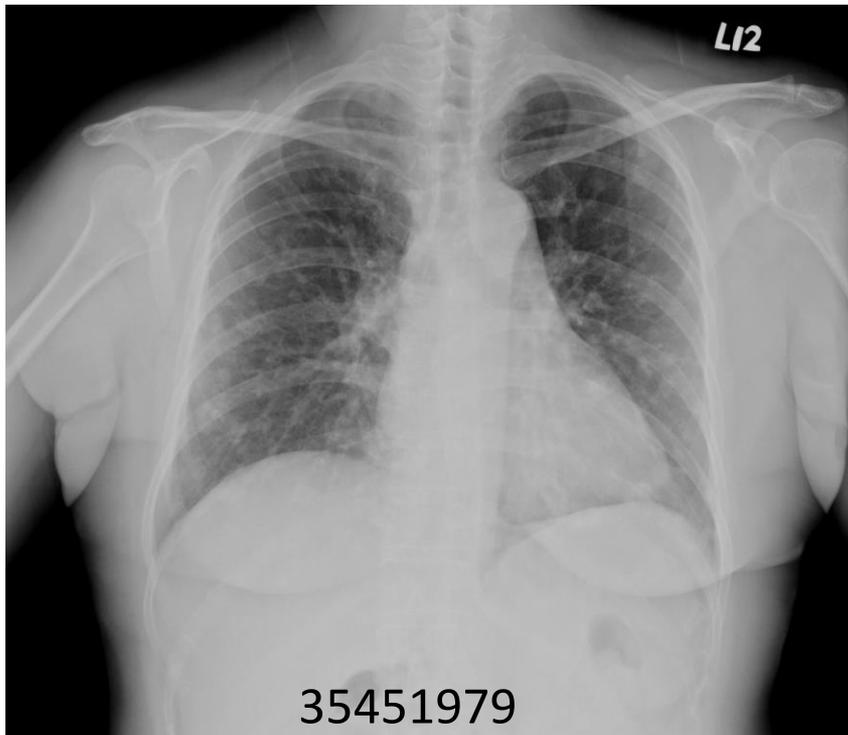
Lung abscess

Sharp margin suggest hematogenous spreading

Favor: septic embolism, metastatic lesions, Wegener's granulomatosis

thin-walled cavity in 55/F, cough with dyspnea for two months.

Favor metastasis or septic embolism, congenital cysts, Mycobacterium infection

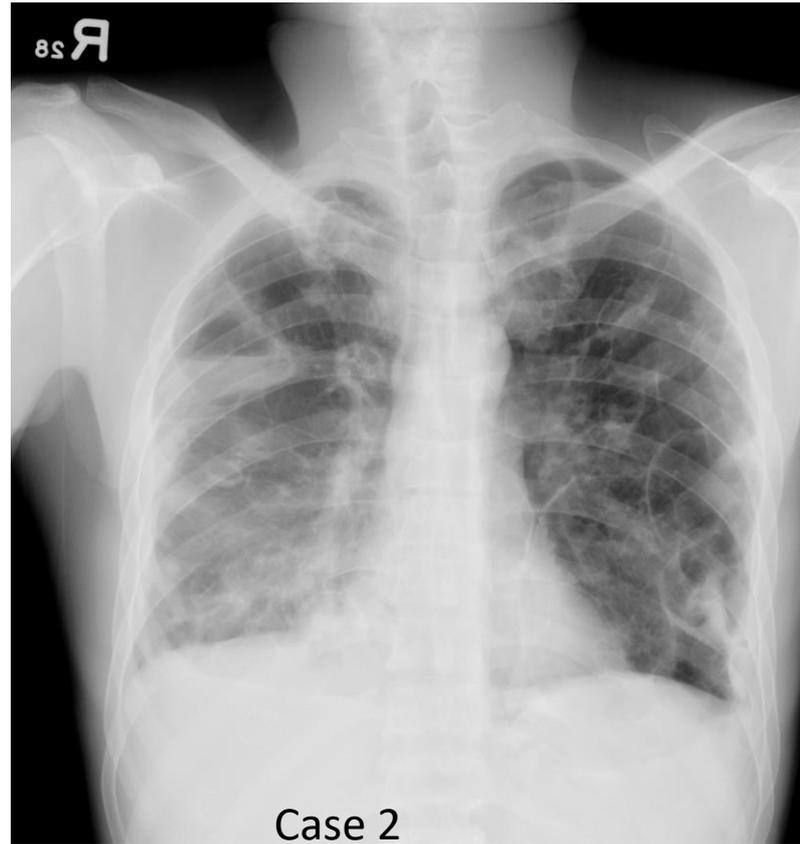
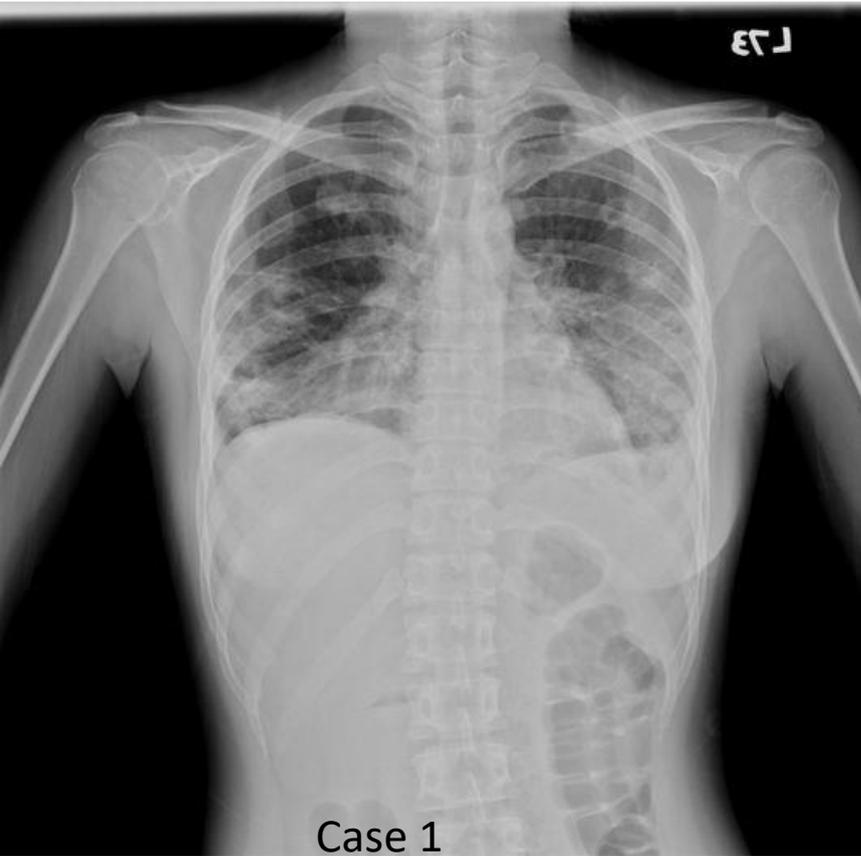


Note: Female: cervical cancer with lung metastasis

Male: primary lung cancer with lung to lung metastasis

Cell type: adenocarcinoma or squamous cell carcinoma

Multiple cavities in pulmonary nodules
25/F, chill with spiking fever, leukocytosis



Dx: Septic embolism (staphylococcus) in drug abuser

Metastatic lung cancer: most commonly from cervix ca.

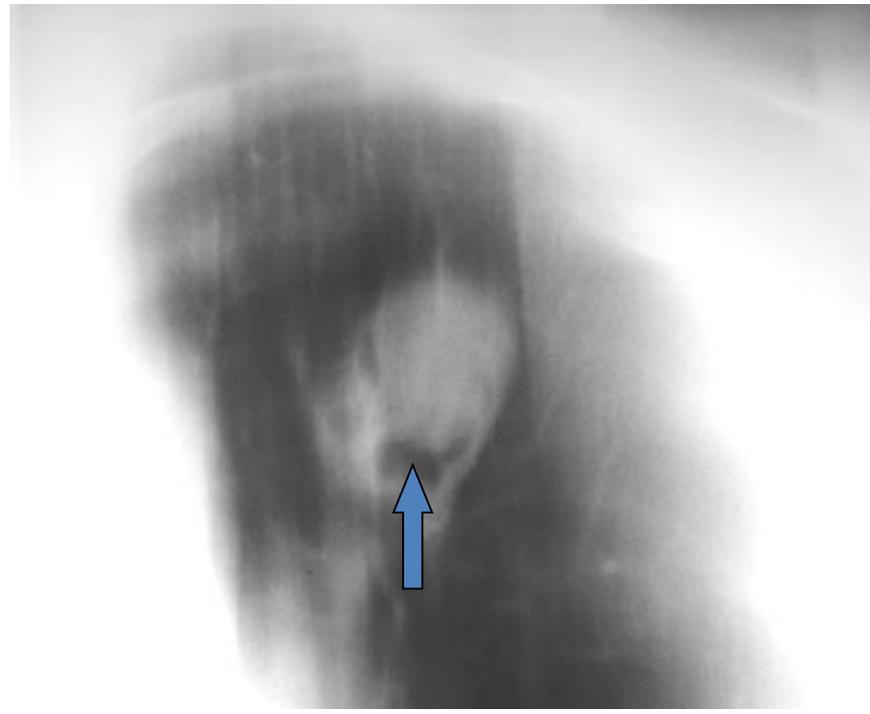


Cervical cancer with lung metastasis

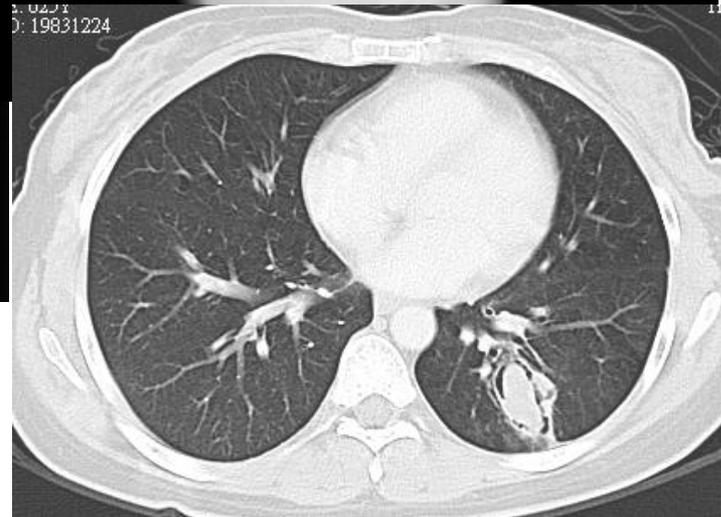
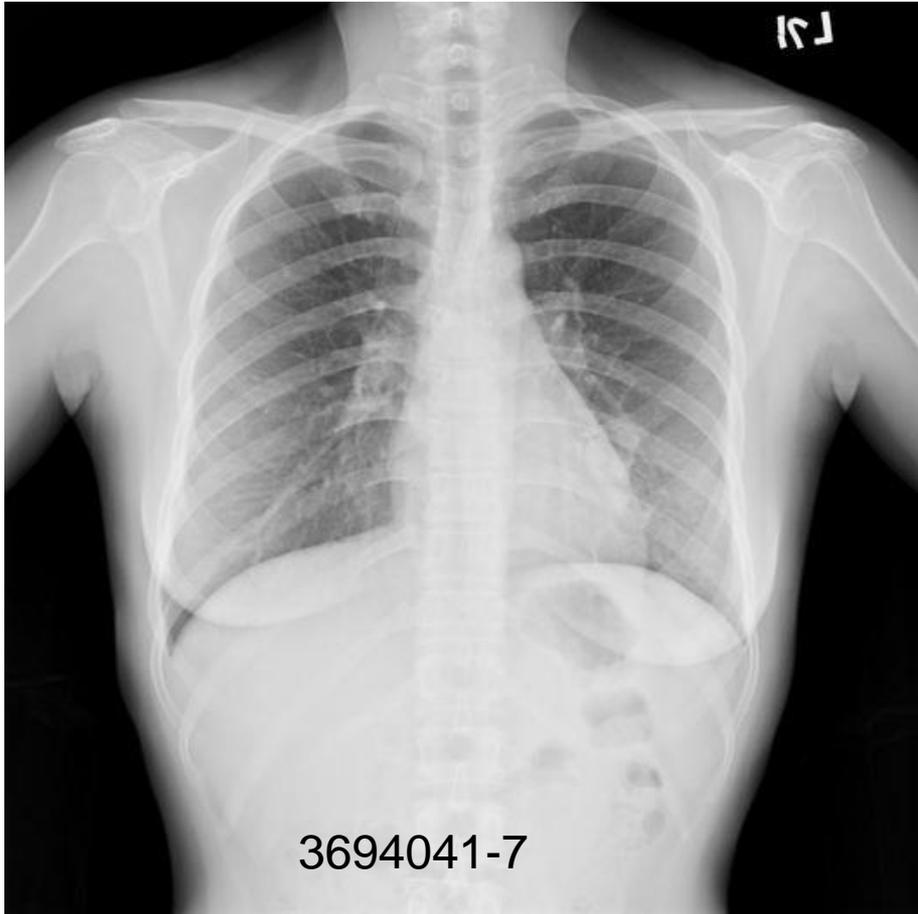


Air crescent on LUL
Mass shadow

Ball-in-hole
Dx: mycetoma, LUL



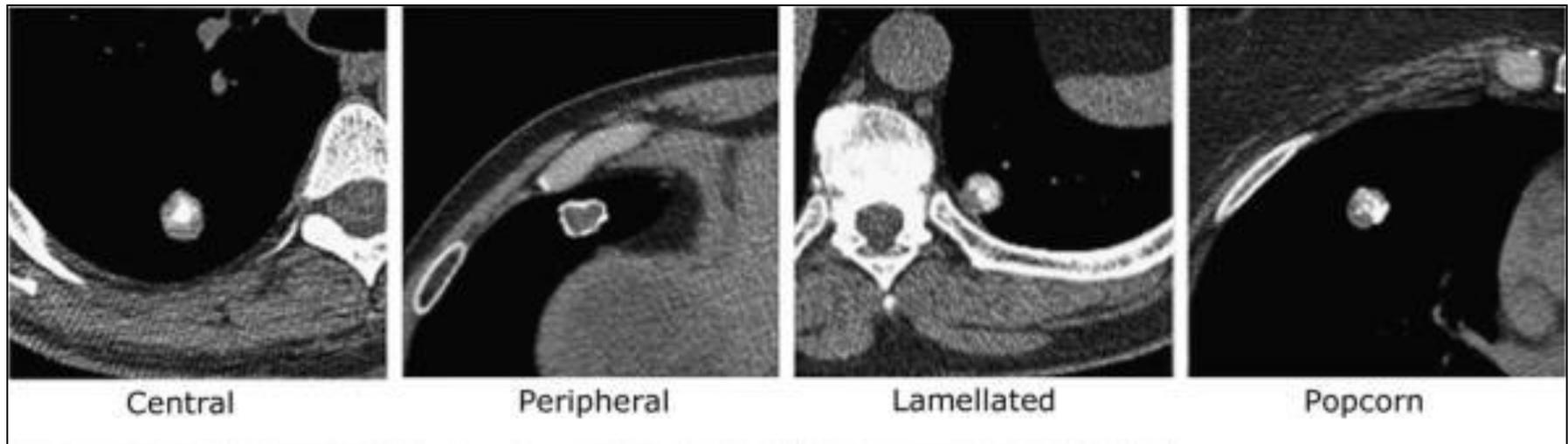
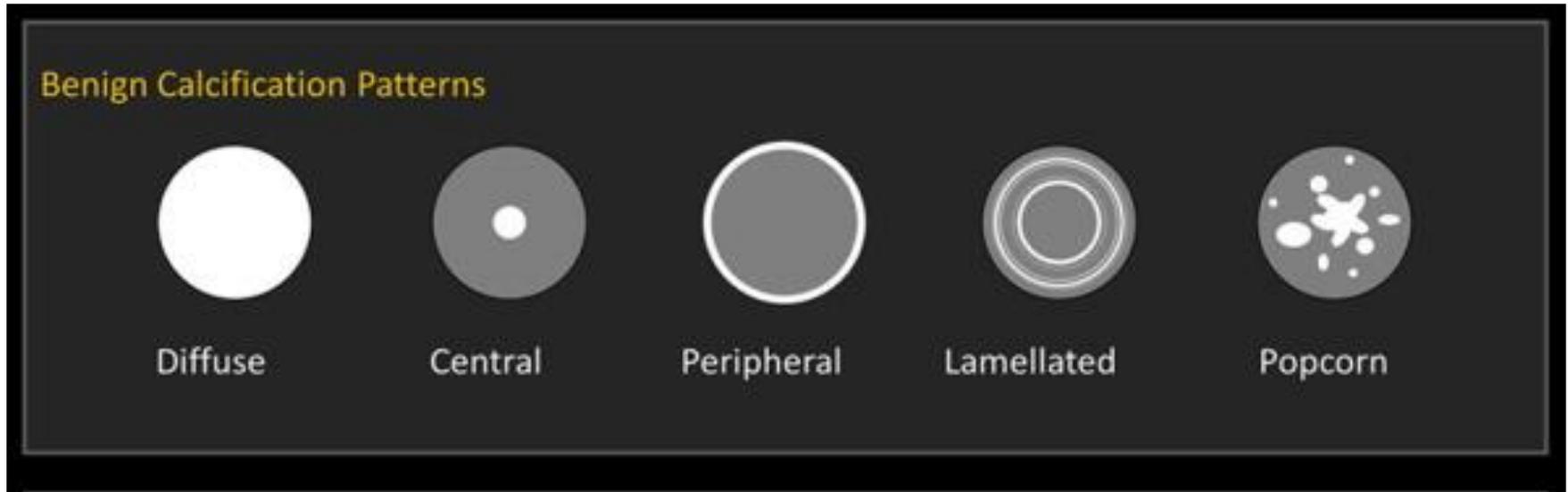
26/F hemoptysum off and on for three yrs.

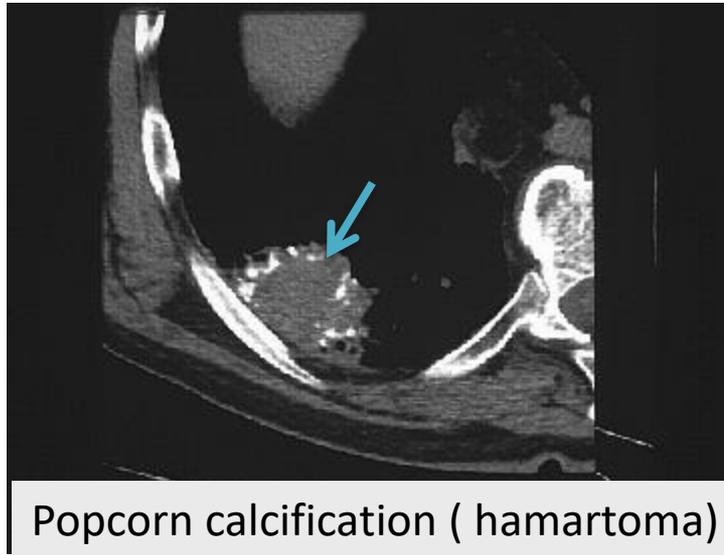
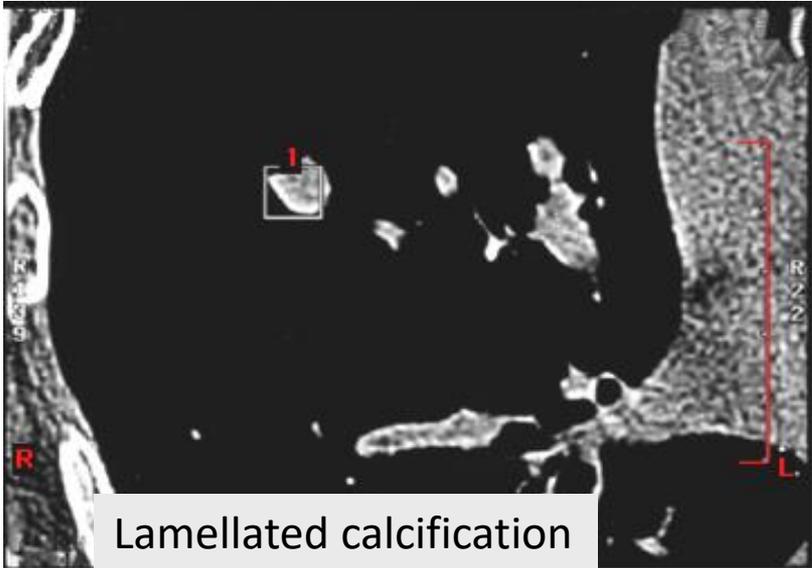
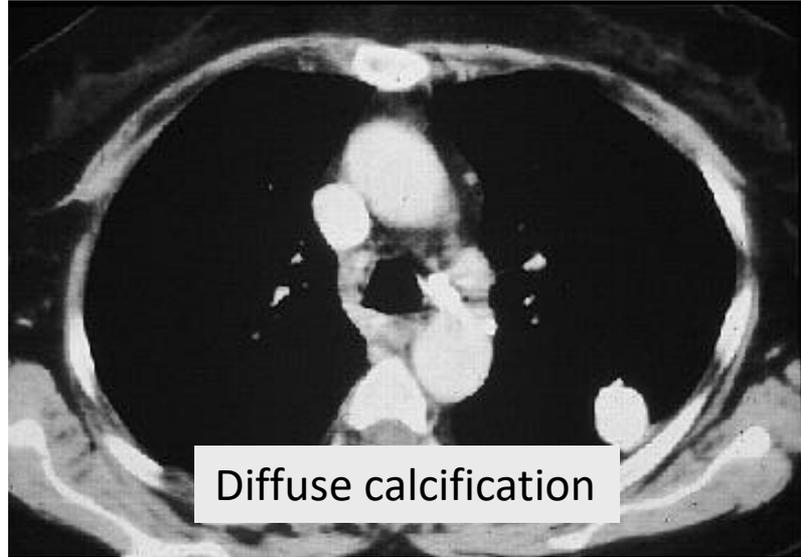
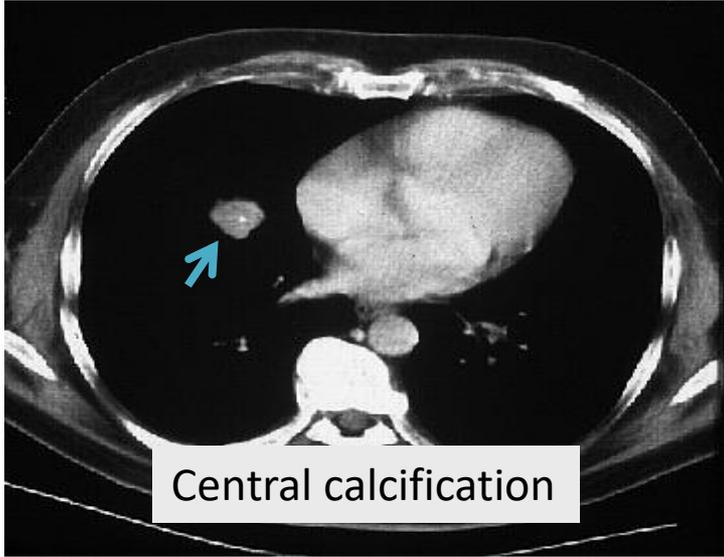


Aspergillosis on LLL (ball-in-hole)

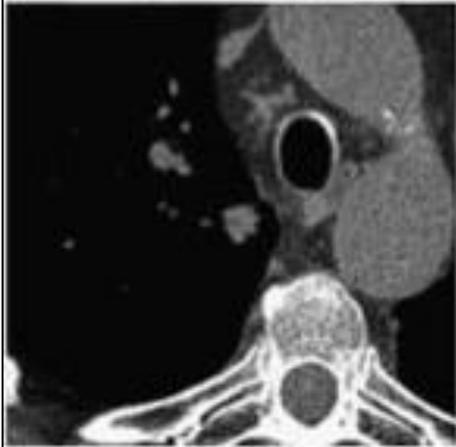
4. Calcification in pulmonary nodule /mass

Benign pattern

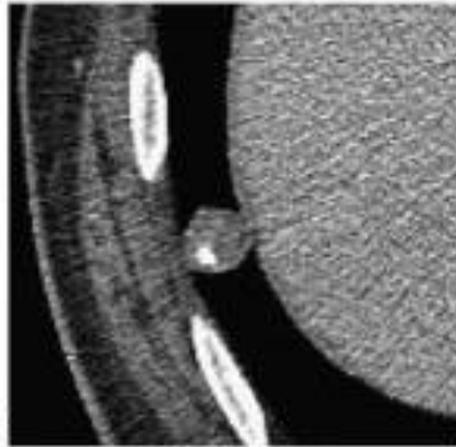




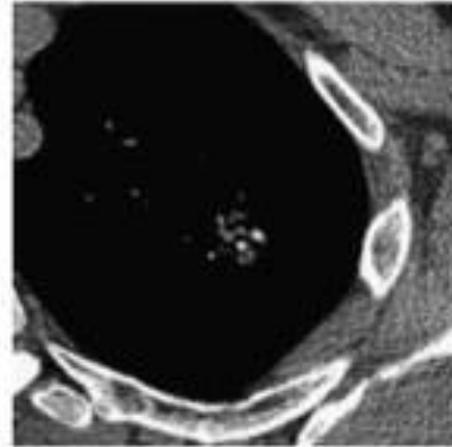
Malignant pattern



Non-Calcified



Eccentric



Irregular/Random

Punctate calcification (小斑點)

Amorphous calcification (無定形)

Indeterminate or Malignant Patterns



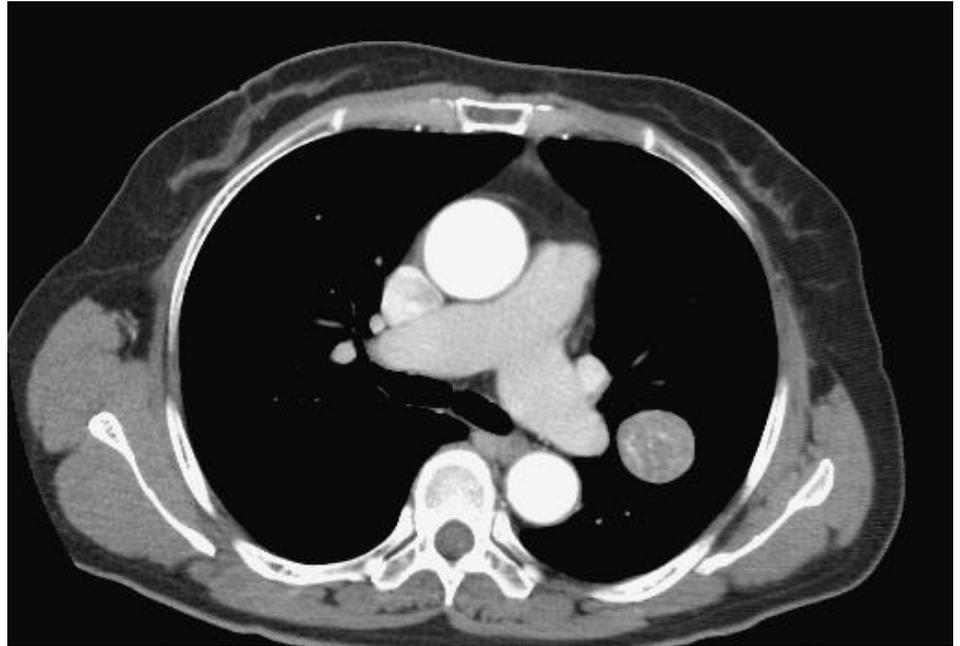
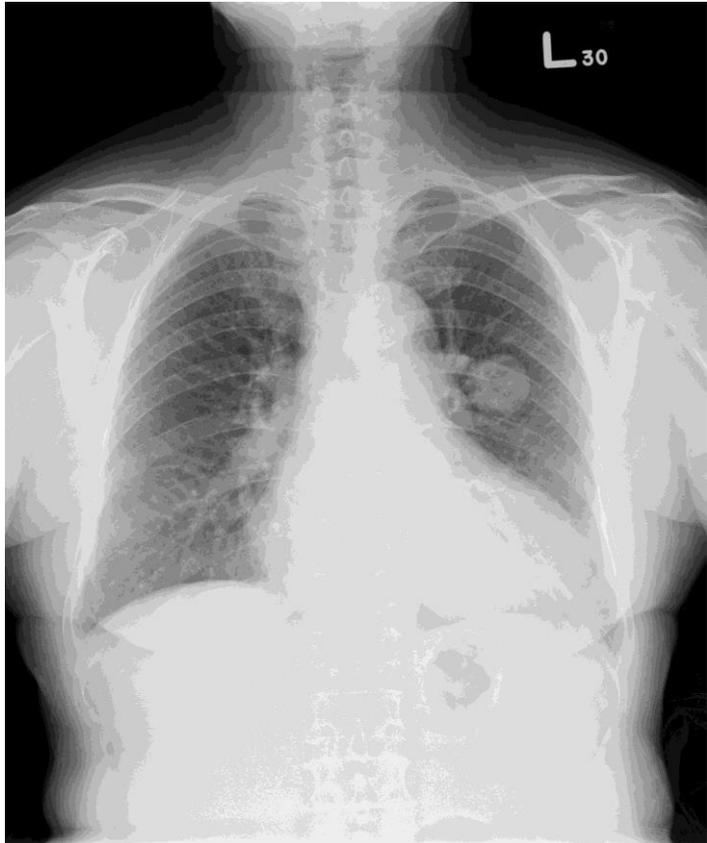
Non-Calcified



Eccentric



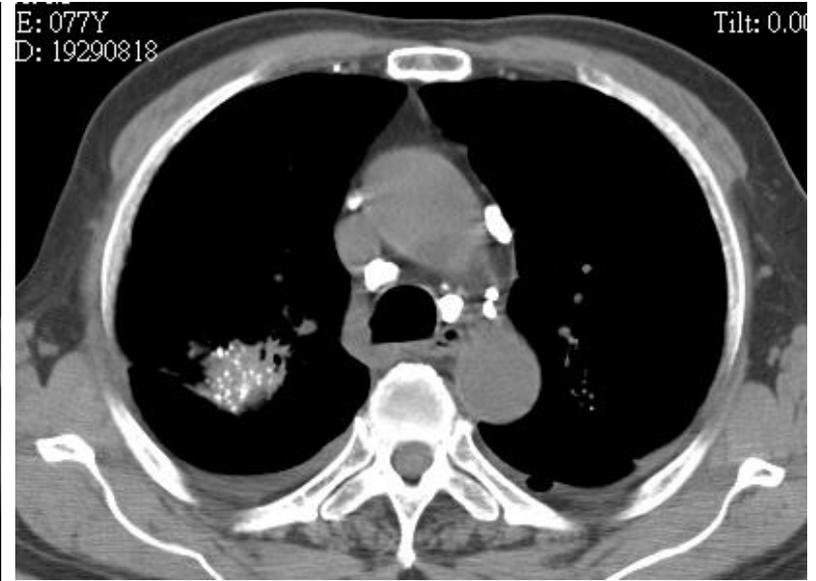
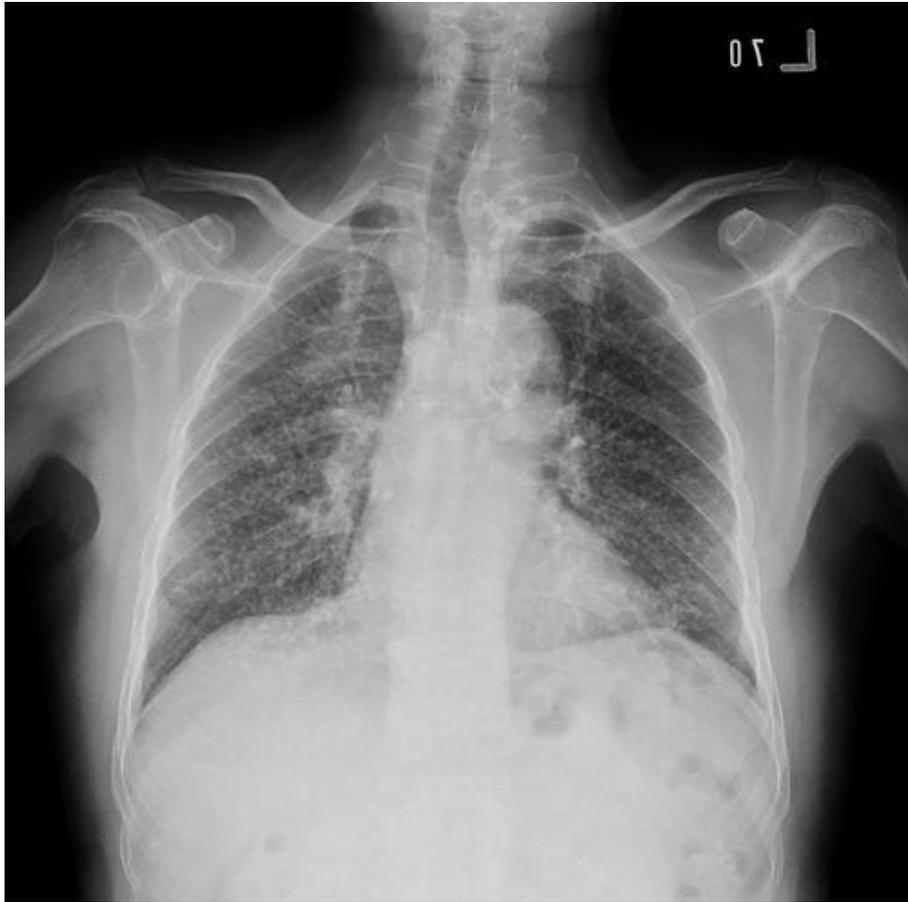
Irregular/Random



**Well-defined nodule with calcification
Dx: sclerosing hemangioma**

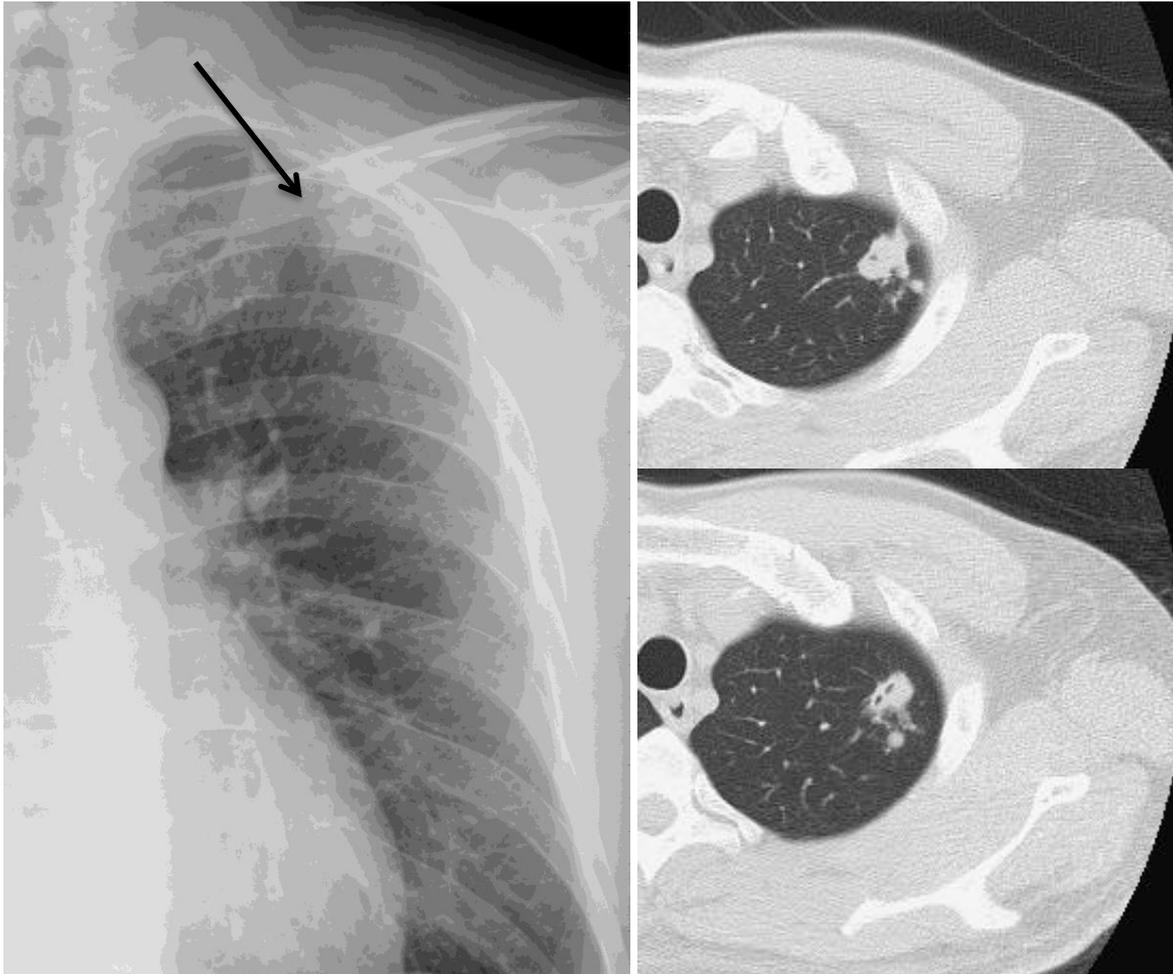


**Mass shadow on both upper lung fields and egg-shell LN calcification
Dx: pneumoconiosis with PMF**



RUL tumor with calcification (diffused)
LN calcification (+)
Multiple small nodules bil. Lung fields
Dx: pneumoconiosis and PMF in RUL

5. Satellite lesion in pulmonary nodule /mass



Benign granulomas on LUL

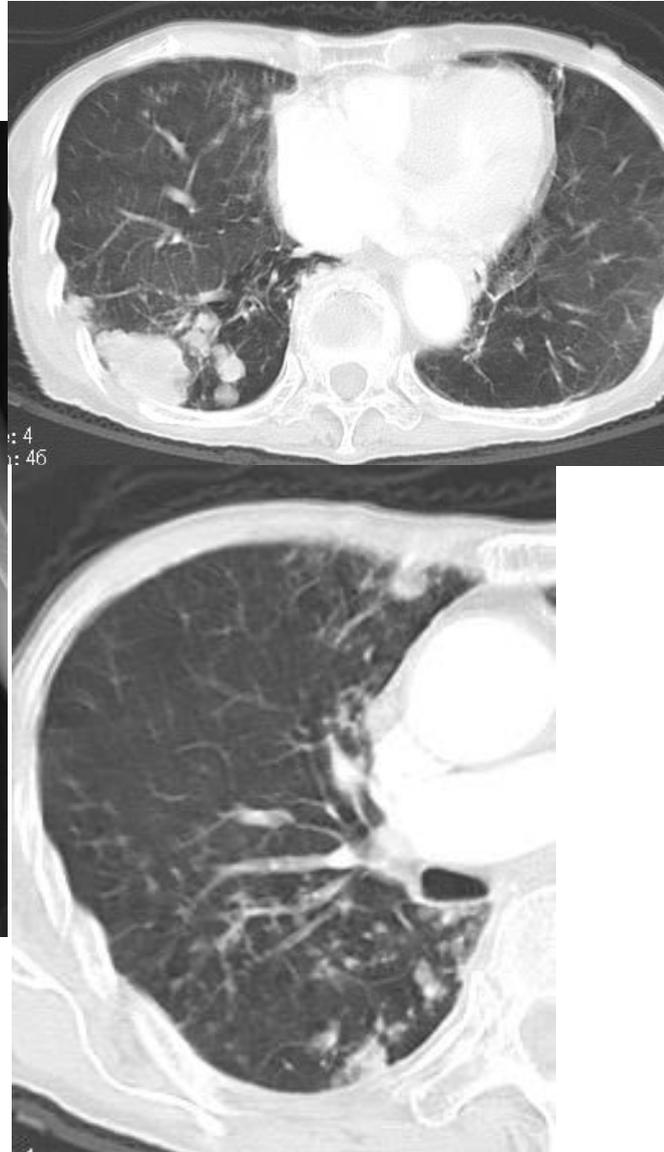
**Satellite nodule in pulmonary nodule/mass
Favor TB granuloma**



Pulmonary Nodule/Mass with Satellite Lesion



Dx: pulmonary TB, active

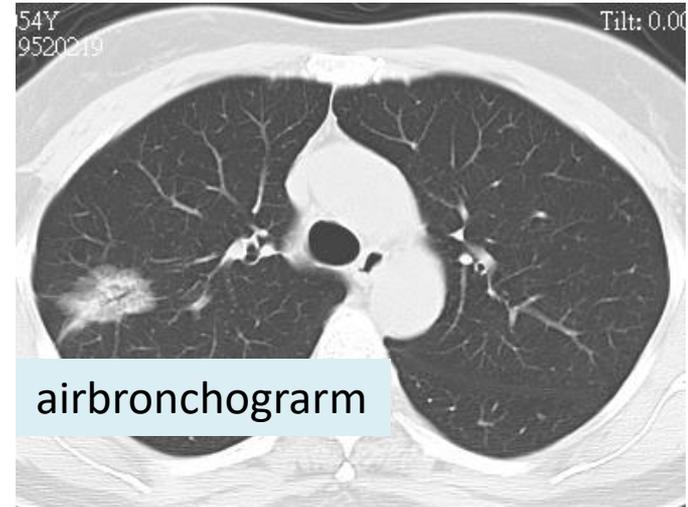


6. Internal characteristics in pulmonary nodule /mass

Benign or malignant?

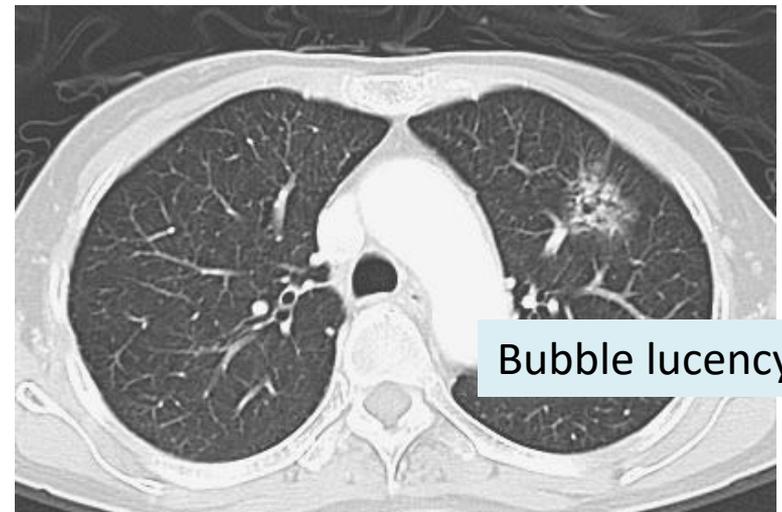
Malignant features:

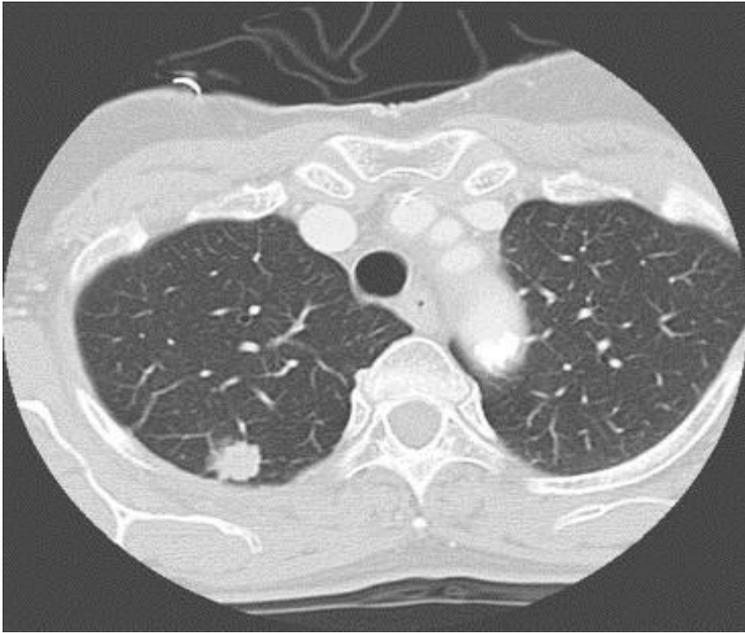
1. air-bronchogram
2. Vascular invasion



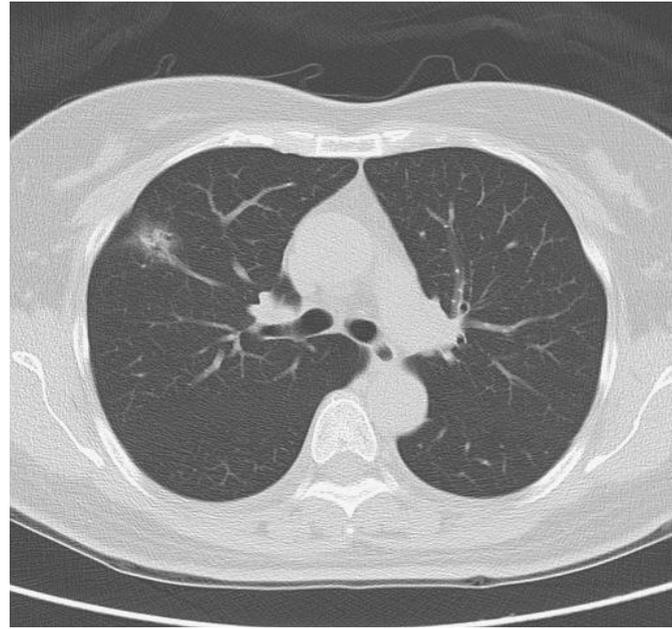
3. Bubble lucency: patent small bronchi or small cystic spaces within tumor

Favor: adenocarcinoma (30%). Adenocarcinoma in situ (60%)





Lobulated margin



Bubble lucency



Air-bronchogram

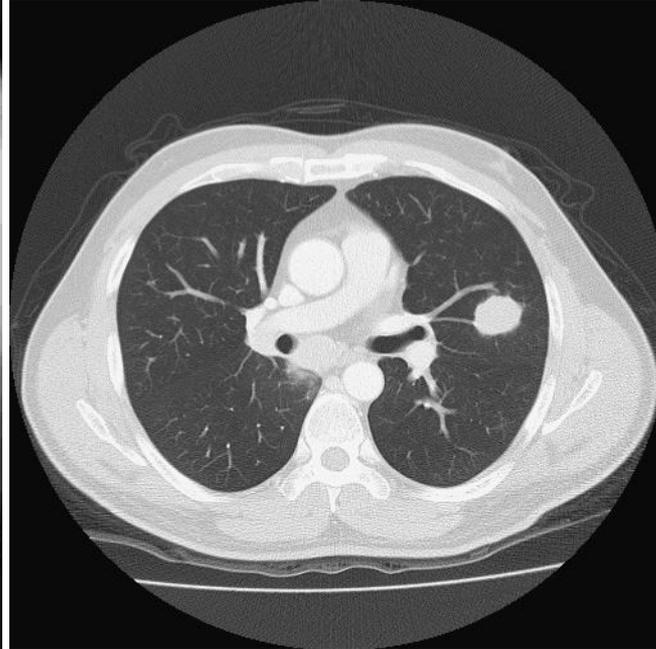
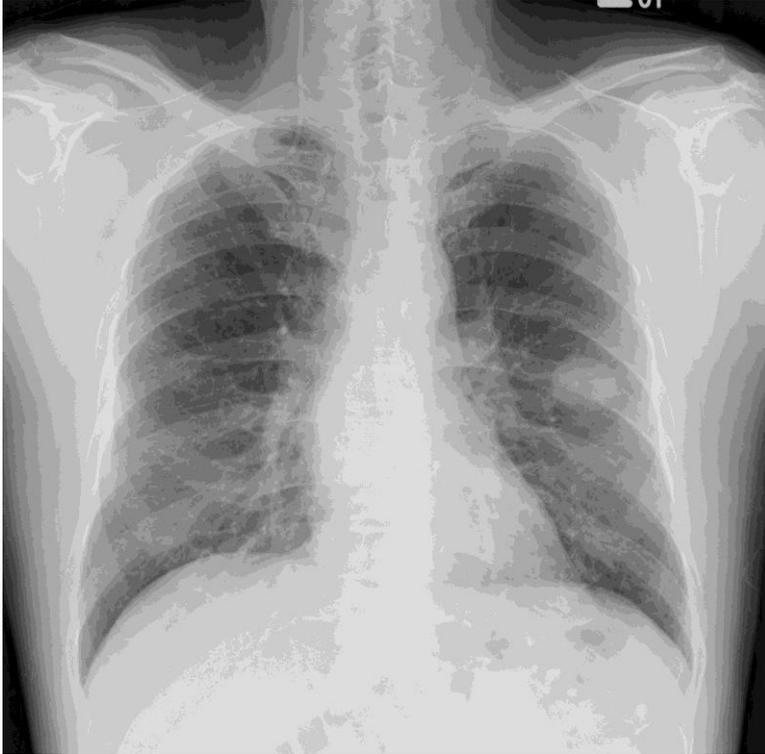


Adenocarcinoma LUL

Bubble lucency nodule

7. Malignant history in pulmonary nodule/mass

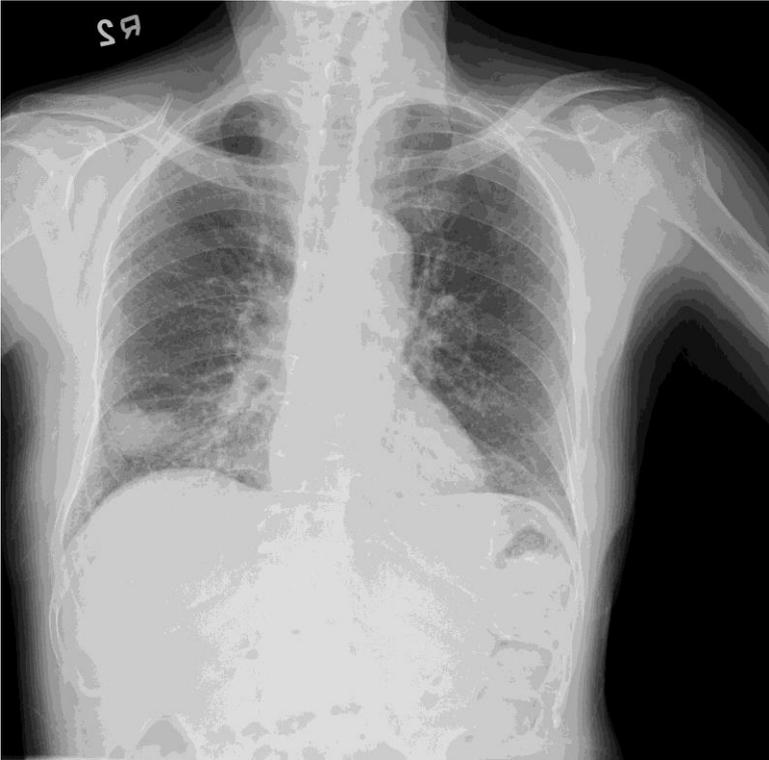
- D.D.: Metastatic carcinoma?**
- Primary lung cancer ?**
- Miscellaneous ?**



NPC with lung metastasis
Solid tumor mass on LUL

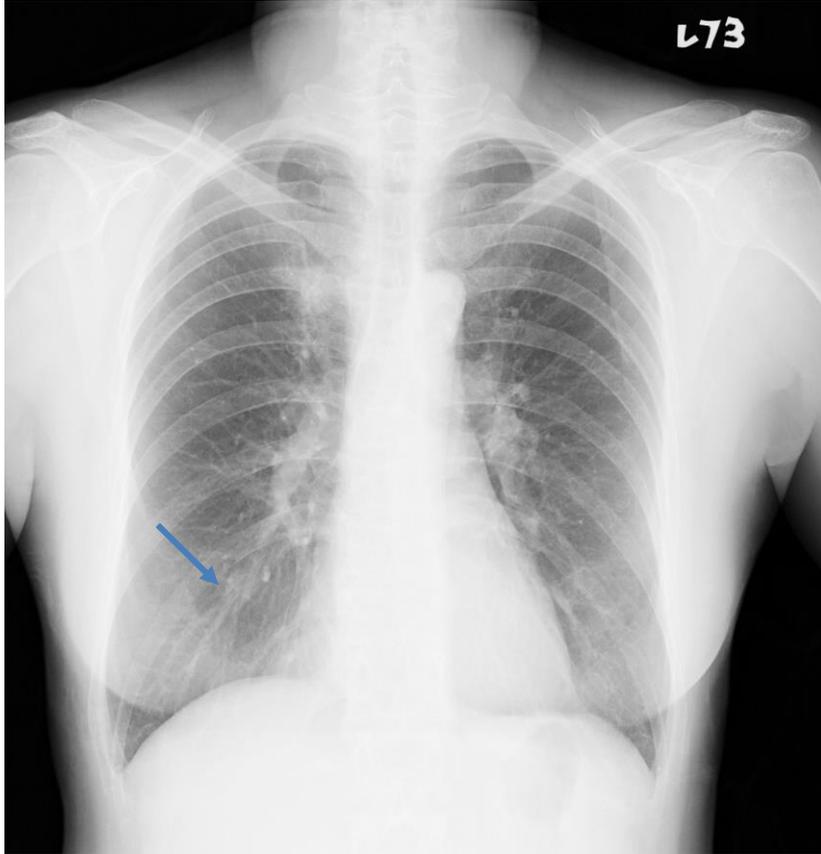
Solitary pulmonary mass on RLL

History of colon cancer s/p op.



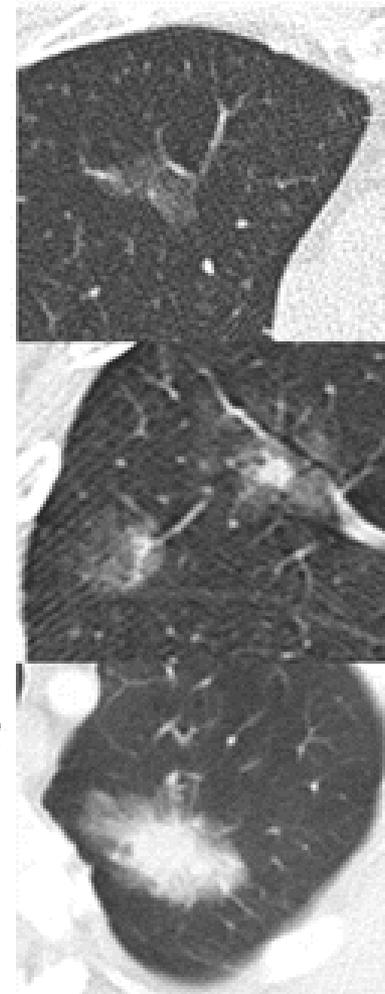
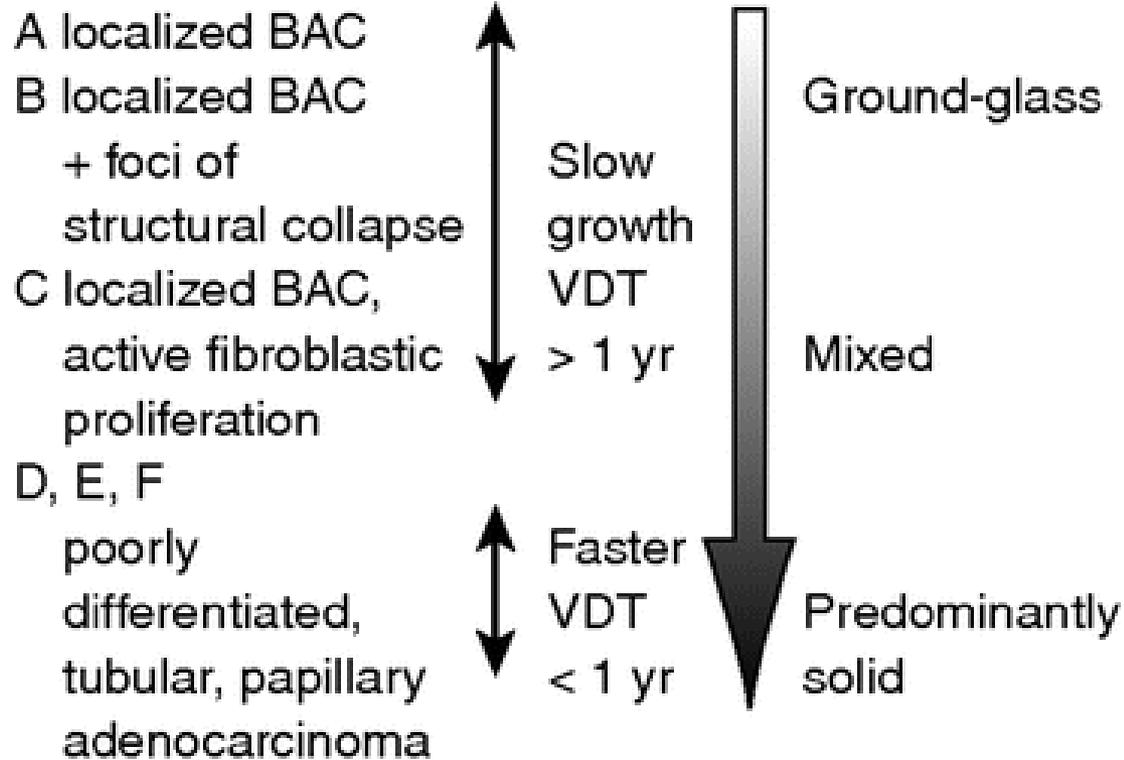
Dx: Colon cancer with lung metastasis

**GGO or part-solid nodule in extrapulmonary malignancy
Suggest primary lung cancer**



**Colon cancer s/p op.
Pulmonary nodule on RUL: adenocarcinoma of lung origin**

Spectrum of Adenocarcinoma



8. Growth rate in pulmonary nodule/mass

Malignant cells:

CT nodule doubling time:

pure GGN

1556 days

part-solid nodule

solid component < 5mm

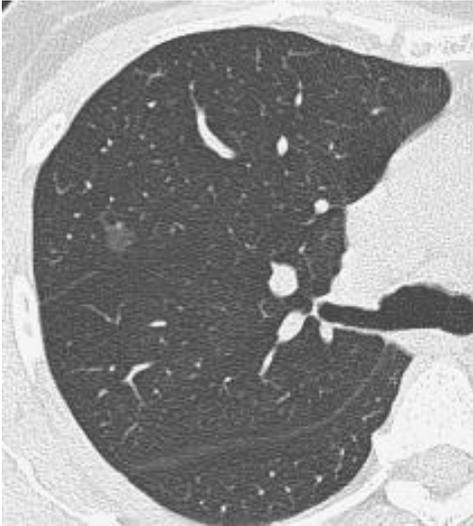
1199 days

solid component > 5mm

627 days

(Radiology 2014; 273: 276-284)

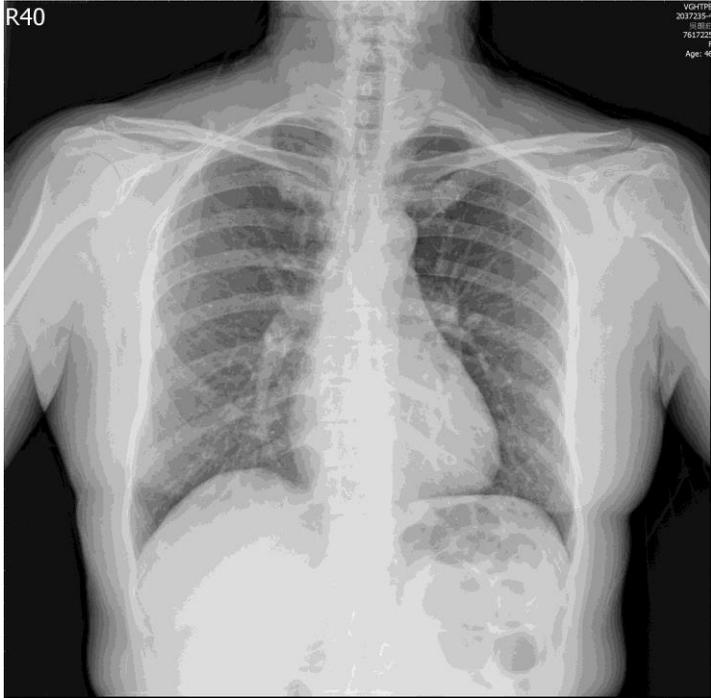
Indolent tumor growth



10/30/2006



11/30/2012



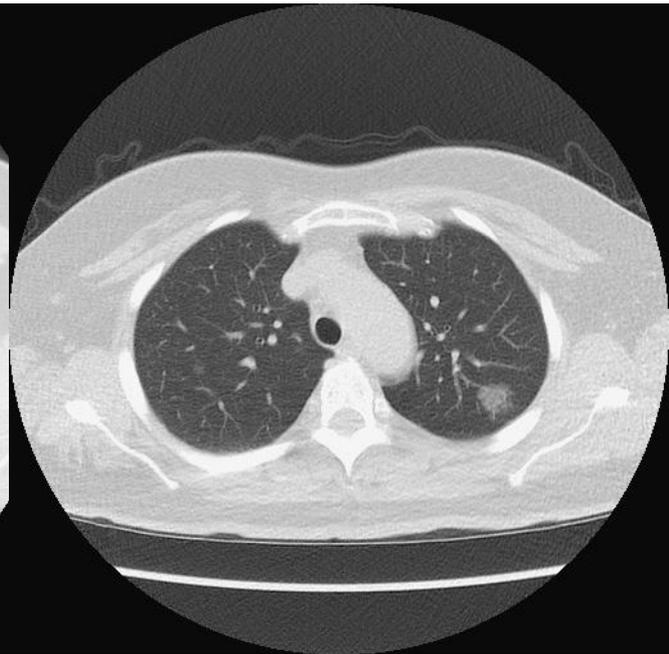
**Adenocarcinoma RUL, T1aN0M0
Invasive, non-mucinous**



07/06/2006

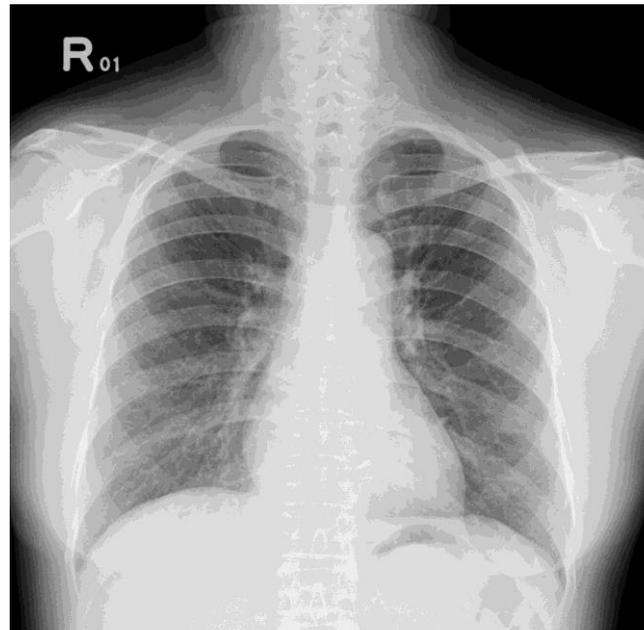


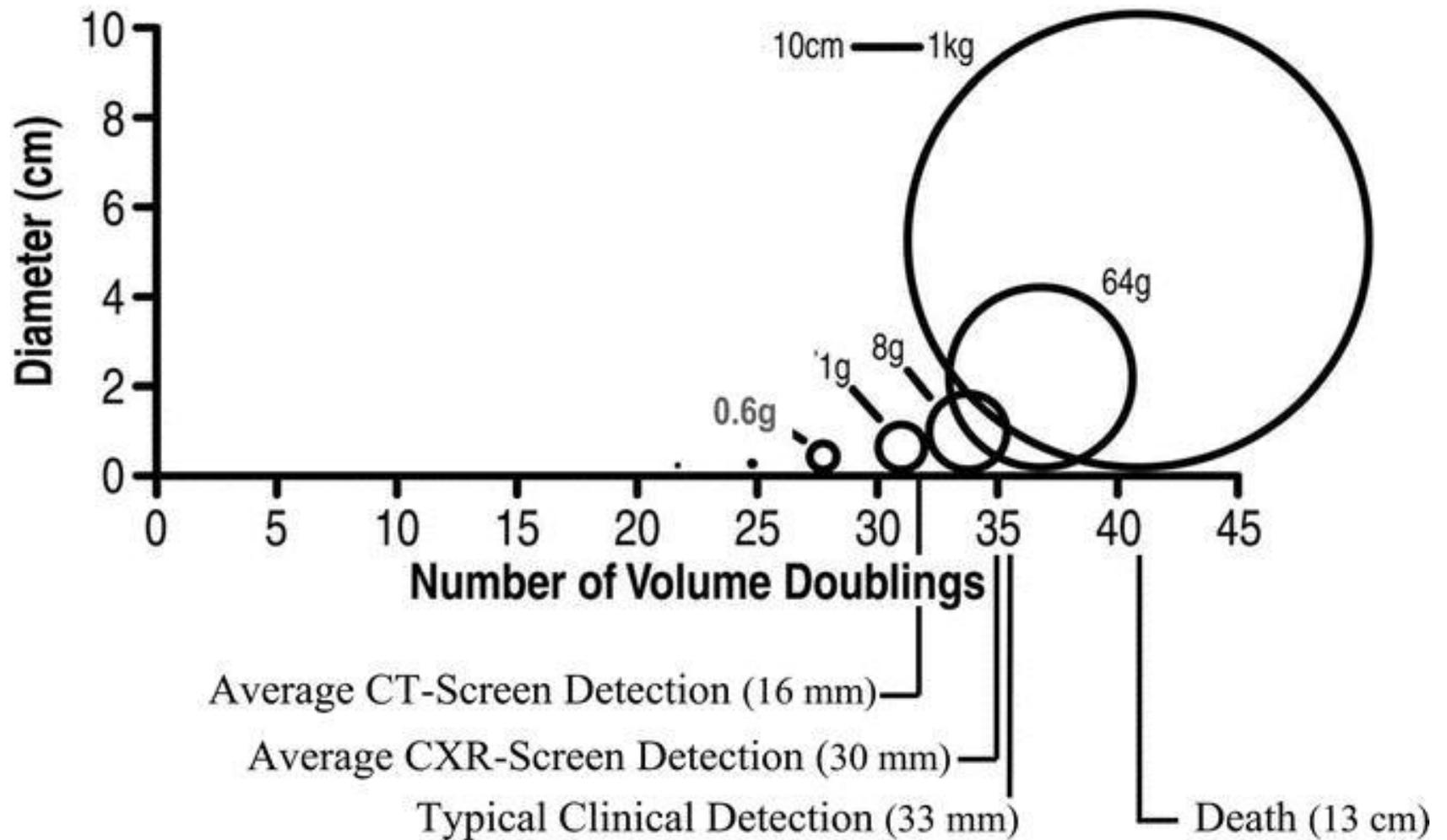
04/01/2008



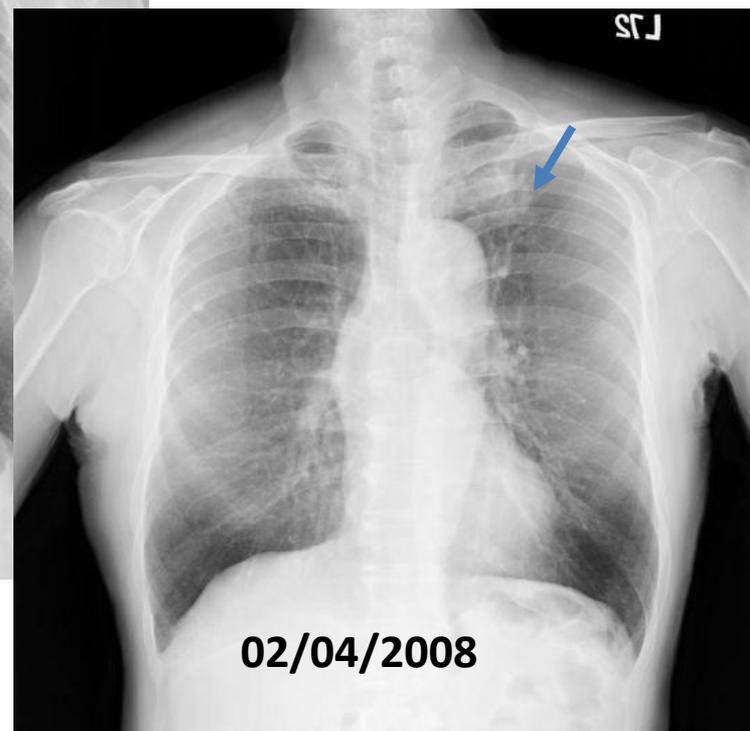
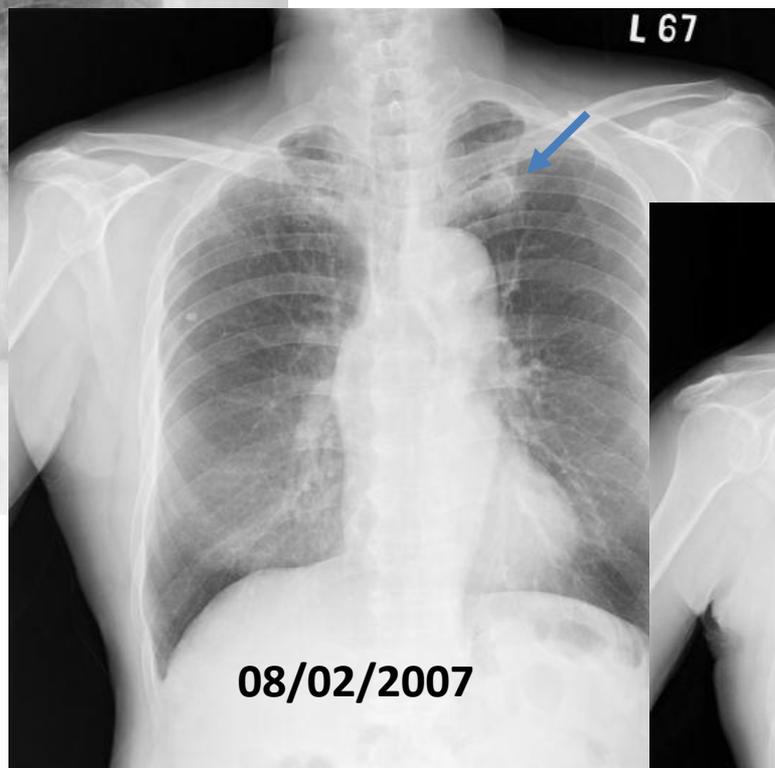
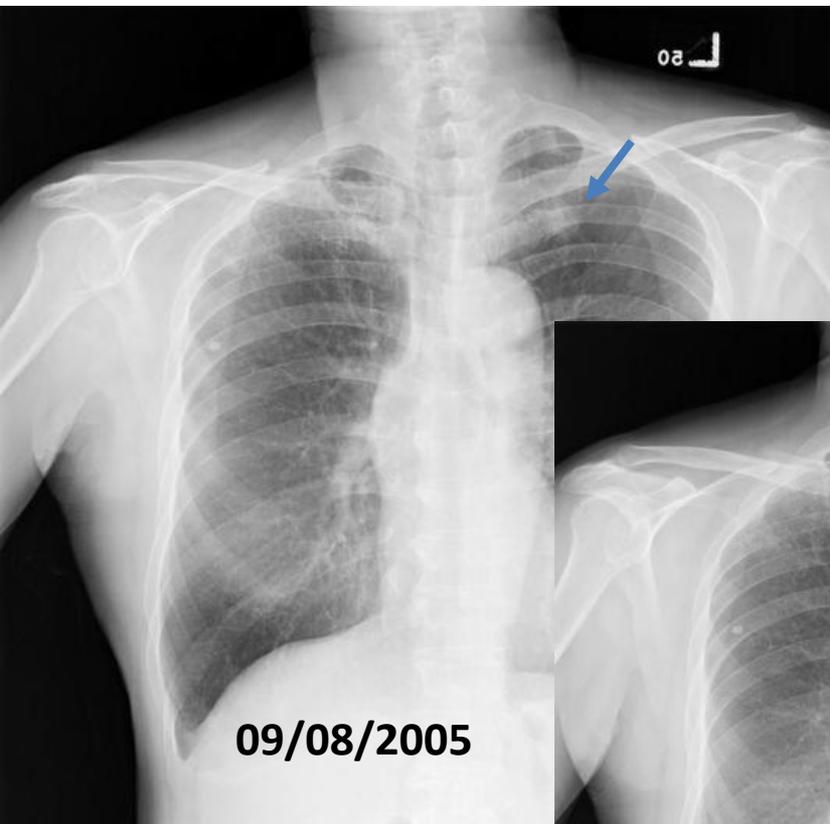
01/05/2013

**Indolent tumor growth
Adenocarcinoma, LUL, stage IA
GGN , non-mucinous**





Tumor size vs doubling time



9. *Double lesions of pulmonary nodule/mass*



Dx: cryptococcal pneumonia bil.

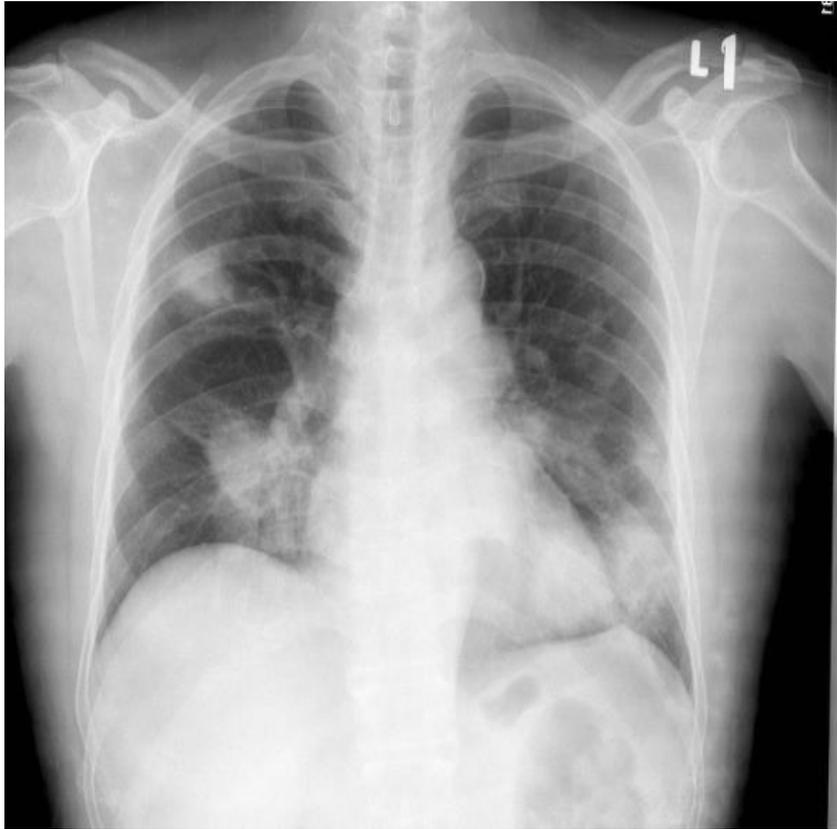
10. Multiple focus lesions in pulmonary nodule/mass

1. Inflammatory processes:

**TB. Granuloma, septic embolism, pneumoconiosis with PMF
fungal infection, Wegener's granulomatosis**

2. Primary lung tumor: lymphoma, lung cancer,

3. Metastatic carcinoma: pancreas, cervix, NPC, colon, renal cell ca.



Cryptococcal pneumonia

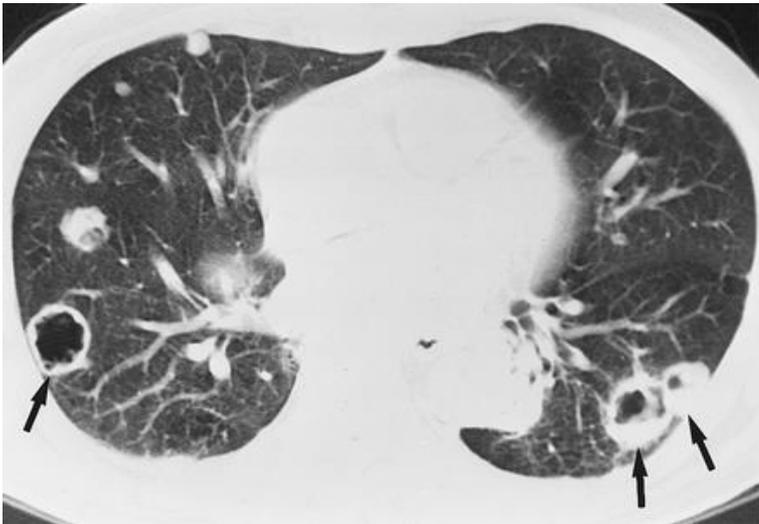




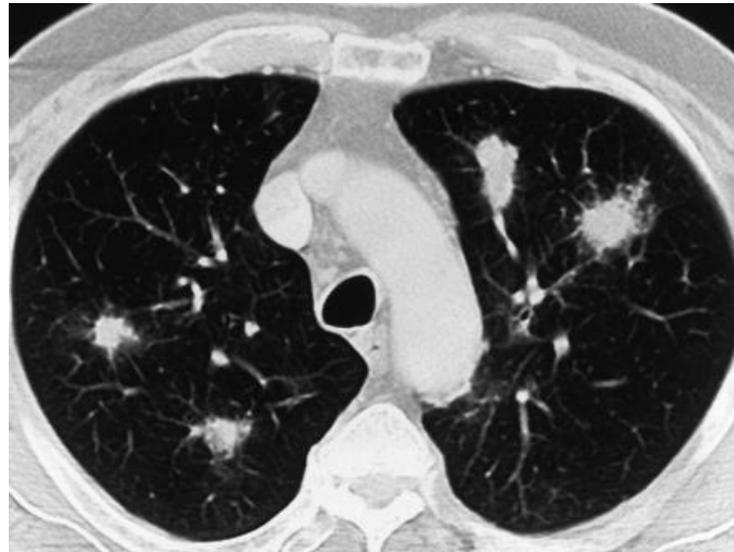
Septic embolism



Pulmonary TB with cavity



Metastatic cancer with cavity



Wegener's granulomatosis

11. Clinical manifestations associated with pulmonary mass lesion

Case 1. Hoarseness x 3 months



Adenocarcinoma of lung, LUL

Case 2. 36/F. Hemoptysis (+)



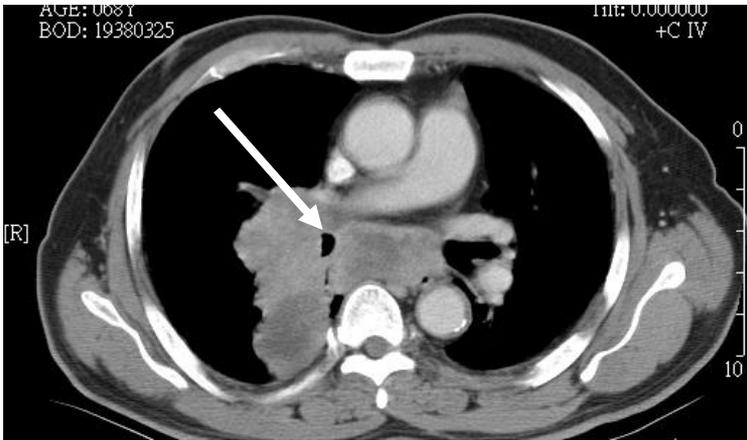
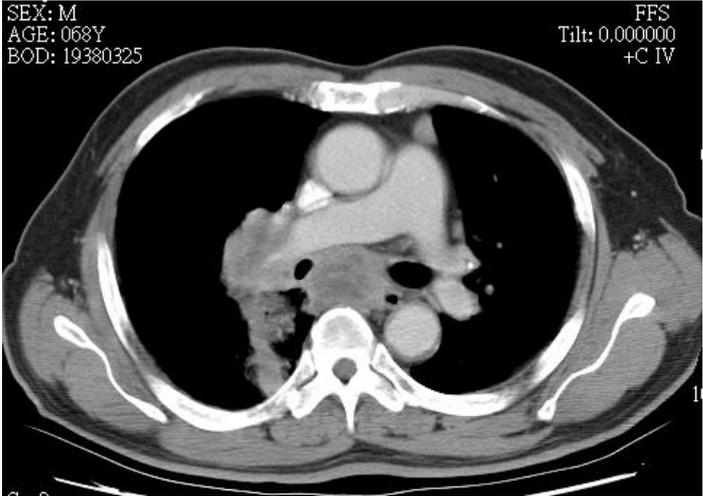
Dx: adenocarcinoma of lung, RUL

Case 3. Bronchial wall extrinsic compression



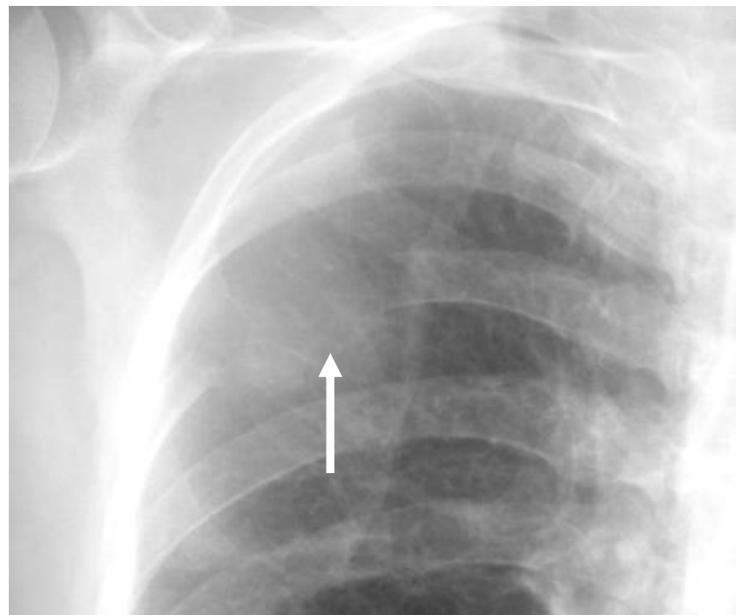
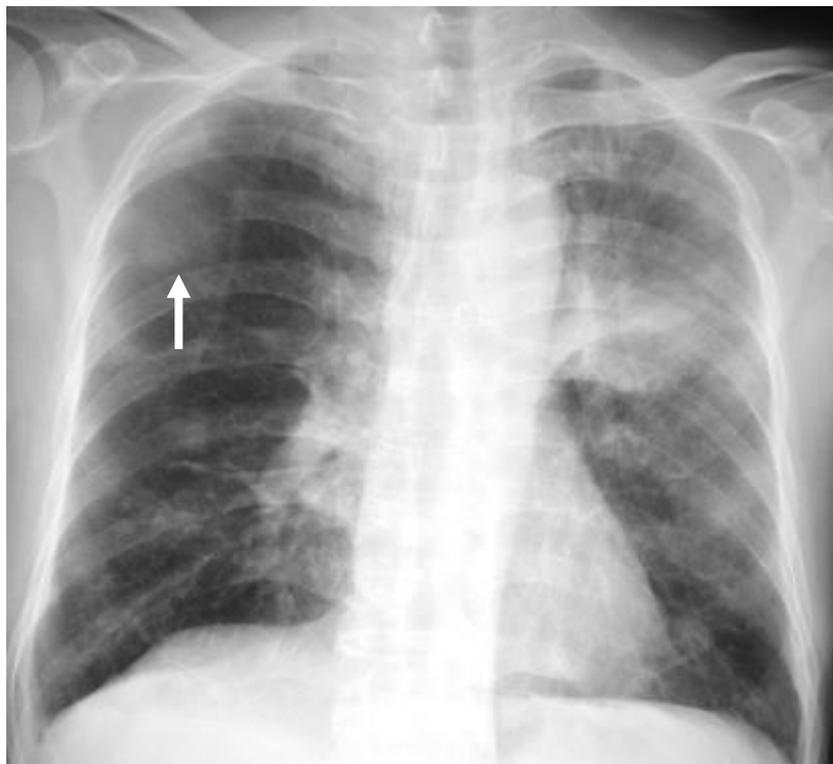
Dx: squamous cell carcinoma, RUL

Case 4. Airway narrowing



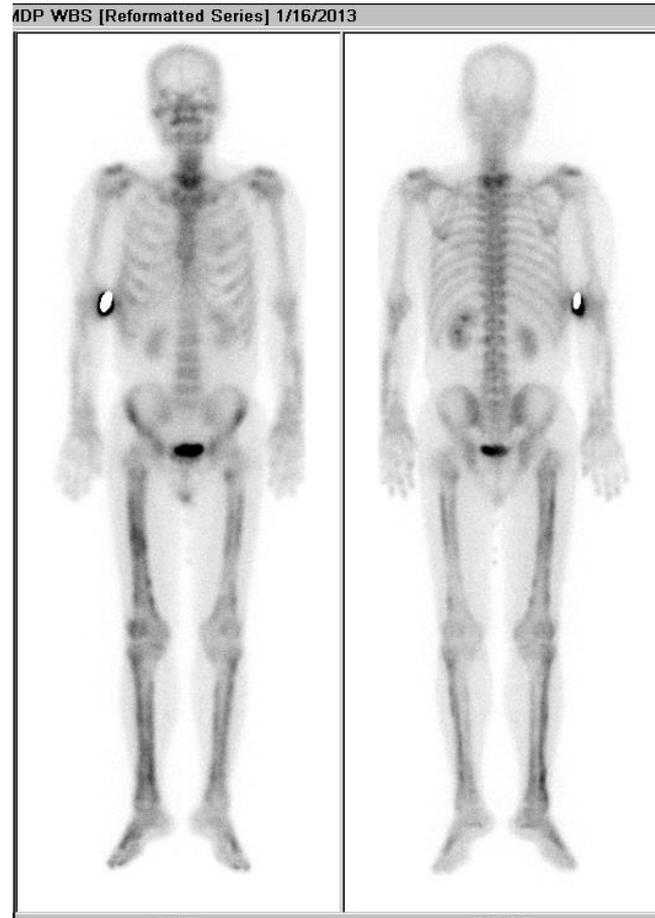
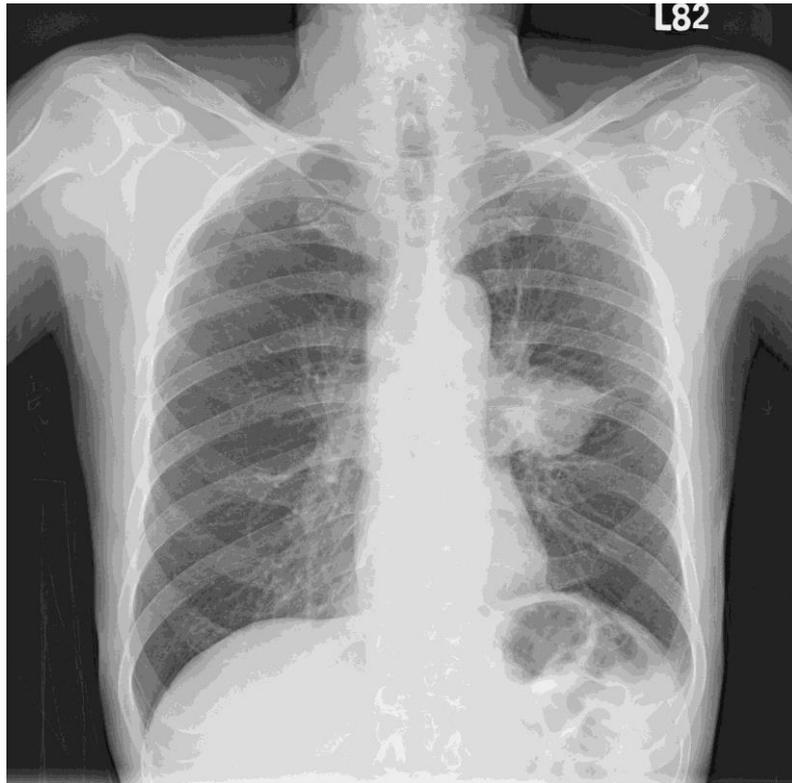
Dx: Carcinoma poorly differentiated, RUL

Case 5. rib destruction

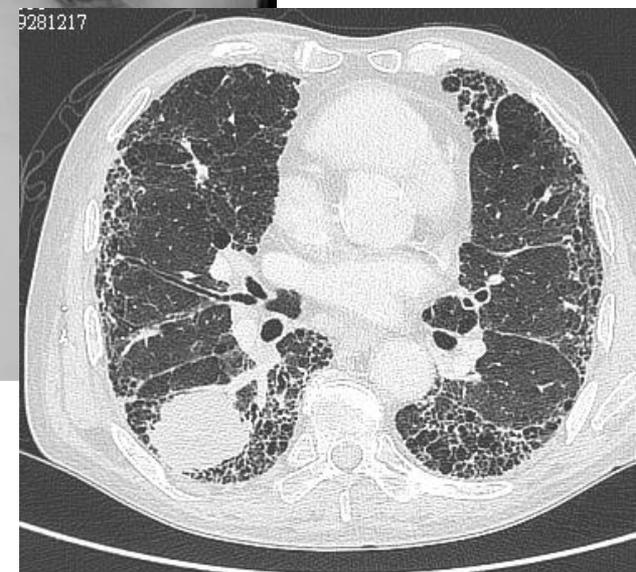
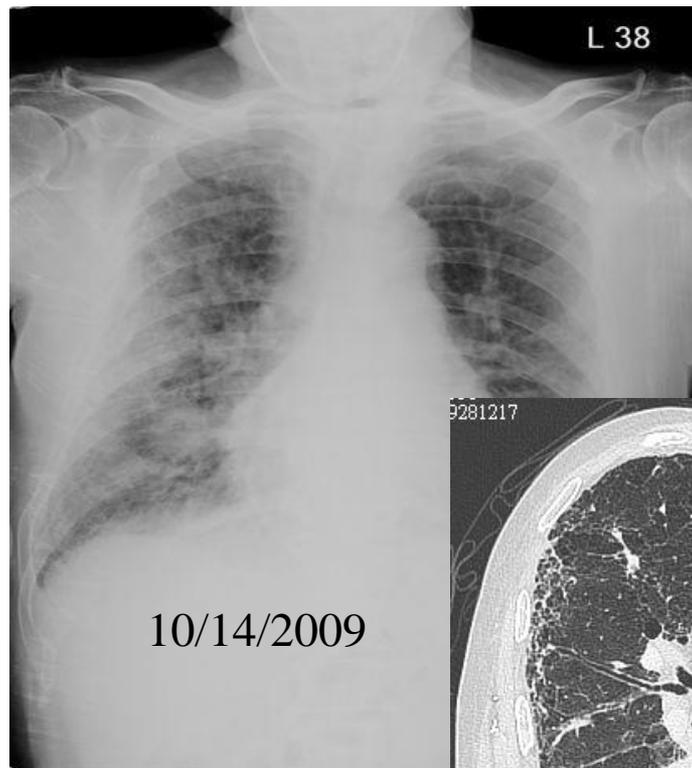
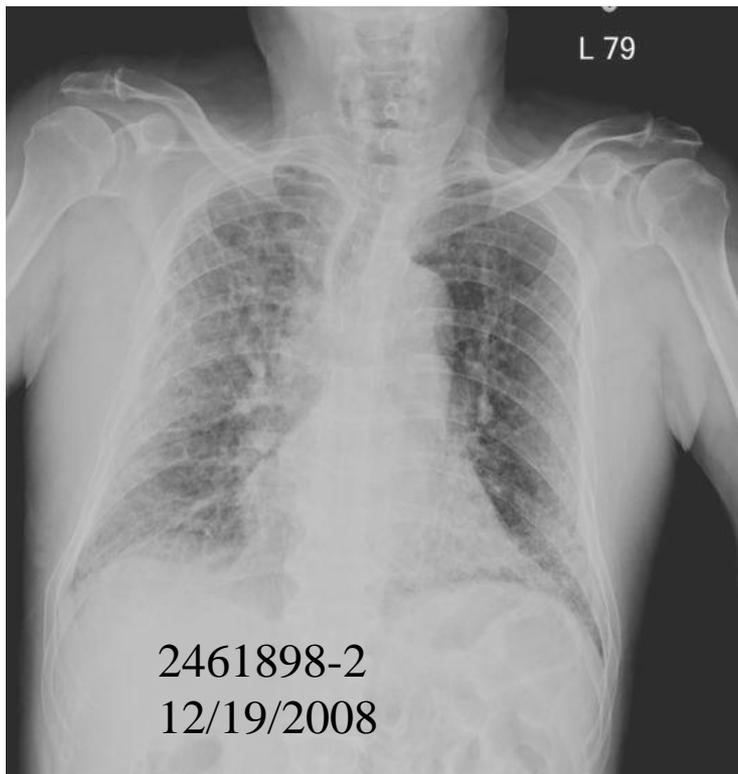


Lung cancer LUL with rib destruction

Case 6. Hypertrophic pulmonary osteoarthropathy

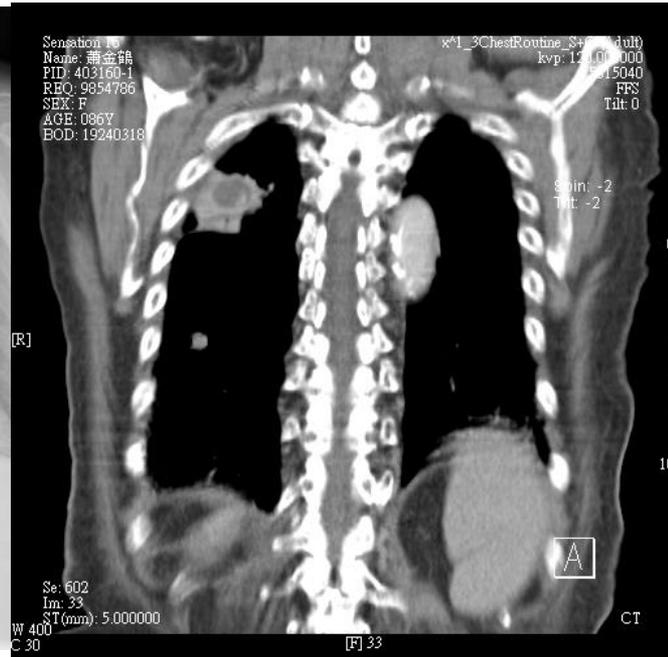
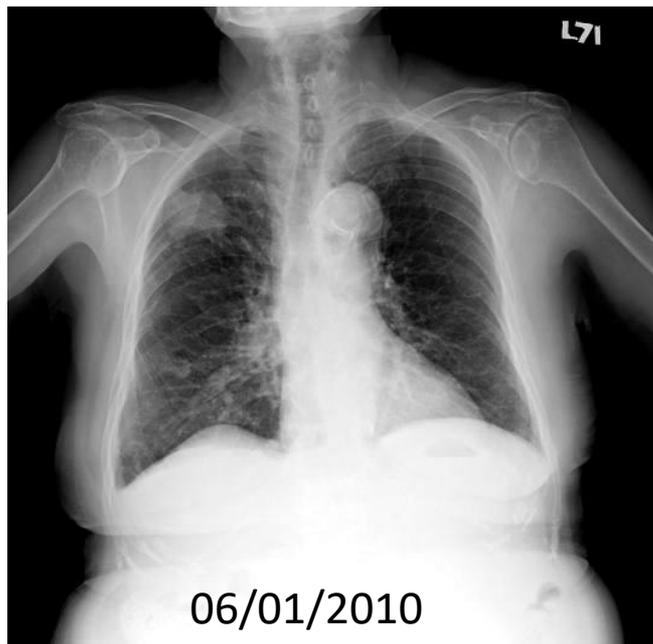


case 7. interstitial pulmonary fibrosis



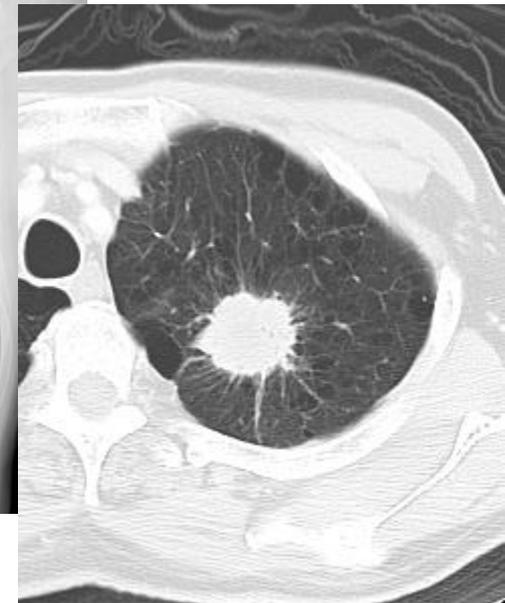
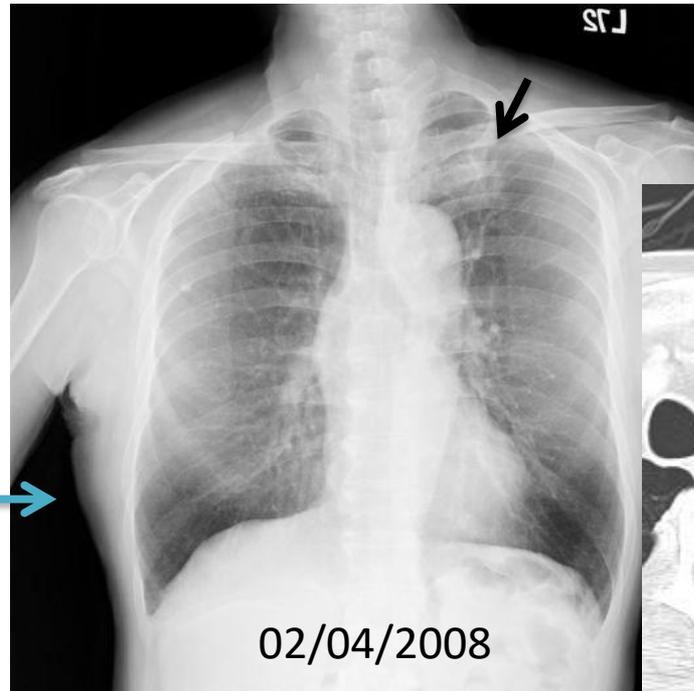
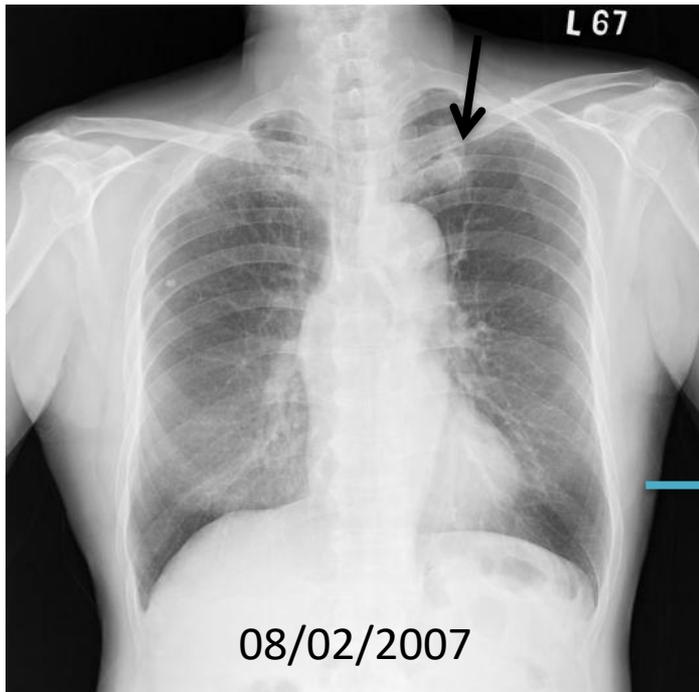
IPF associated with small cell lung cancer, RLL

Case 8. 86 /female Leukocytosis, acute symptoms



Dx: pneumonia RUL

Case 9. Chronic lung disease

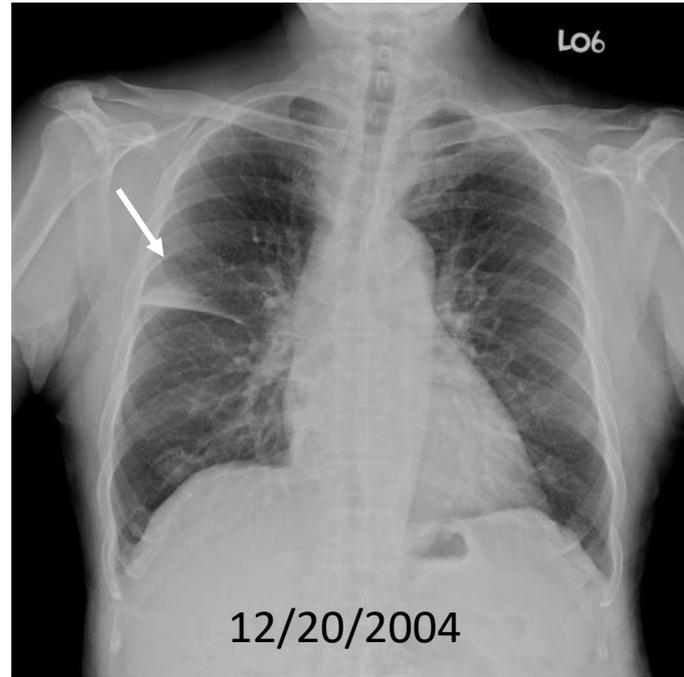
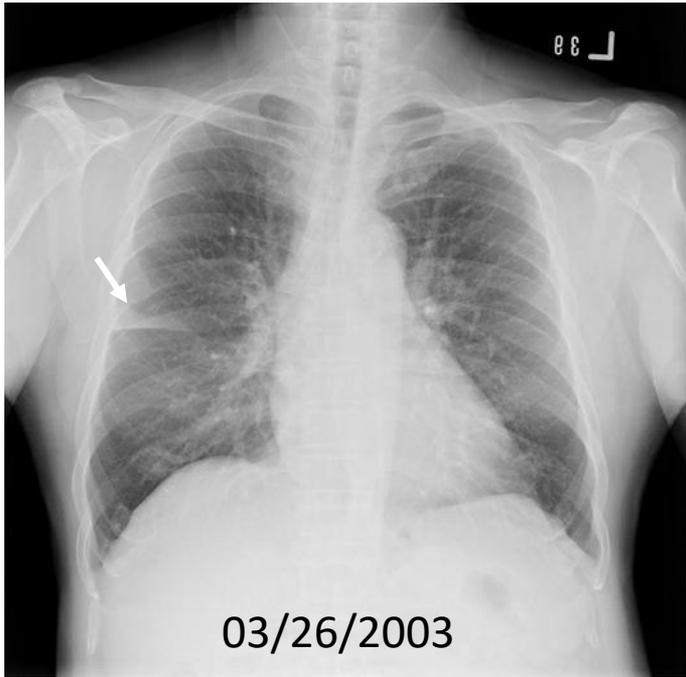


Patient with COPD

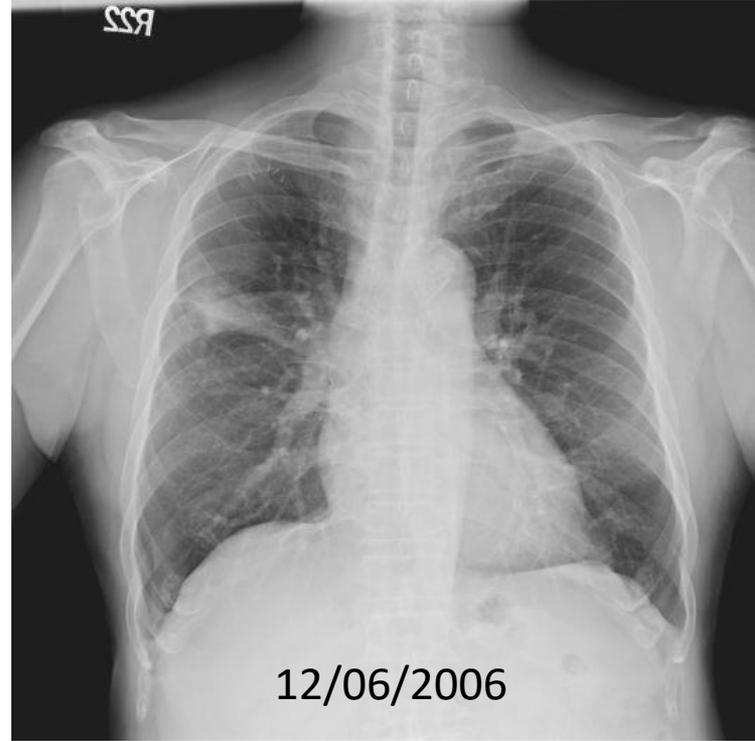
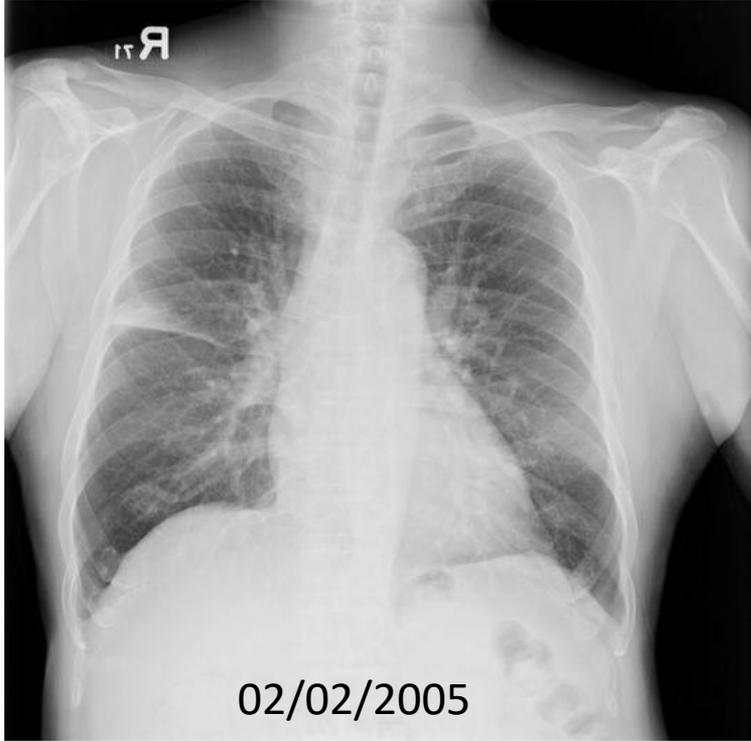
Series CXR : LUL lesion increased in size

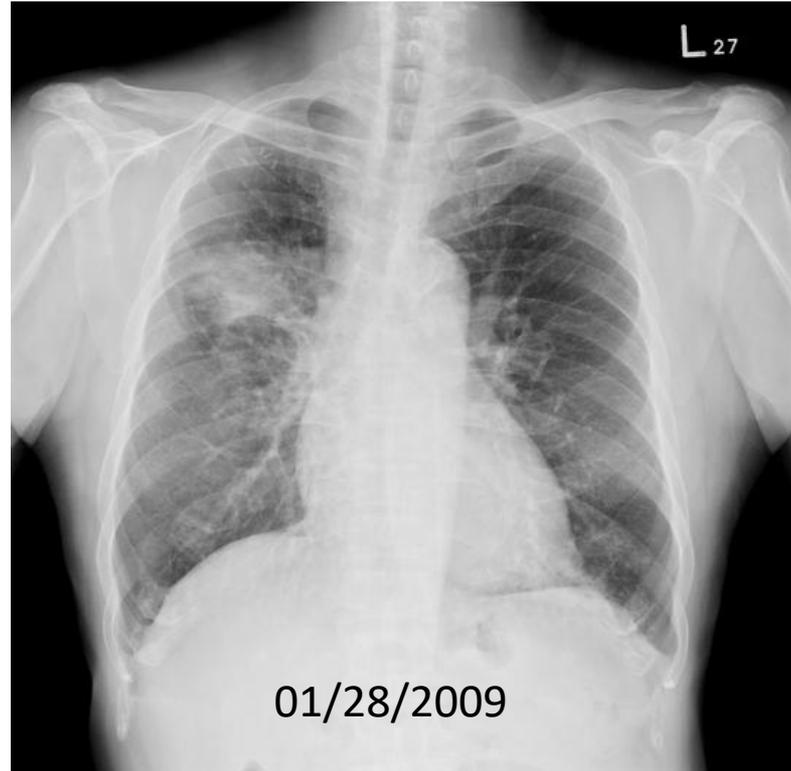
Dx: adenocarcinoma of lung

Case 10. Slow growing tumor



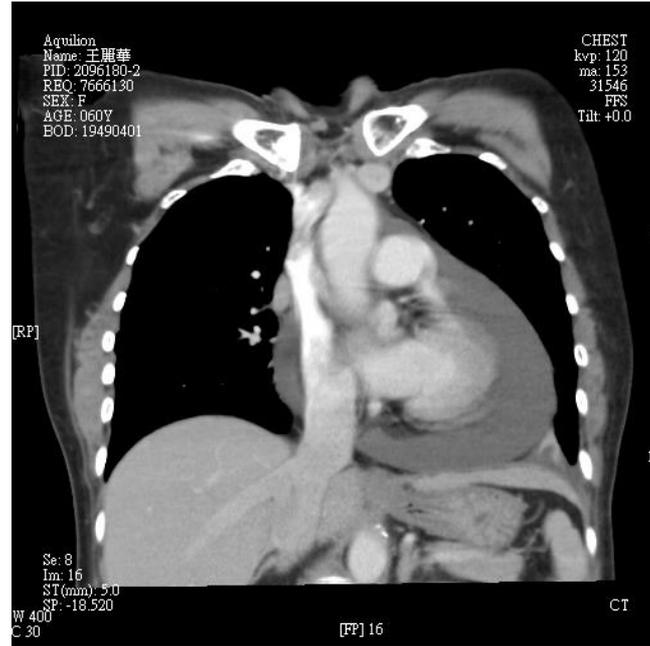
**77/M, dyspnea, persisted.
COPD, prostate cancer
Follow up irregularly (never in CM OPD)**





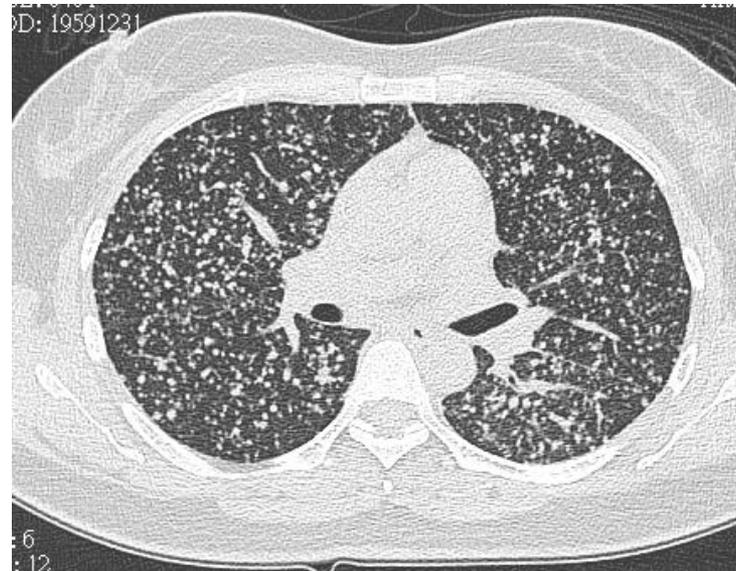
Dx: adenocarcinoma of lung, on 02/16/2009, stage IV

Case 11. Pulmonary lesion with pericardial effusion



Dx: adenoca. LUL
Pericardial effusion(+)

12. Hilar enlargement or lymphadenopathy associated with pulmonary nodule/mass



45 /female **Dx: adenocarcinoma of lung, LLL, lung to lung meta.**

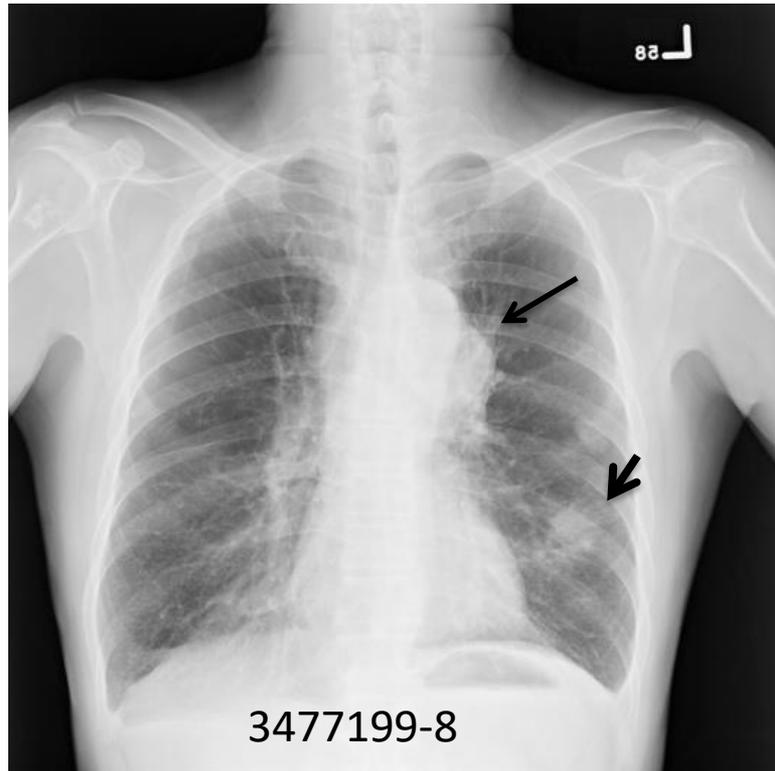
Uneven size micronodules on both lung fields

Suggest malignancy. (not miliary TB)

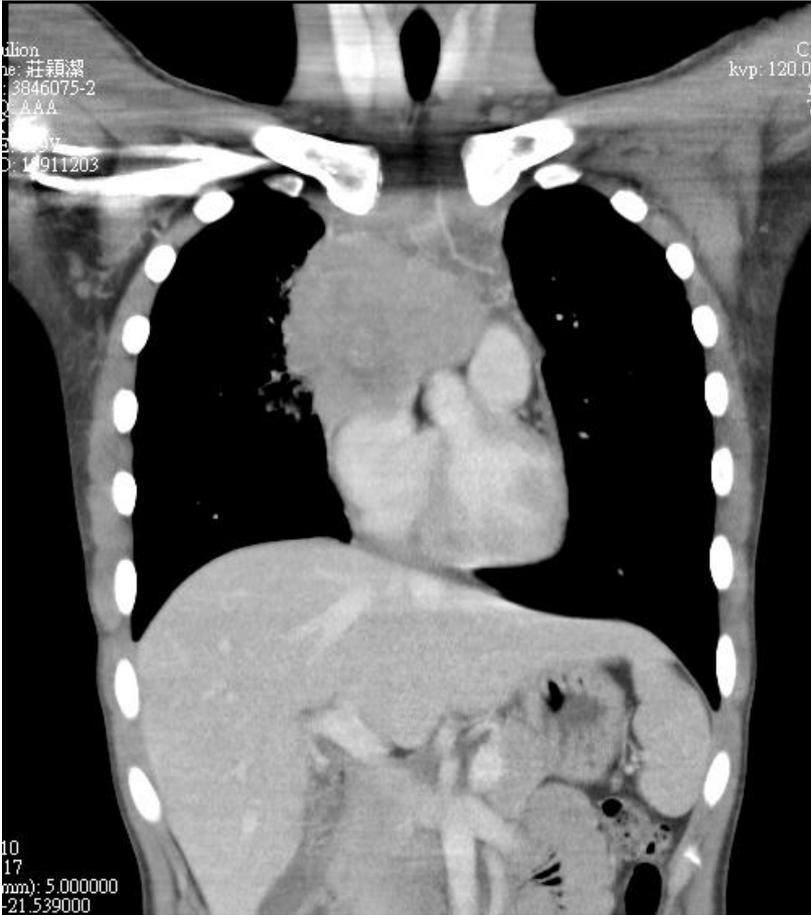
Mediastinal LN (+)

13. Hilar enlargement or lymphadenopathy associated with pulmonary mass

**Peripheral nodule with LN enlargement
Suggest malignant nodule**

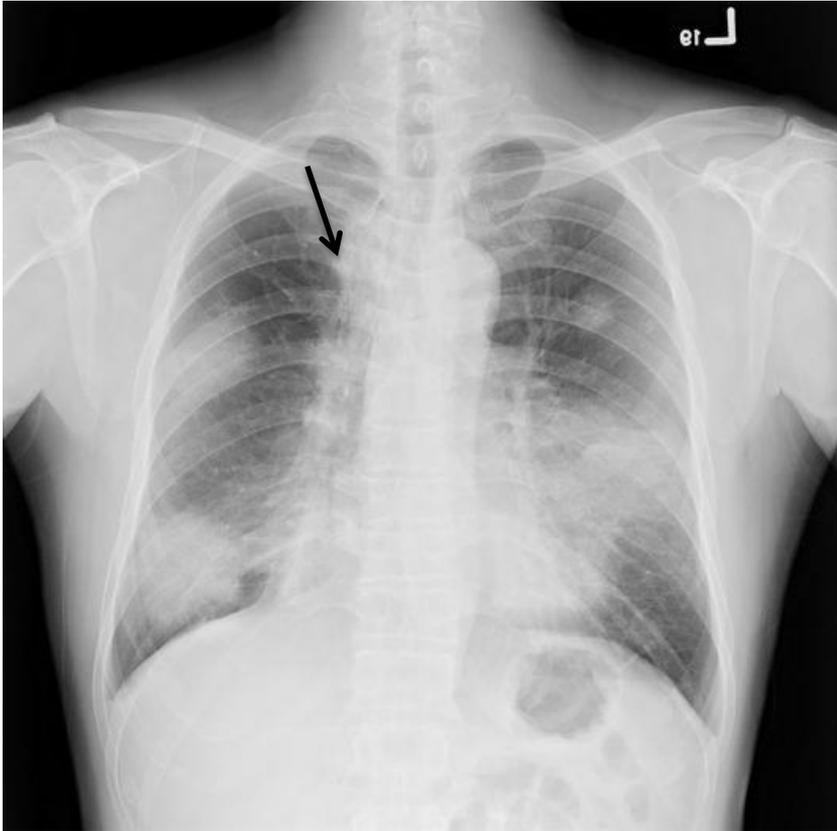


20 year old female, fever off and on , loss of BW



Dx: mediastinal large B-cell lymphoma

**Irregular shape and size of pulmonary masses on both lung fields
Associated with mediastinal LN enlargement**



**Dx: extranodal marginal zone lymphoma of MALTOMA
LCA(+), CD20(+), CD79G, CD43(+)**

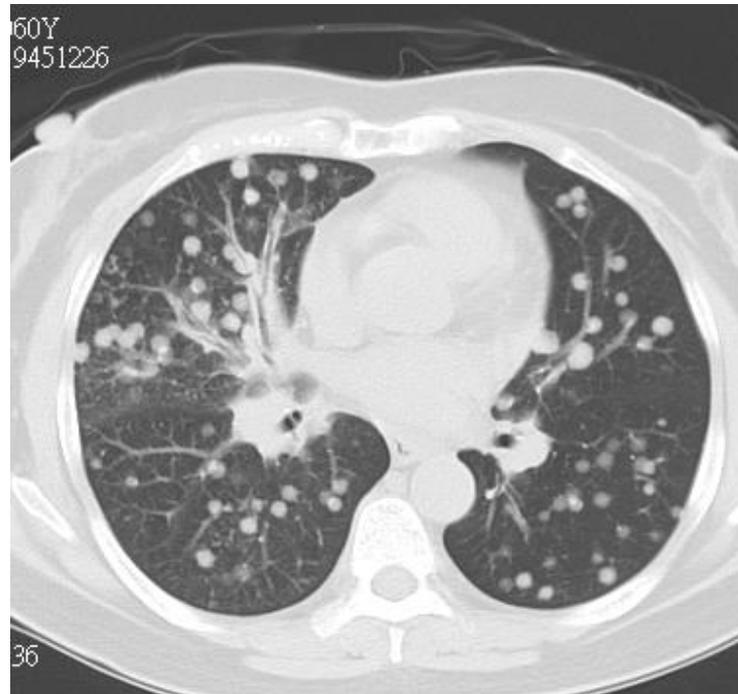
14. Multiple pulmonary nodule/mass (1)

Malignant Multiple nodules: lung to lung metastasis, metastatic cancer,

Uneven nodular size

Subpleural nodules

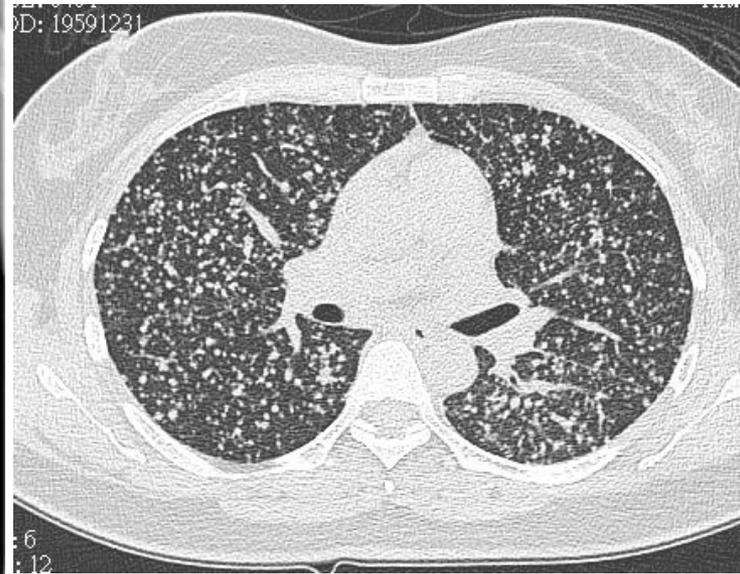
Nodules with cavity



Lung cancer, RUL with lung to lung meta.

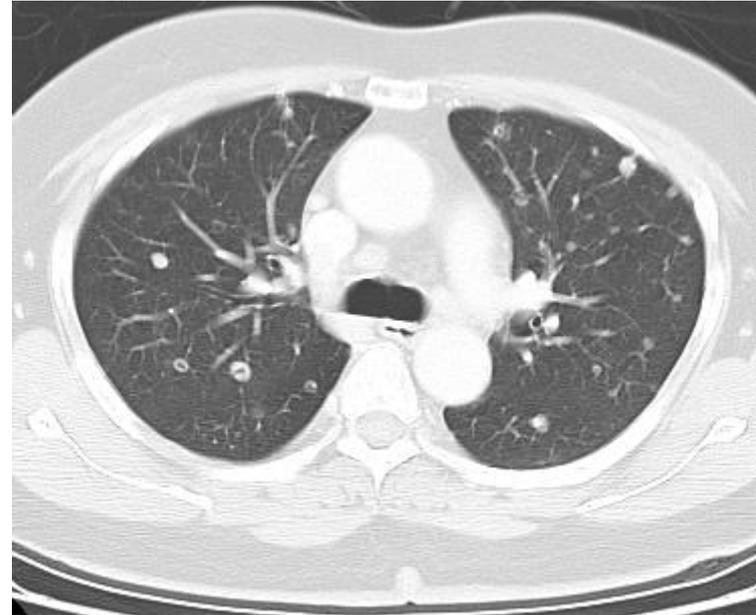
Uneven sized well-defined nodules bil.

Uneven sized diffuse micronodules



Dx: adenocarcinoma of lung, LLL, lung to lung and LN meta.

Nodule with cavity

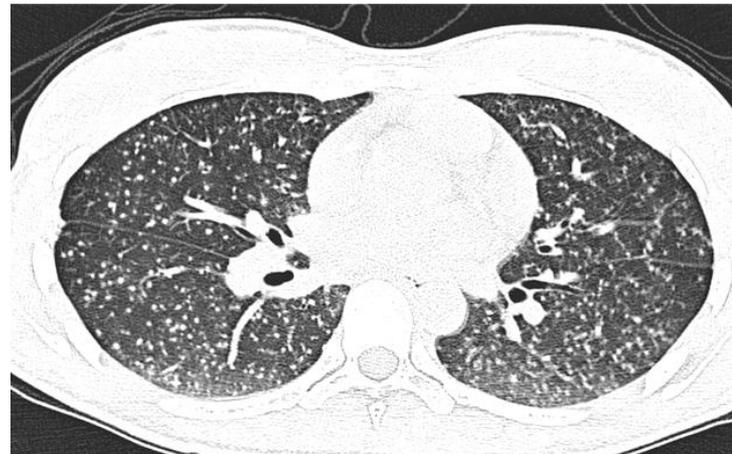
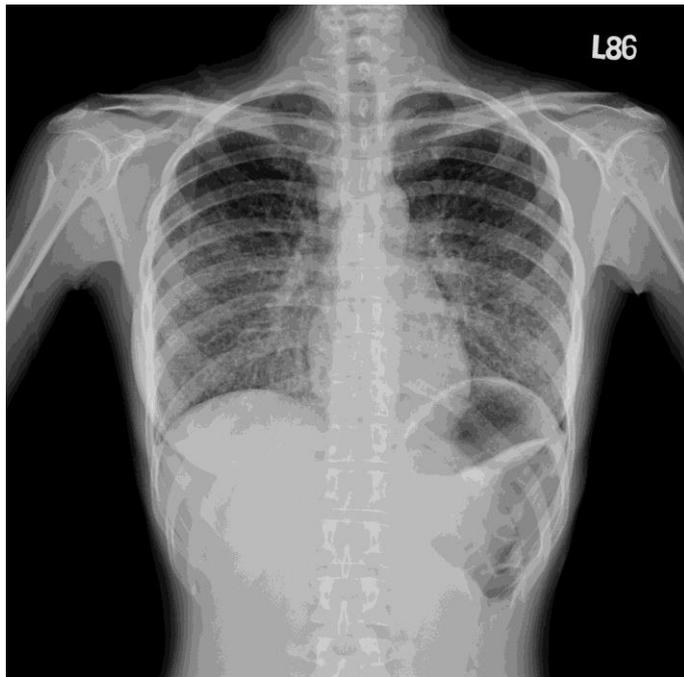


**Uneven sized nodules with cavity on both lung fields
Dx: squamous cell carcinoma of lung, lung to lung meta.**

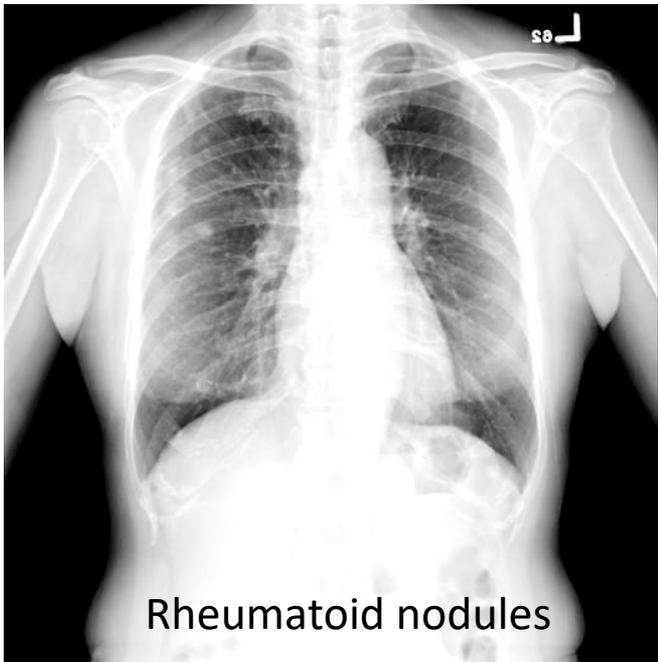
14. Multiple pulmonary nodule/mass (2)

Benign Multiple pulmonary nodules :

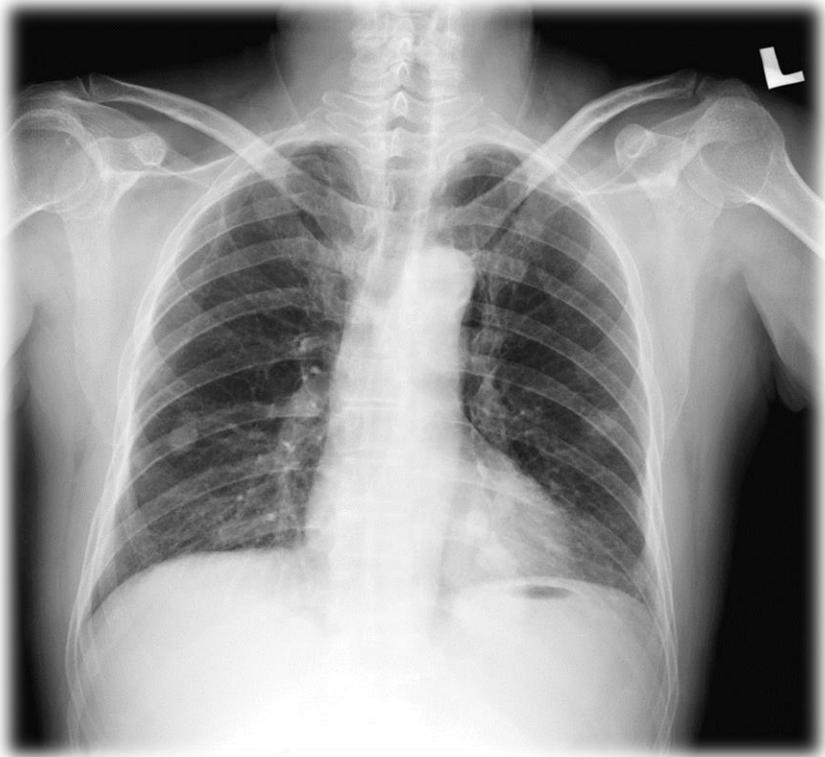
**fungal infection, sarcoidosis, granulomatous infection,
lipomatosis, rheumatoid nodules, AV malformation**



Miliary TB

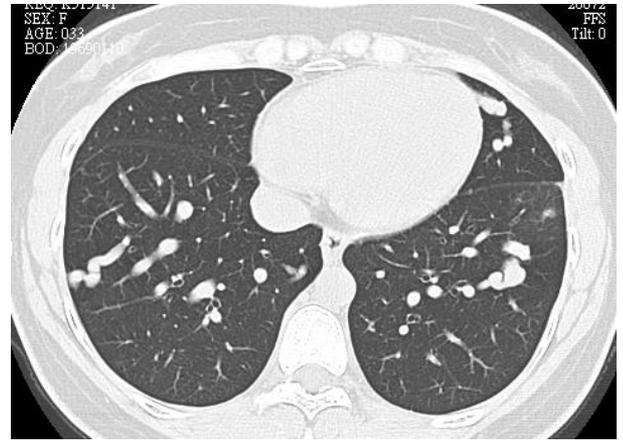
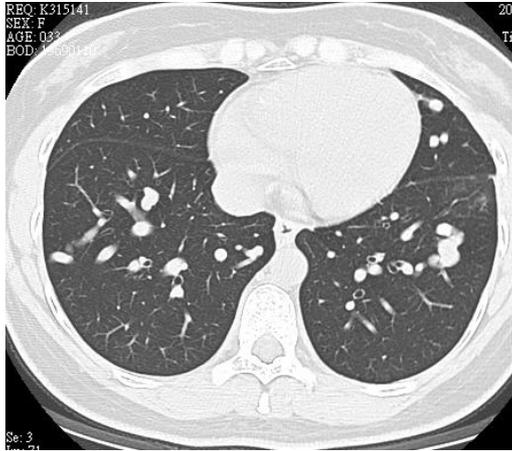


Multiple uneven size pulmonary nodules

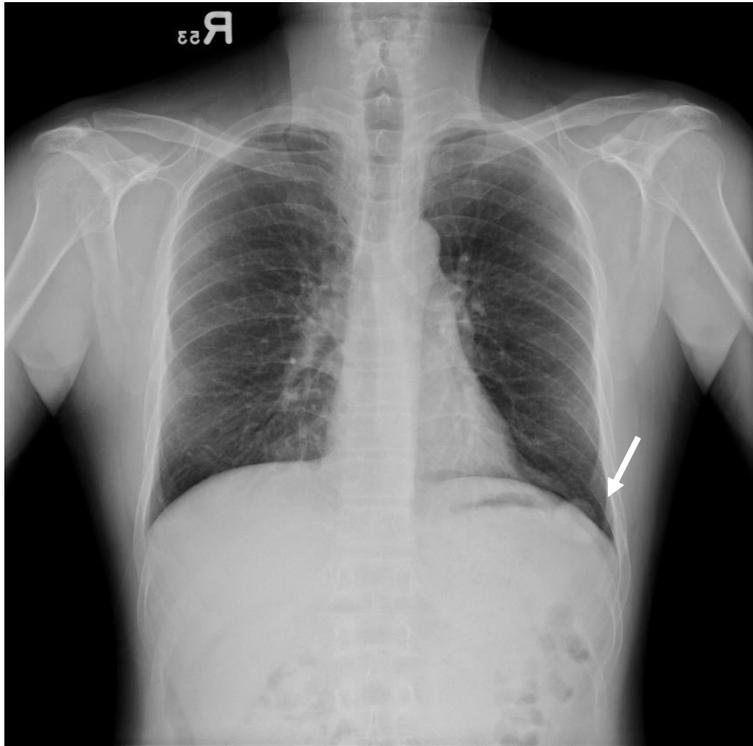


A-V malformation





A-V malformation



A-V malformation

Algorithm of Approach to Solitary Pulmonary Nodule

