

胸部X-ray 影像 判讀原則與常用徵象



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胸部X光片之判讀要領

■ 片子：良好

- 照相品質
- 病人姿勢
- 基本資訊

■ 知識：

- 了解正常解剖學與影像
- 以patterns & signs作鑑別診斷
- 熟悉疾病之典型表現，再學習其多樣化表現

■ 技巧：

- 固定的判讀程序，避免遺漏。
- 利用不同階段的X光片，以病灶的時序變化作鑑別診斷
- 利用不同的照像技術
- 參考臨床資料

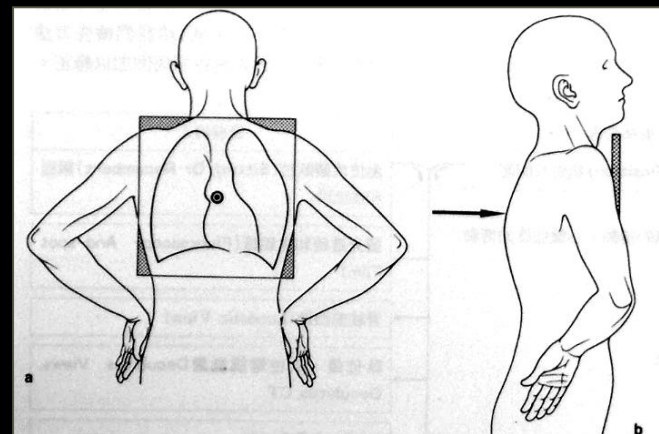


好的胸部X光片

- 看的範圍愈多愈好

常規正面像

- 立姿
- 深吸氣
- 後前像 (PA)
- 距離 6 英尺
- 暴露適當



照相品質好不好

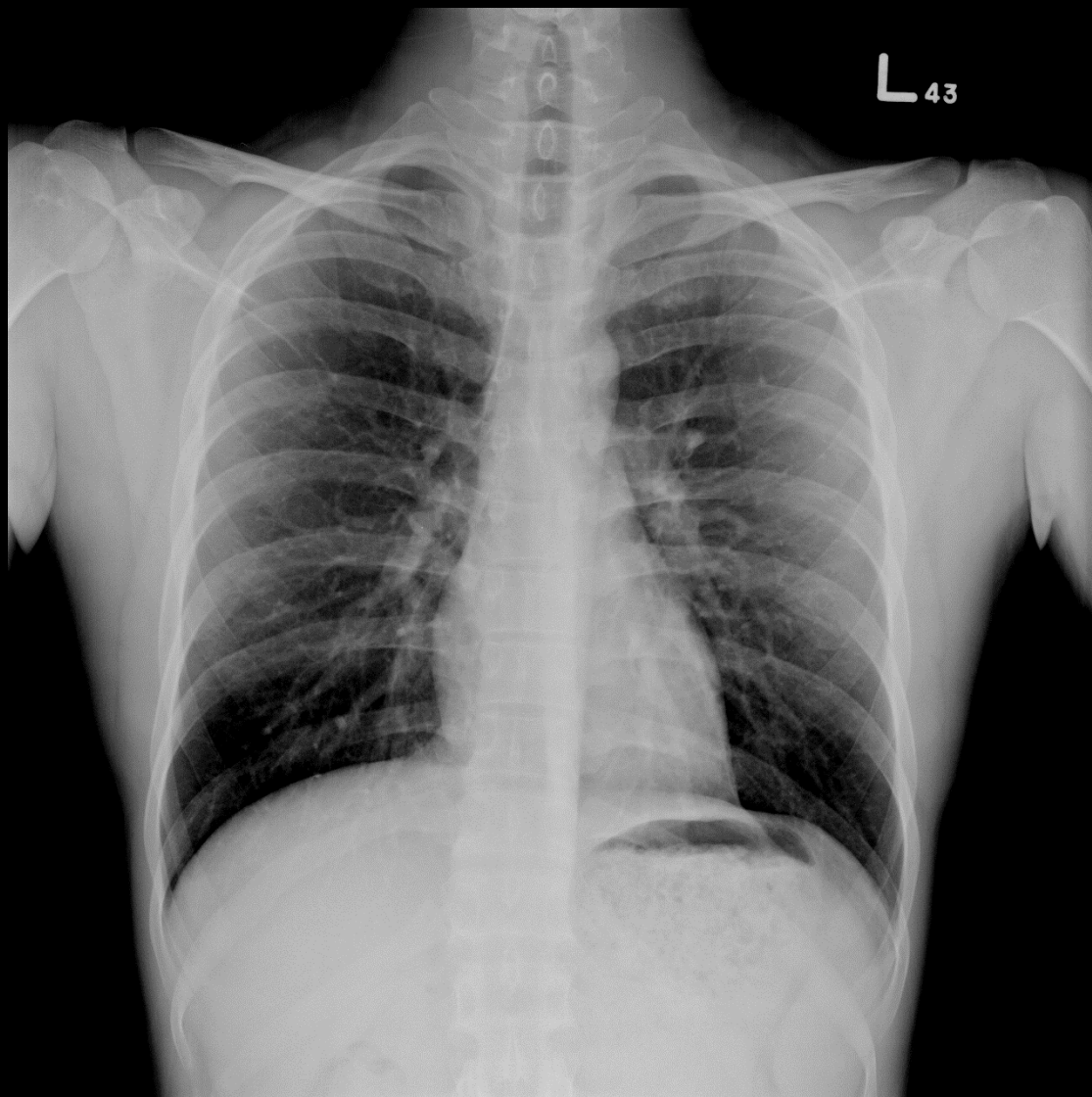
■ 片子夠大：應該涵蓋

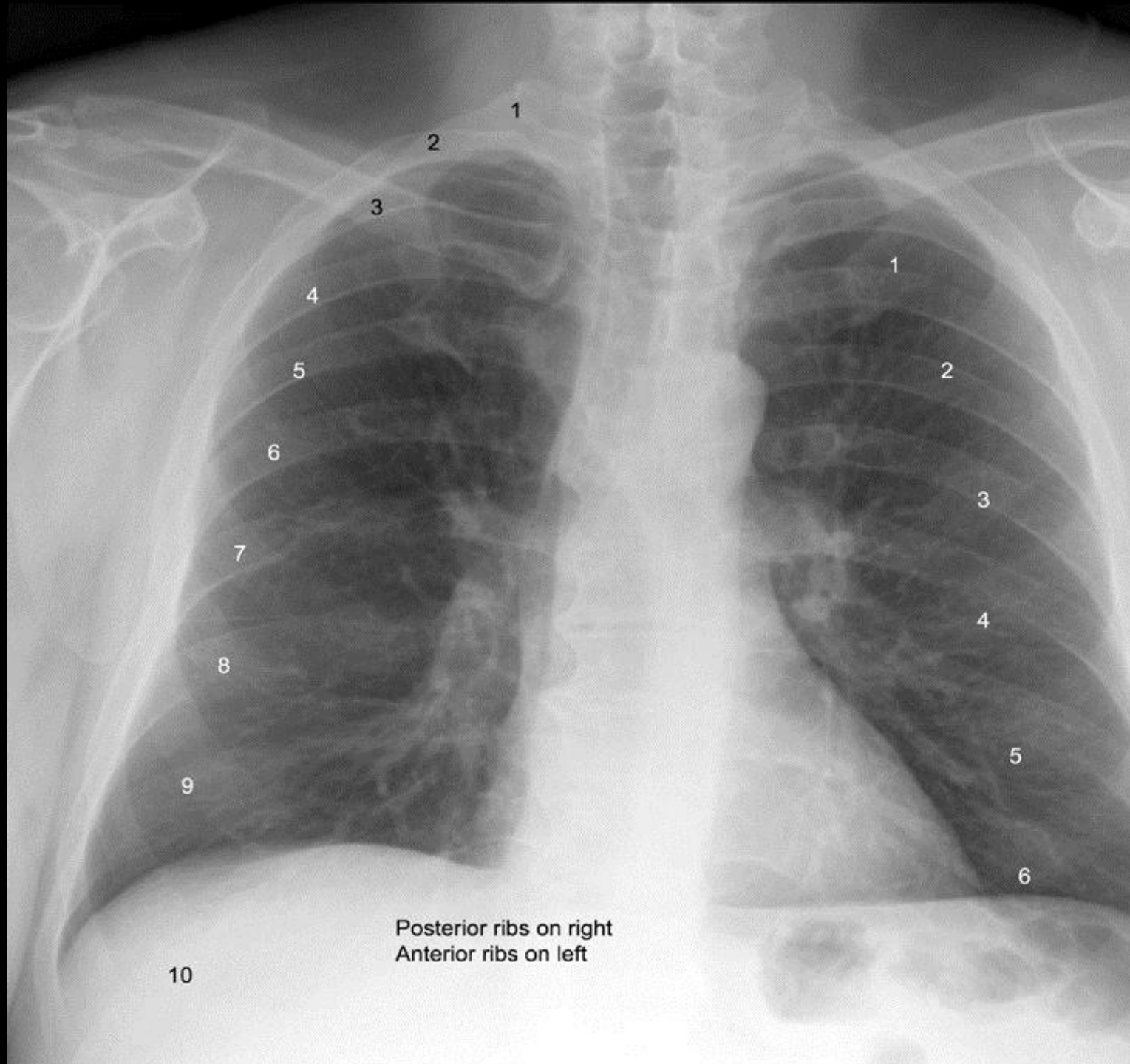
- Neck: 以免loss trachea 病變
- 胸廓: 以免loss soft tissue/ bony lesions
- Diaphragm: sub-diaphragm lesions, 如liver, gastric bubble
- Bil CP angle: 以免loss少量 P.E.

■ 吸氣充足：

- 正常PA view : diaphragm中心點與肋骨交會(前6後10)

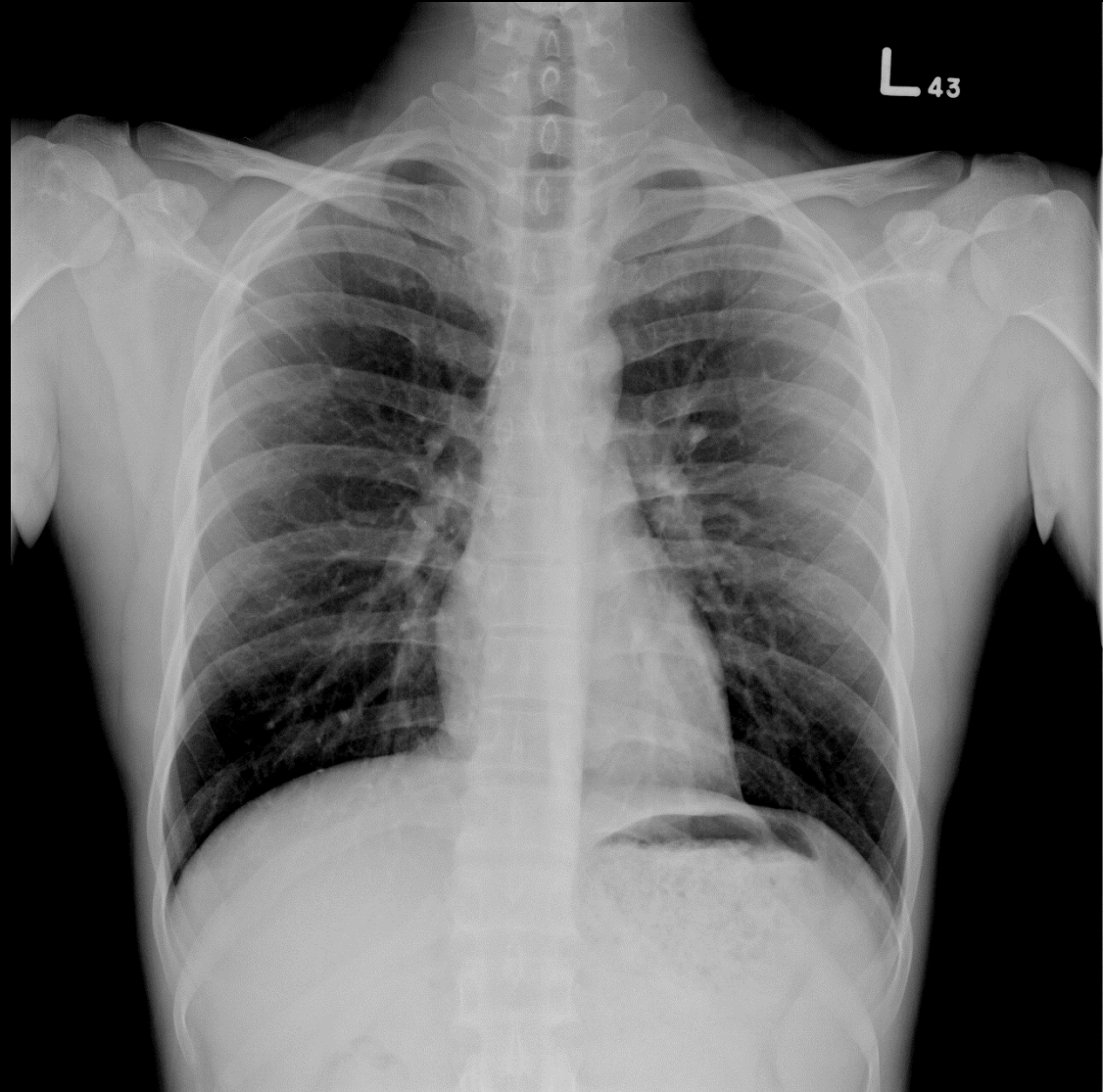
■ 曝光適當





如何判斷曝光好不好？

- Trachea與carina隱約可見
- 下段vertebra清晰可見
- 脊柱間盤隱約可見
- 心臟後與橫膈下方的肺紋可識
- 兩側肺紋至外三分之一清晰可見



曝光良好的CXR

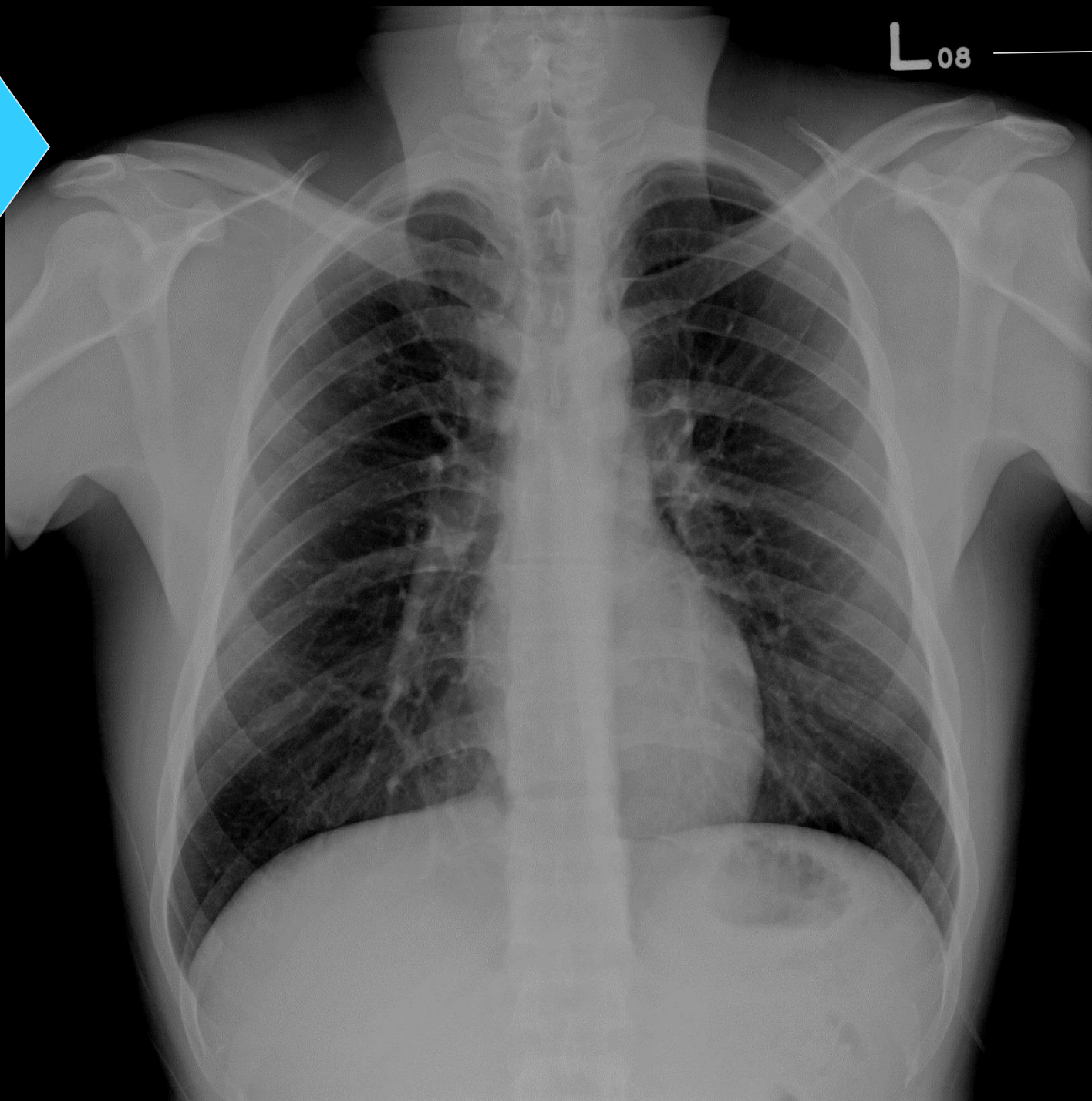


- 曝光太強:過黑，會miss tiny lesions
- 曝光適當
- 曝光太弱:過白，會miss 縱隔腔內、心臟後的病變

開始判讀前的基本資訊

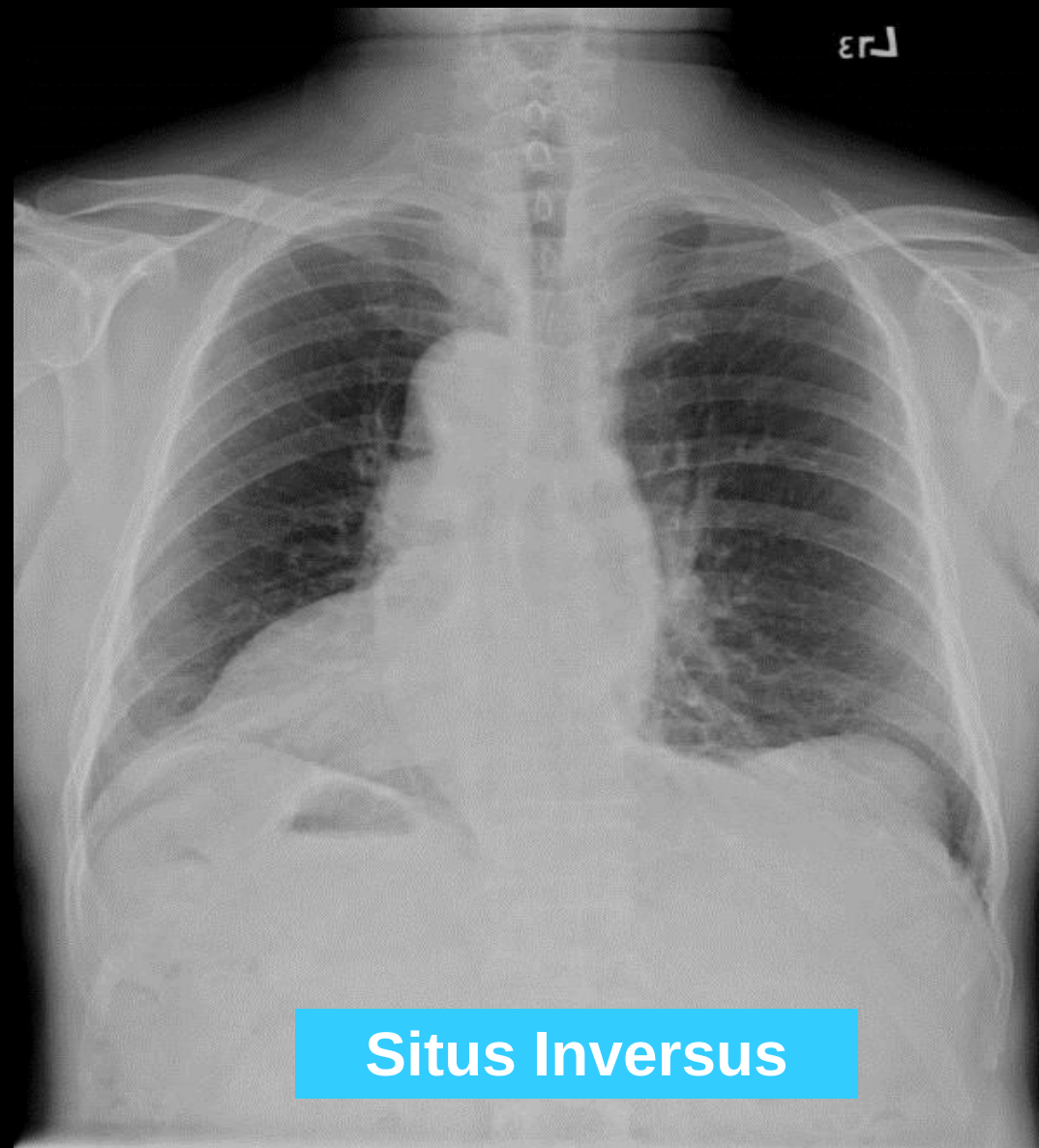
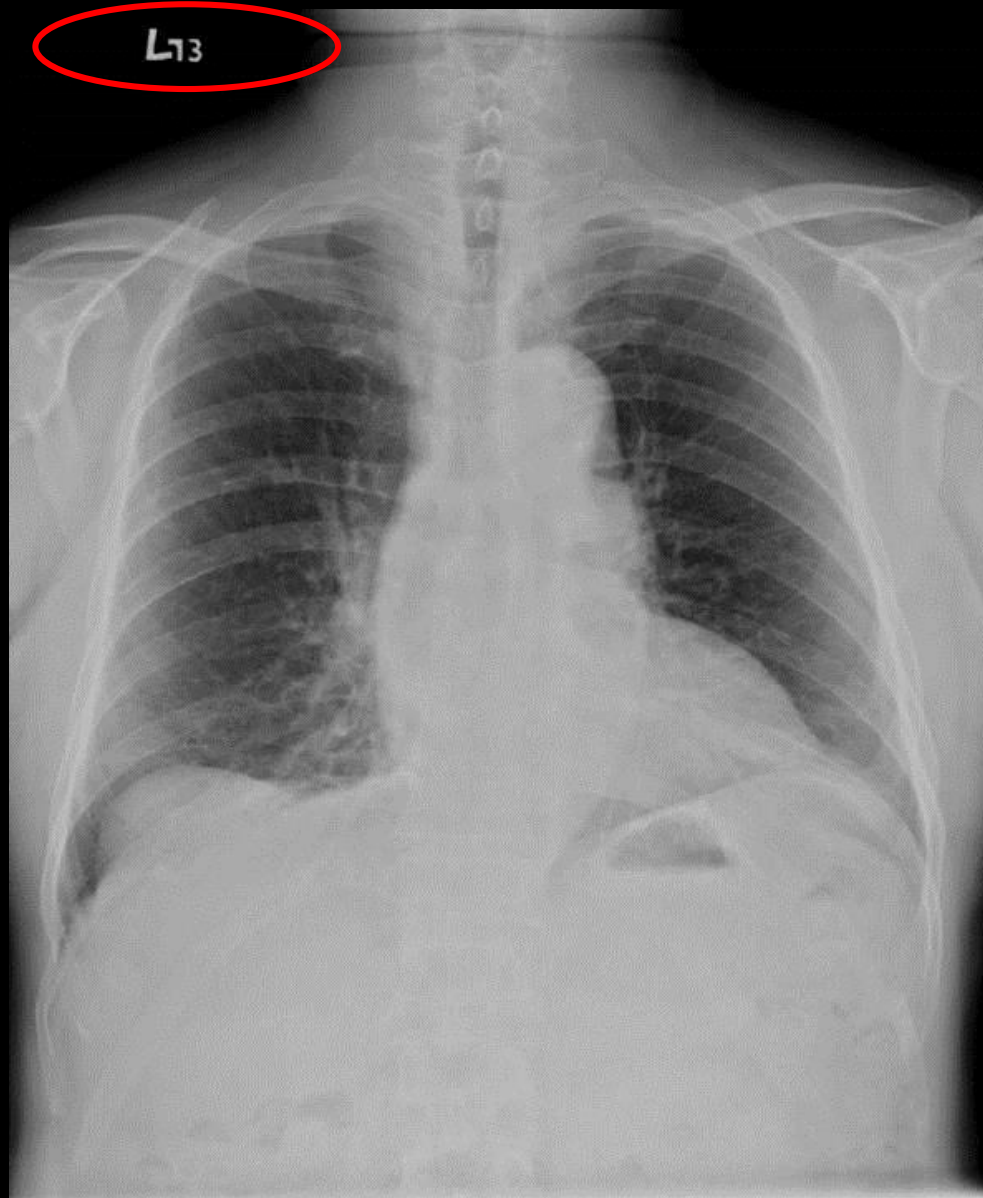
- 確認病人的姓名、病歷號及申請單號碼
- 確認左或右的字牌
- 做全般性的觀察(general screening)

姓名
病歷號
申請單
性別



L08

左邊



General Screening (1)

■ 照相的體位(standing or lying)

■ 觀察重點：

■ Scapular 有沒有打開：看 tip of scapula

■ Clavicle 走向：站著照 clavicle 比較平，躺著照 clavicle 會變斜上揚

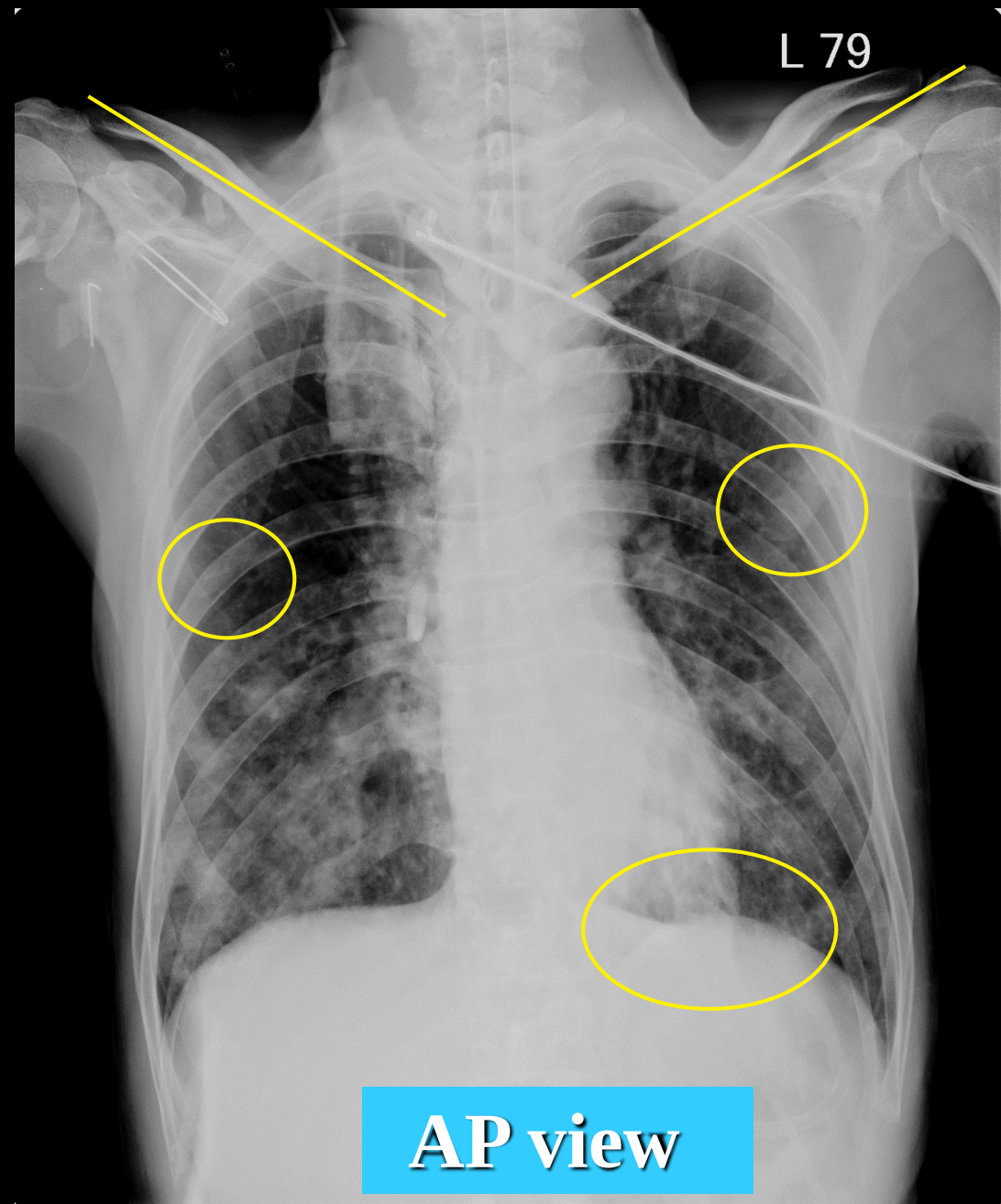
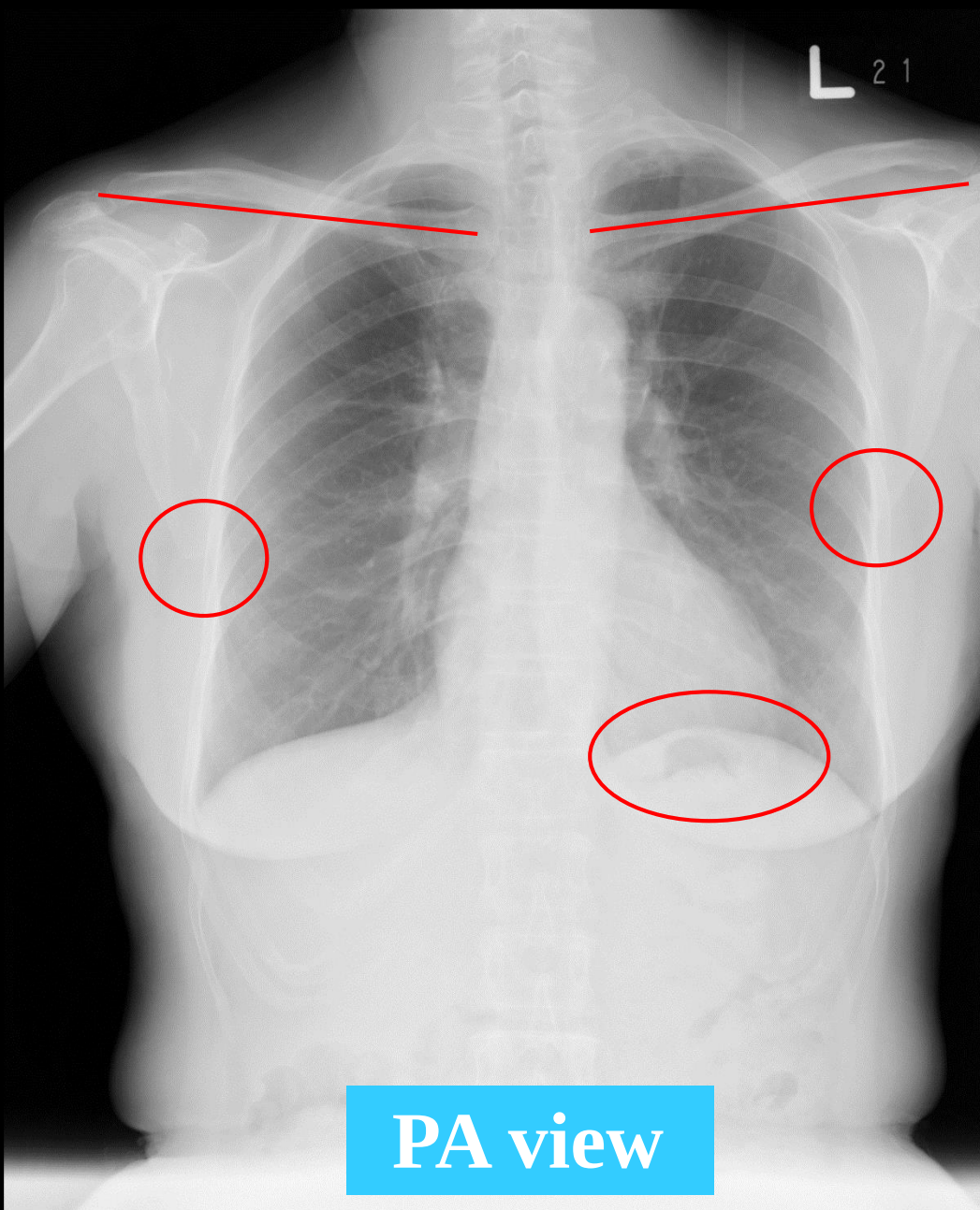
■ Gastric-bubble 內是否有 air-fluid level

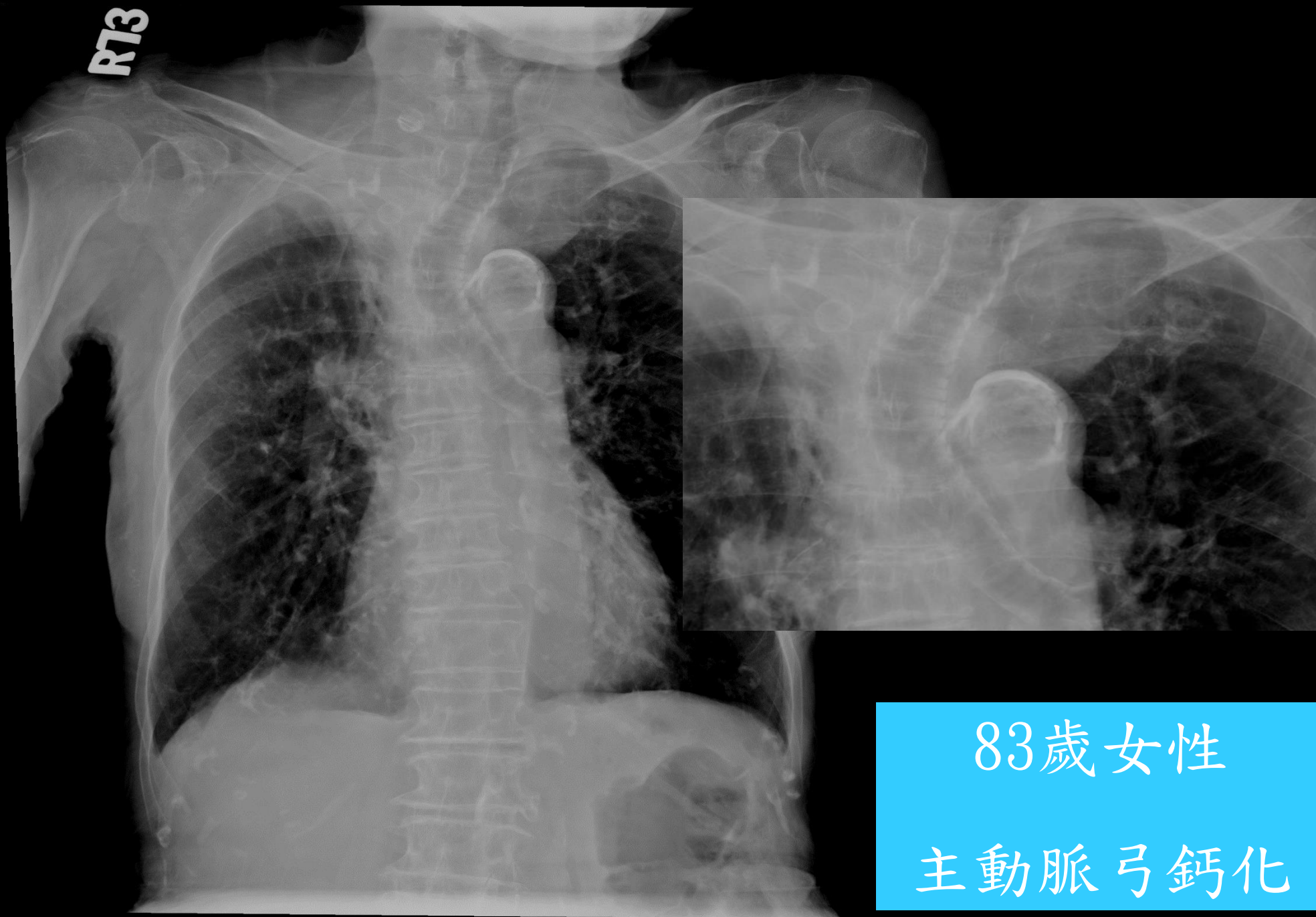
■ 通常躺著照相，表示病情較為嚴重。

■ 年齡

■ 第一根肋軟骨鈣化: 30-40 y/o

■ Tortuosity of aorta & calcification of aortic knob: 50-60 y/o





83歲女性
主動脈弓鈣化

胸部X光片之判讀要領

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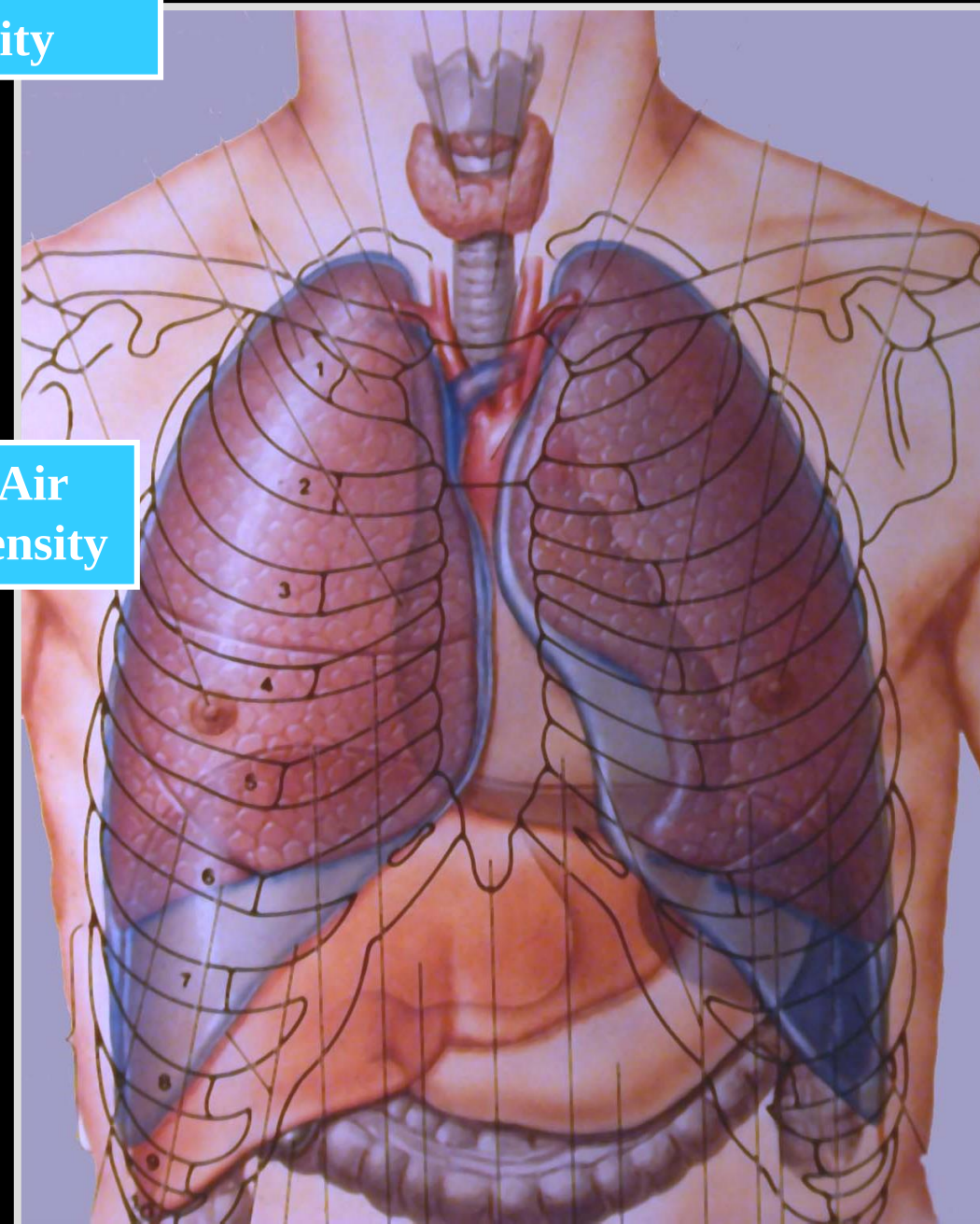
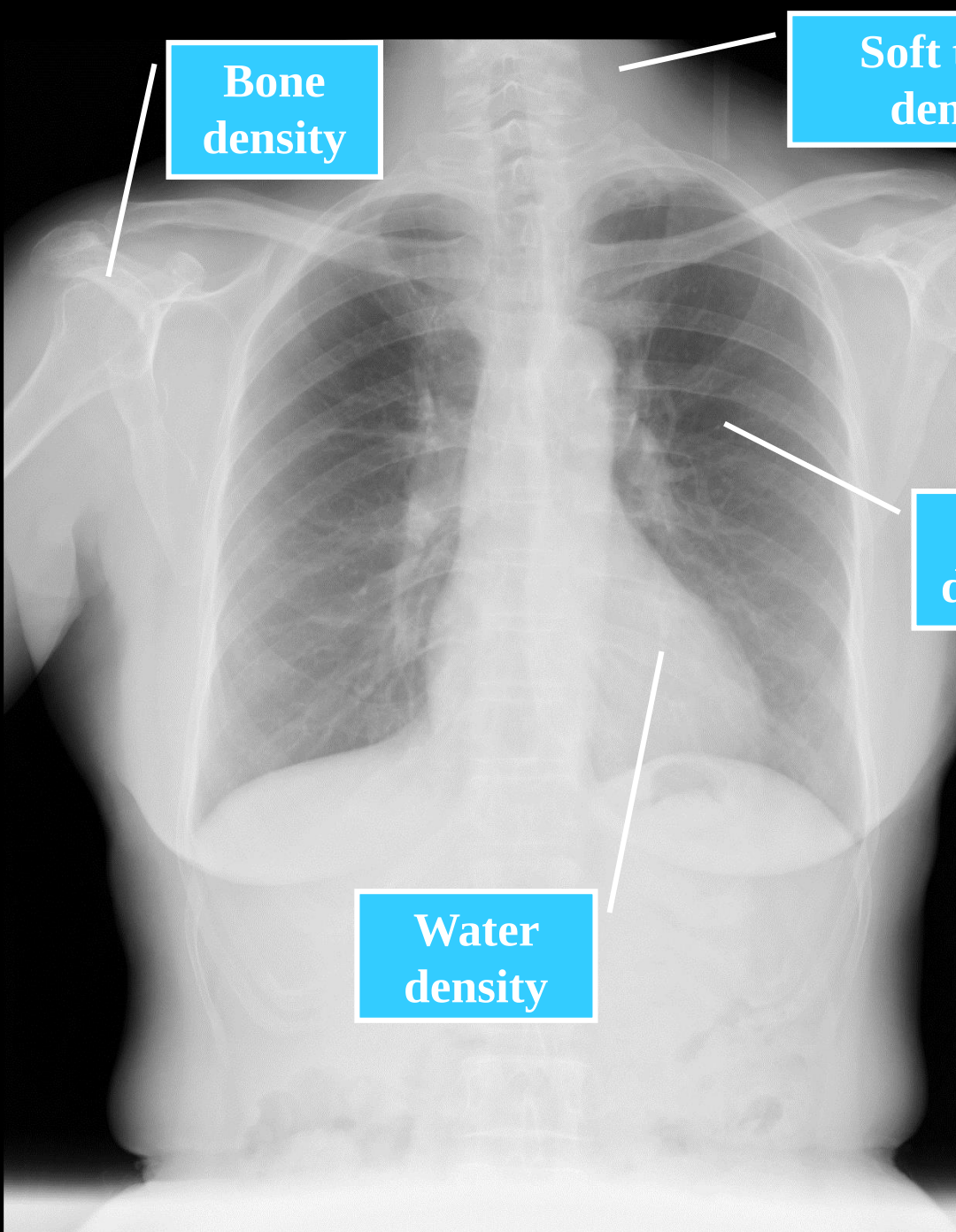
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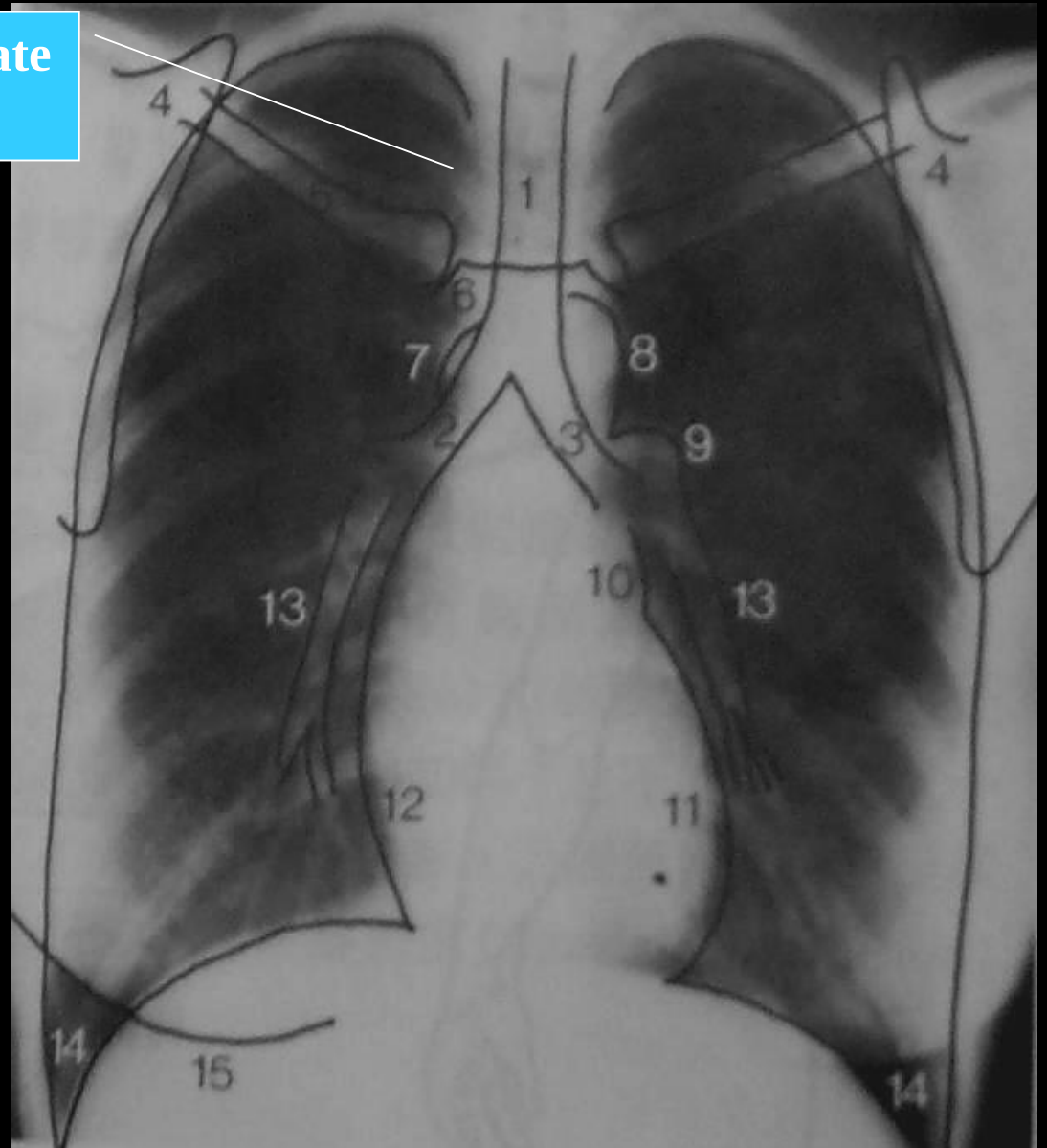
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Frontal View

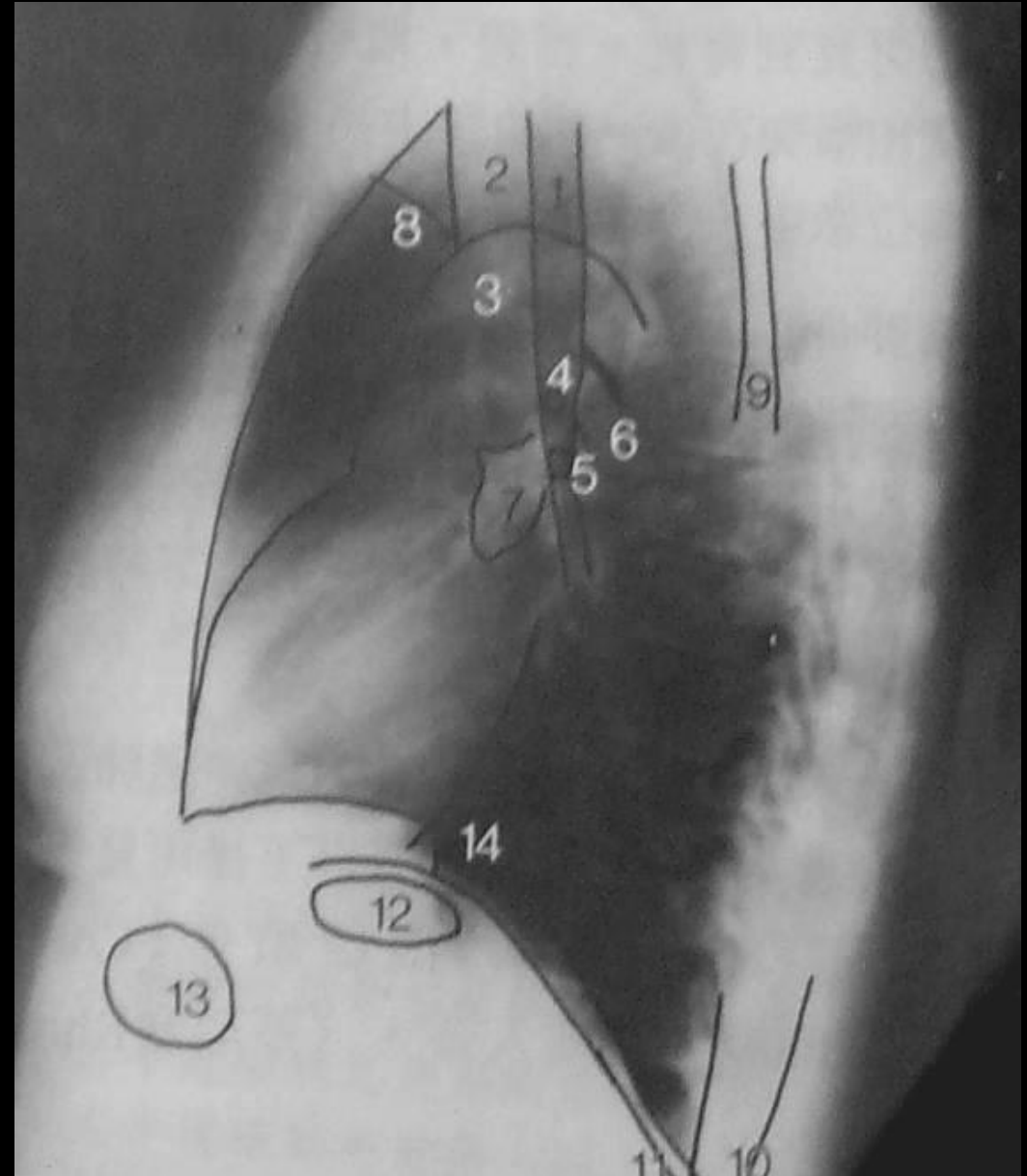
Innominate
artery

1. Trachea
2. Right main bronchus
3. Left main bronchus
4. Scapula
5. Clavicle
6. Manubrium Sterni
7. Azygous vein
8. Aortic arch
9. Left pulmonary artery
10. Left atrial appendage
11. Left heart border
12. Right heart border
13. Interlobar pulmonary artery
14. Costophrenic angle
15. Breast shadow



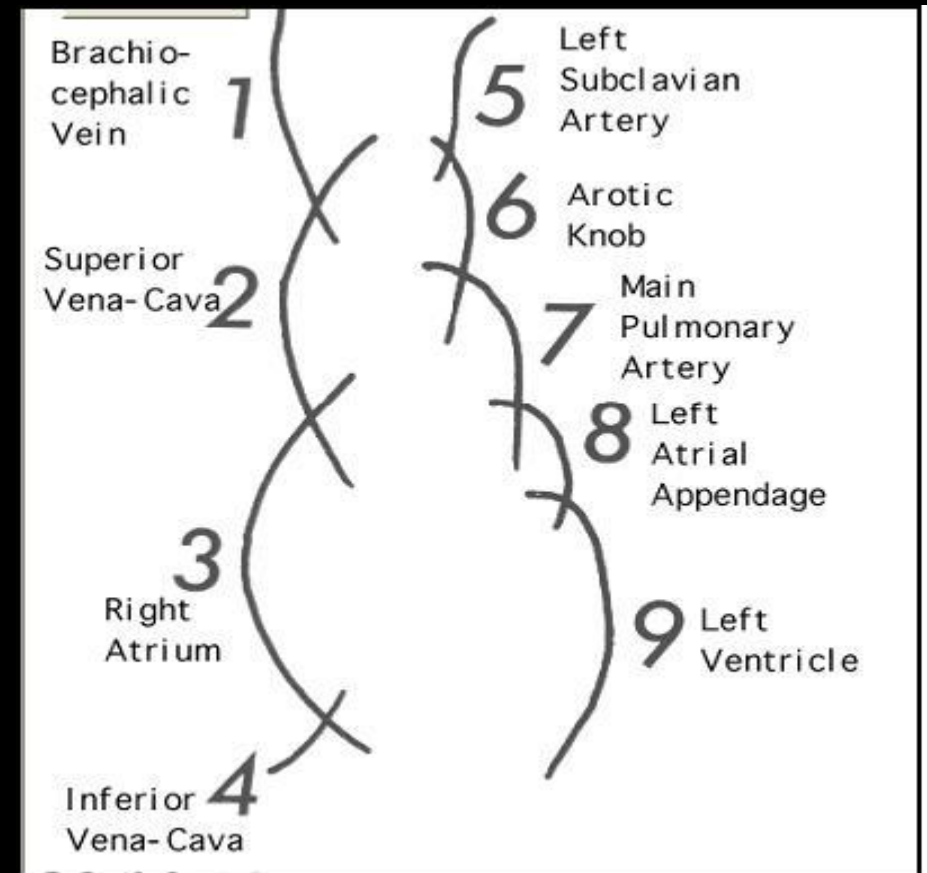
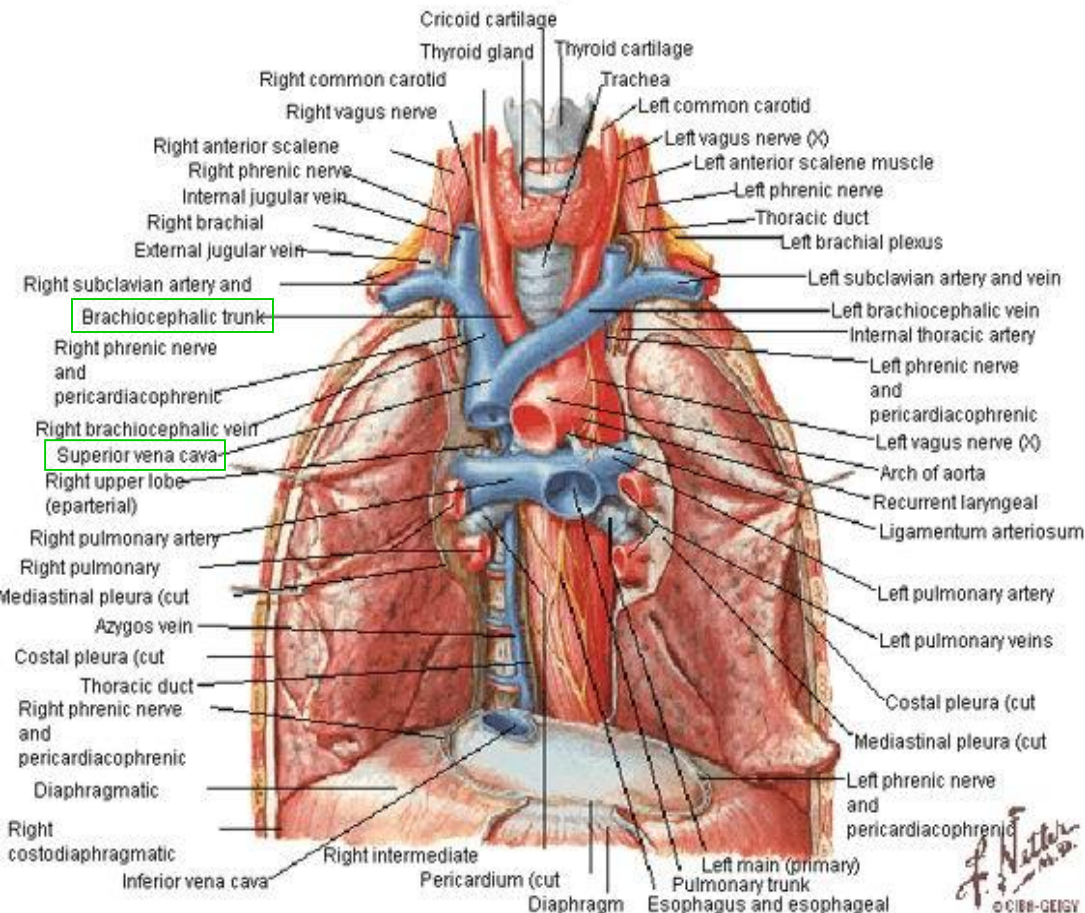
Lateral View

1. Trachea
2. Pretracheal vascular bundle
3. Aortic arch
4. RUL bronchus orifice
5. LUL bronchus orifice
6. Left pulmonary artery
7. Right pulmonary artery in pretracheal oval
8. Axilla
9. Scapula
10. L't C-P angle
11. R't C-P angle
12. Gastric bubble
13. Transverse colon
14. Inferior vena cava



Cardiovascular shadow

Main Bronchi With Pulmonary Arteries and Veins in Situ



系統性的判讀

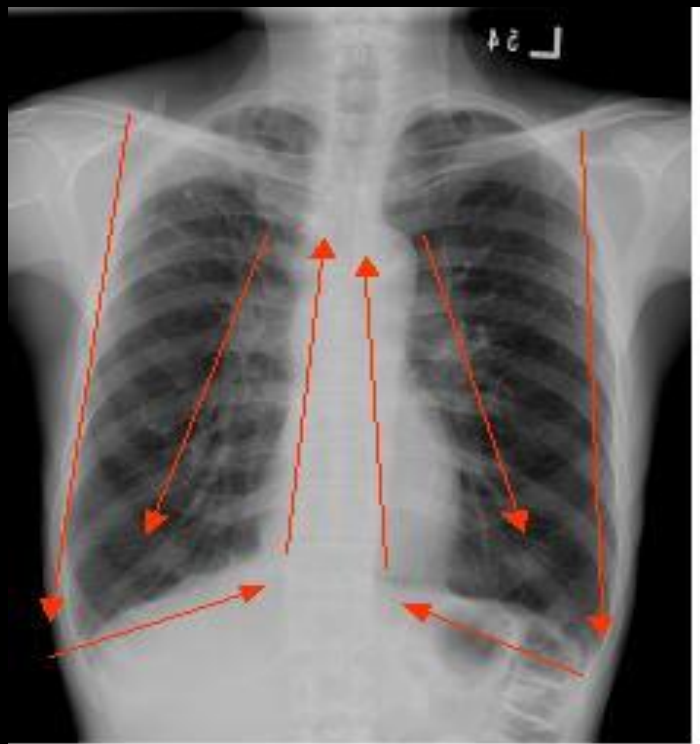
每個人可以建立自己的讀片順序

蕭主任游泳姿勢說

1. 胸廓及其外軟組織
2. 橫膈及腹部器官
3. 縱膈
4. 大氣道
5. 肺門
6. 肺區(肺裂、肺紋及支氣管分支)

Felson: **T**here **A**re **M**any **L**ung **L**esions

1. T(thorax):胸廓及其外軟組織
2. A(abdomen):橫膈及腹部器官
3. M(mediastinum):縱膈，含大氣道和肺門
4. L(單側肺區):肺裂、肺紋及支氣管分支
5. L(兩側肺區左右比較)



胸廓：Bone (Frontal View)

- General appearance

- Scoliosis, kyphosis, kyphoscoliosis

- Osteoblastic change

- Prostate ca.

- Breast ca.

- Osteolytic change

- Metastasis, multiple myeloma

- Osteoporosis

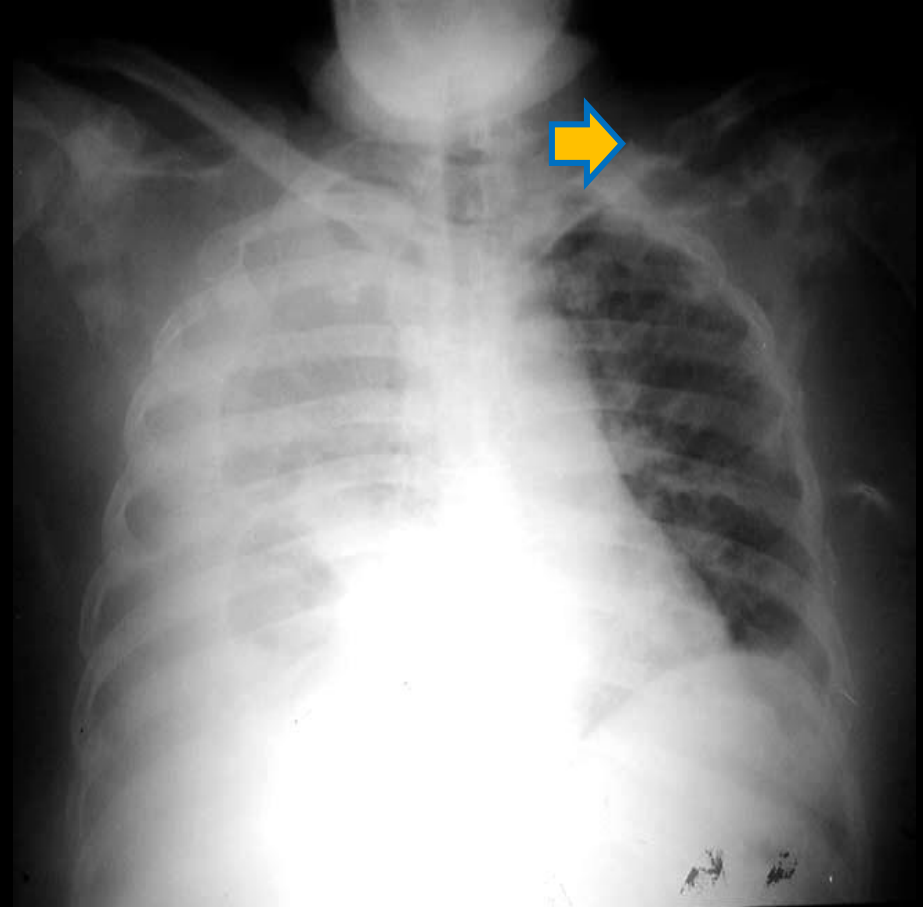
Different bony densities on CXR

Osteoblastic



Prostate ca with bone mets

Osteoclastic



Multiple myeloma

胸廓：Bone (Frontal View)

■ Rib

- 在lateral view中區別左右側的rib：

 - Big rib sign,

 - Vertical displacement sign

- Extra – Cervical rib

- Upper margin – Metastasis

- Lower margin – **Notching: Coarctation of aorta**

- Expansion – Healing of fracture, tumor

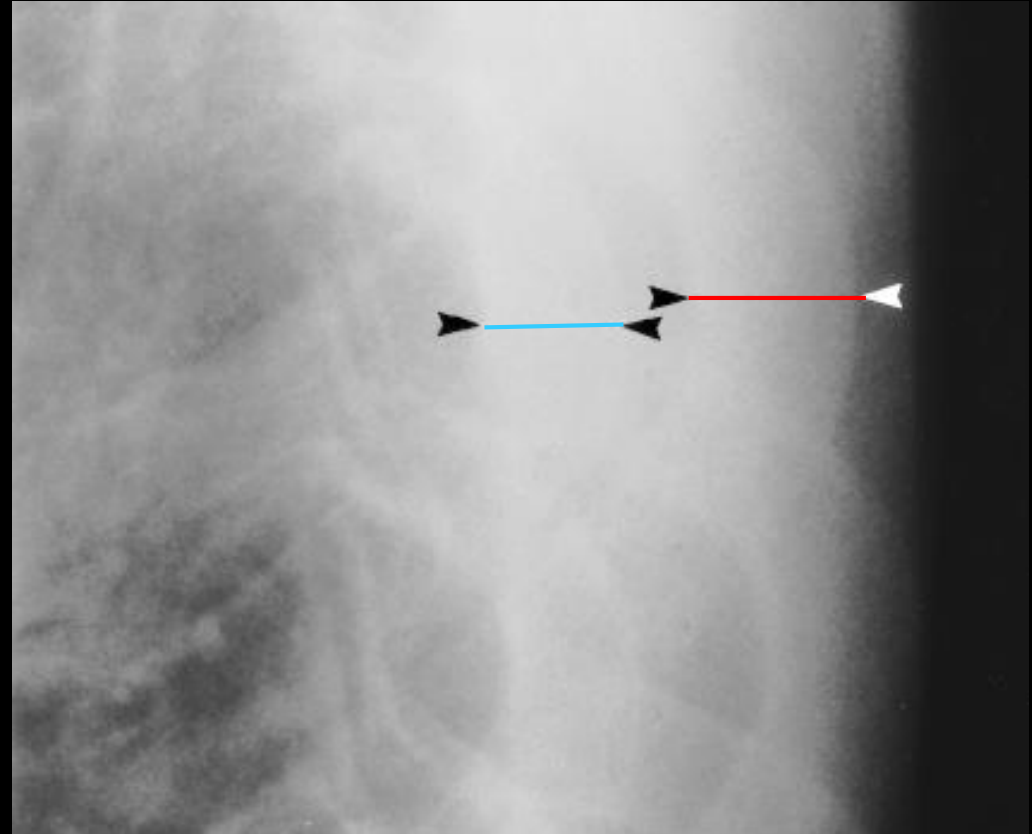
- Diffuse enlargement – Extramedullary hematopoiesis

Left Lateral



Big Rib Sign

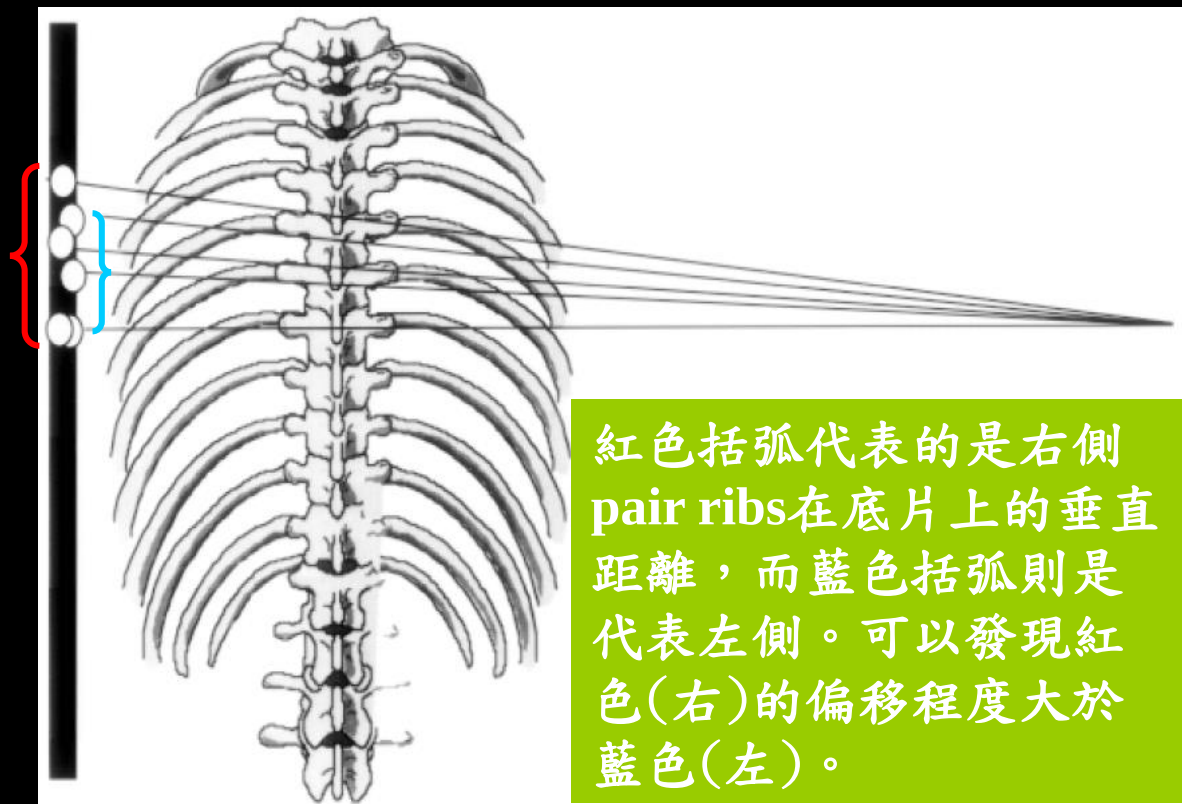
- 原理：**遠離底片**那一側的rib cage因為放大的效果，看起來會比靠近底片側的來得**粗**一些。
- 在well-positioned **left lateral** chest radiograph中，**右邊的rib**看起來會比左邊看起來**粗**
- The big rib sign is very useful but is not perfect because the magnification **difference** between the right and left ribs is **only 10%**.
- Not applicable when the posterior ribs are superimposed



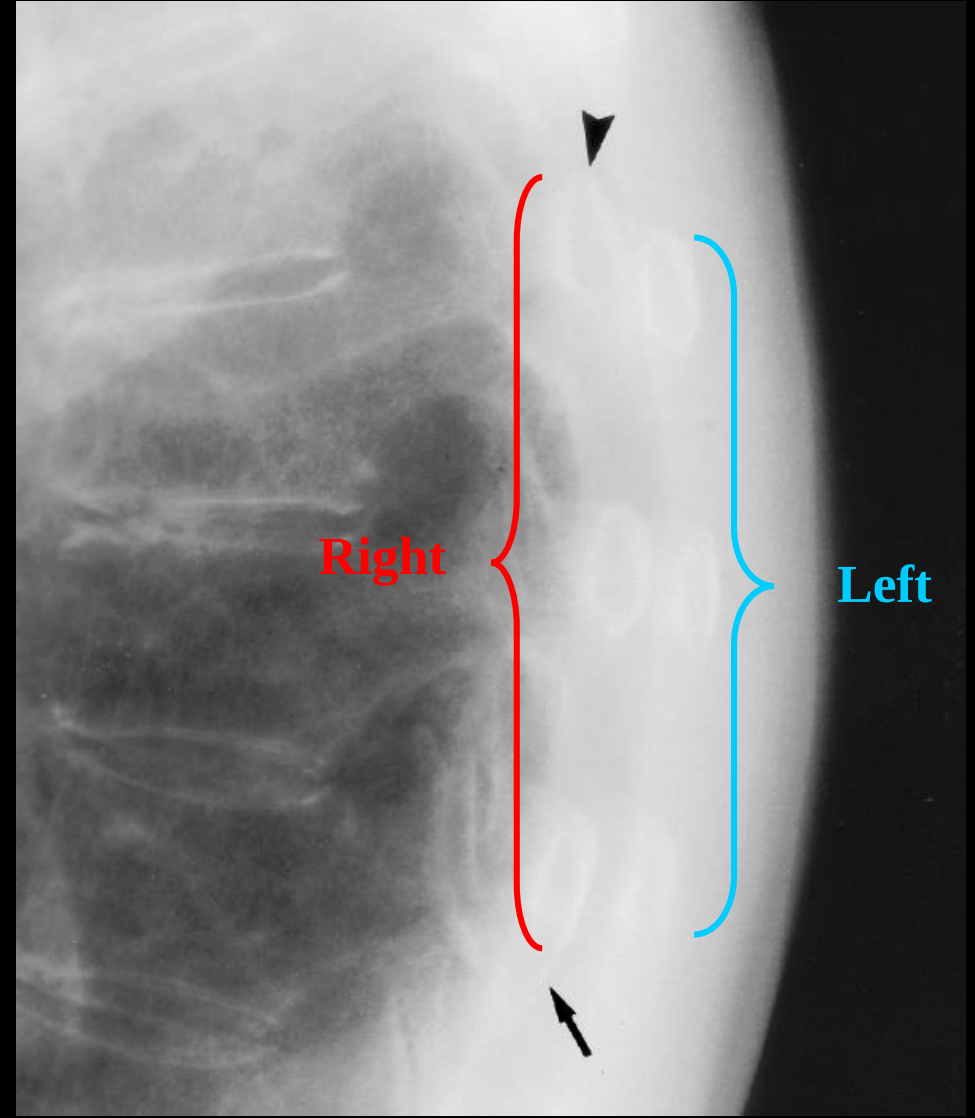
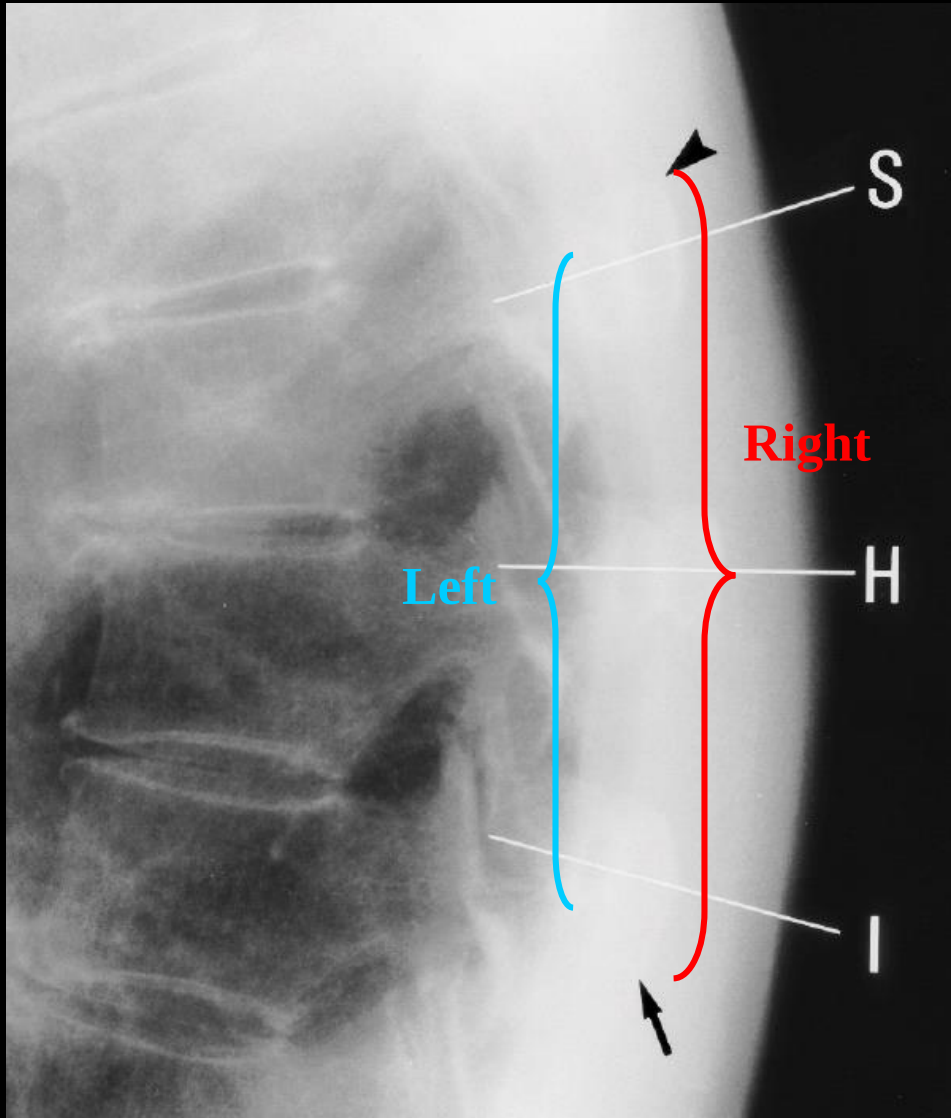
在left lateral view中，紅色線段的rib比藍色線段的rib粗，所以是遠離底片的那一側。

Vertical Displacement Sign

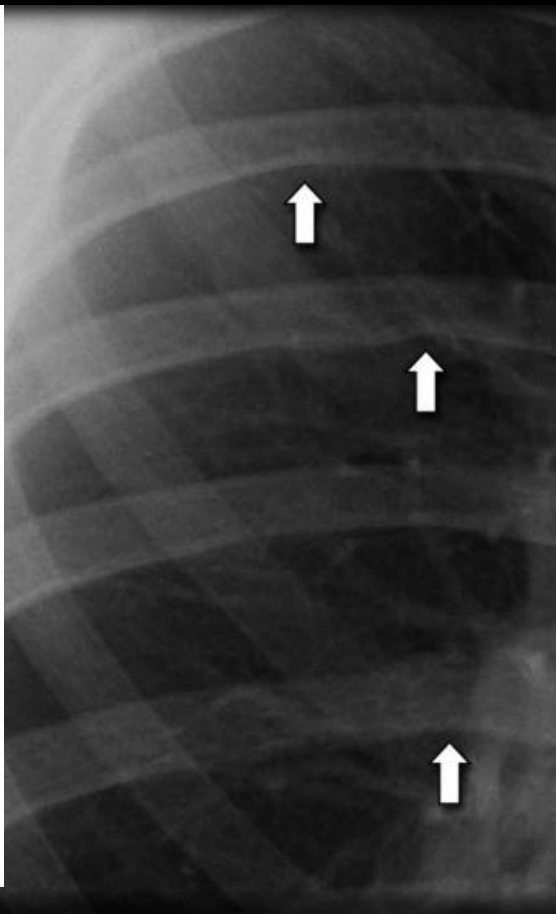
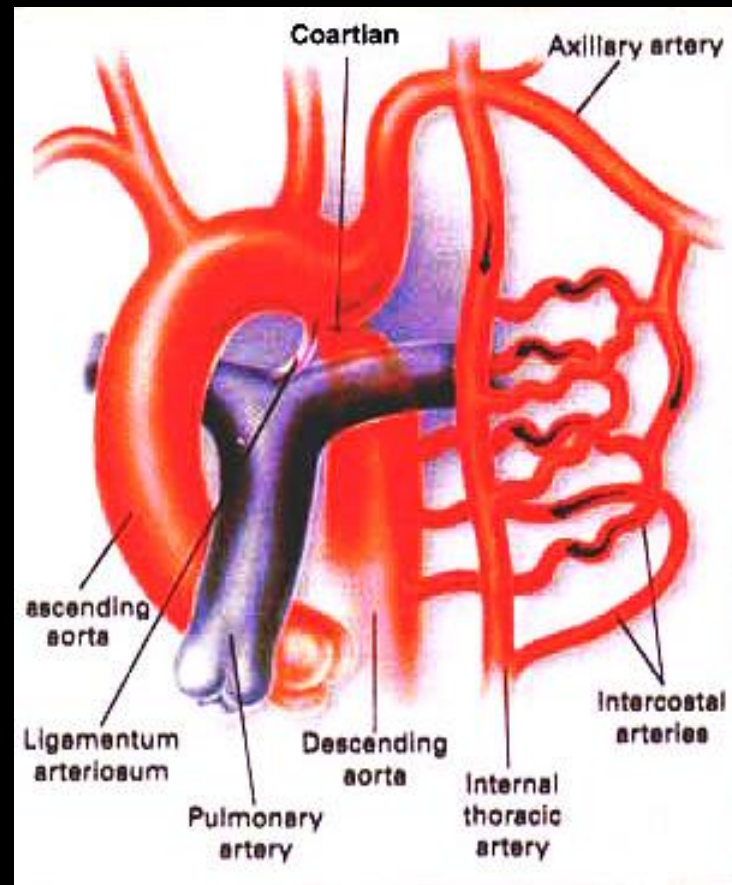
- 原理：based on vertical divergence of the x-ray beam rather than on the magnification of the ribs.
- 以 **L't lateral view** 為例，X-ray beam 投射至底片時，**右側** rib cage 在垂直距離上被 **放大偏移** 的程度會大於左側 rib。
- 用 paired ribs 在垂直距離上偏移的程度可以區分出左右側的 rib
- 即使左右兩側 rib 重疊還是可以區別得出來 – better than big rib sign



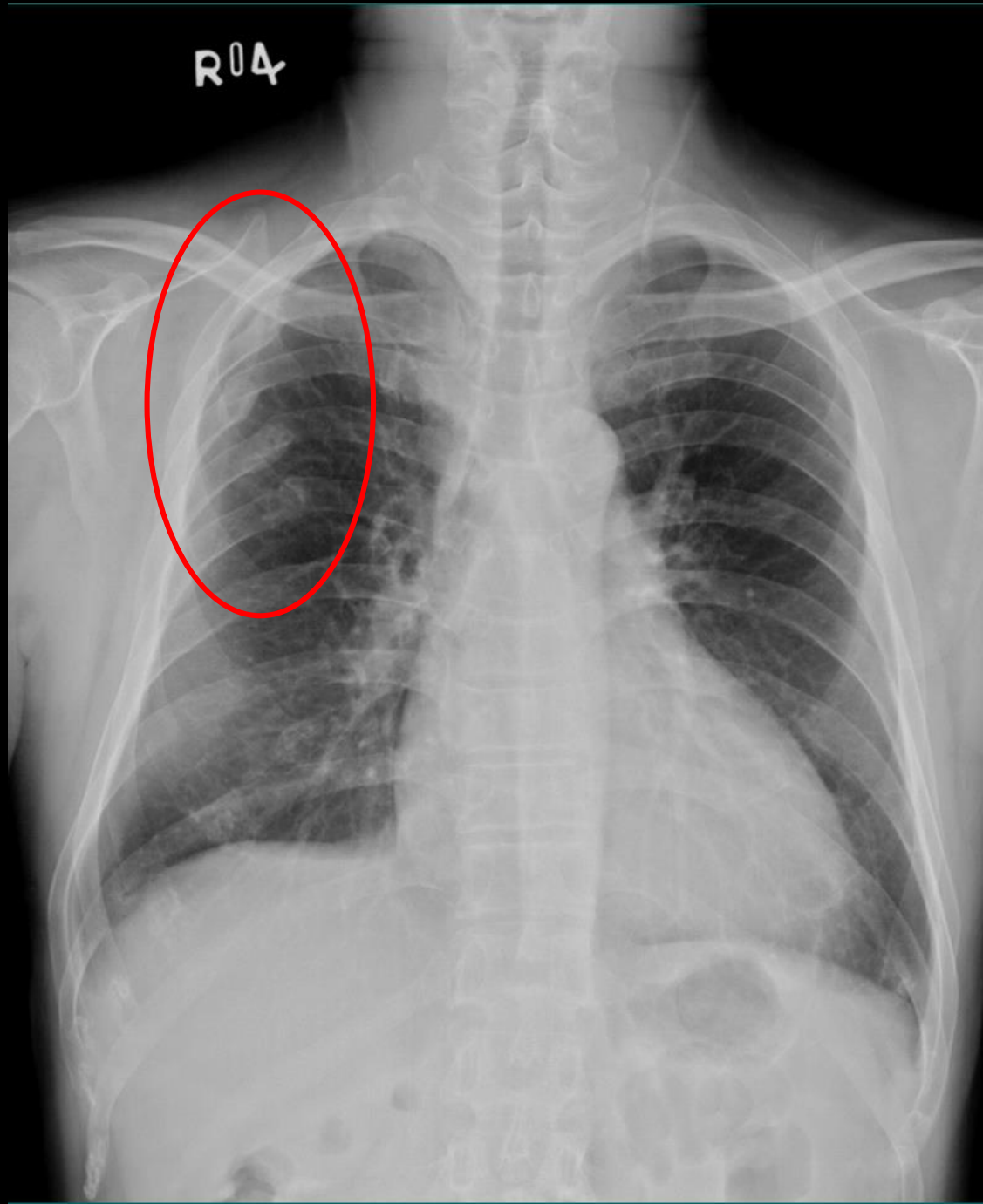
Vertical Displacement Sign



Rib notching: coarctation of aorta



Inferior rib notching in a patient with coarctation of the aorta



**Rib Fracture,
healing**

胸廓：Bone (Frontal View)

■ Sternum

- Pectus excavatum (Funnel chest)

- Pectus carinatum (Pigeon chest)

■ Spine: the lower, the more radiolucent of density

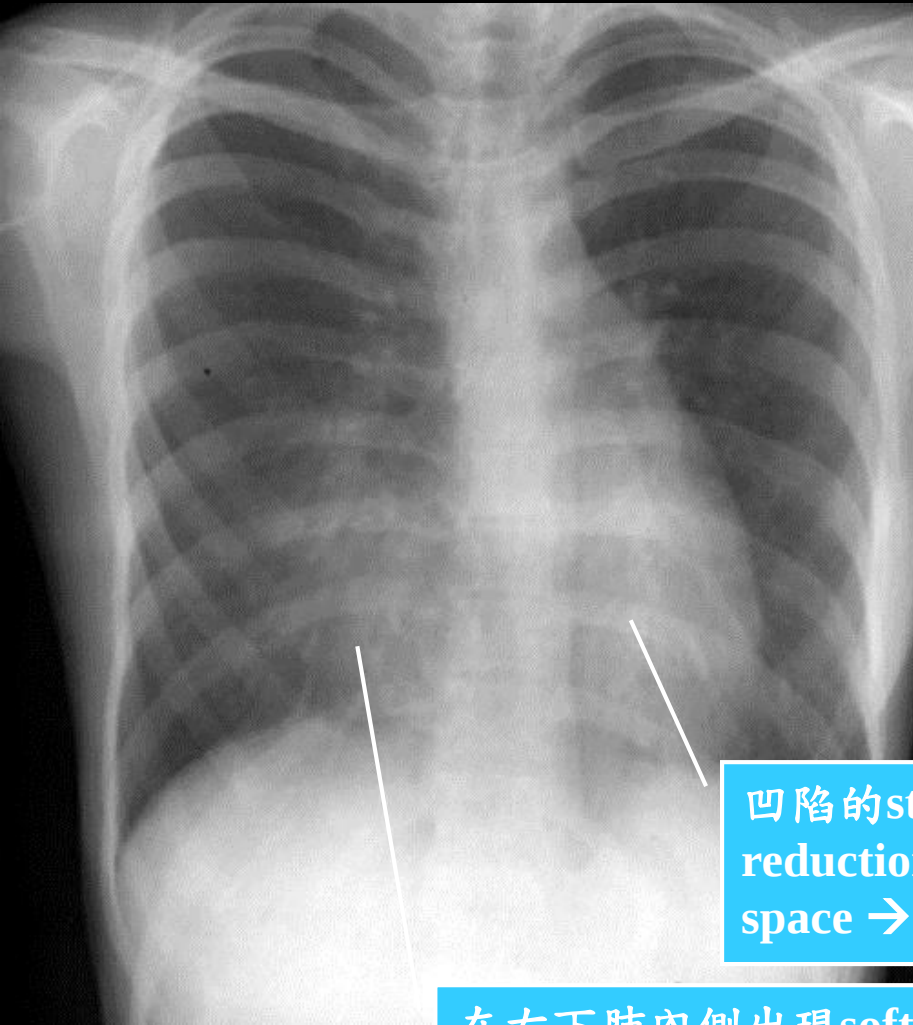
- Compression fracture/osteoporosis

- Bamboo spine

- TB spine

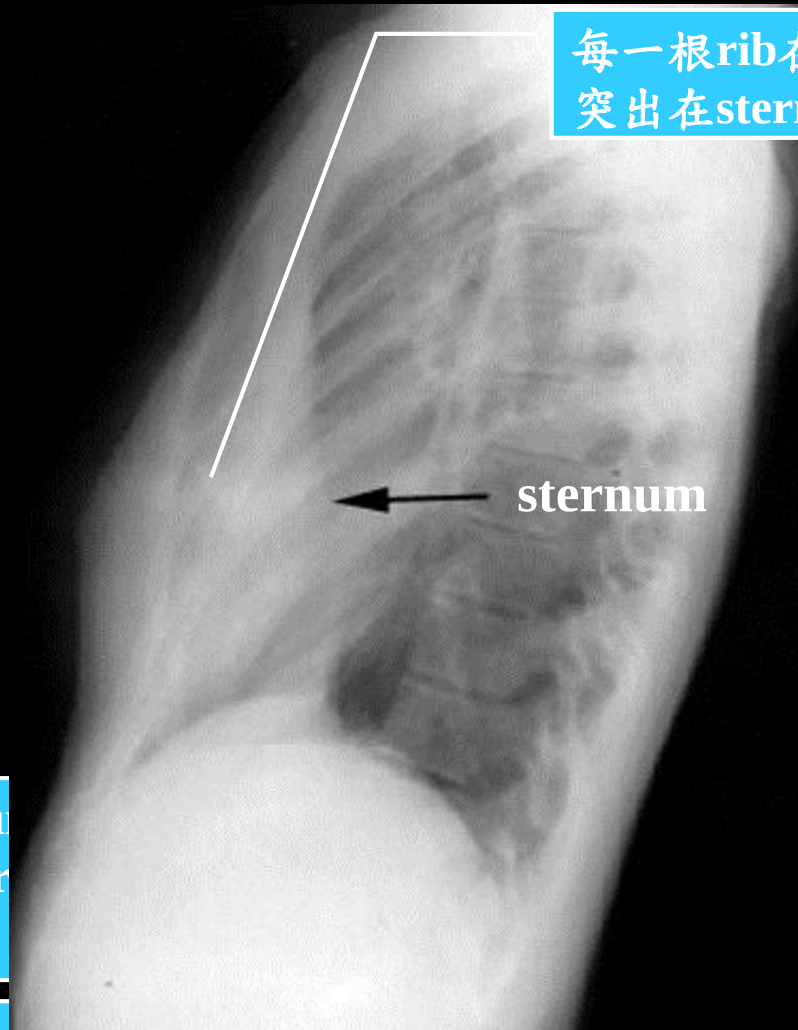
- Metastasis (osteoblastic, osteolytic)

Pectus Excavatum (漏斗胸)



凹陷的sternum
reduction of r
space → Left

在右下肺內側出現soft-tissue density，使得右邊heart border不清楚



每一根rib在lateral view都突出在sternum的前面

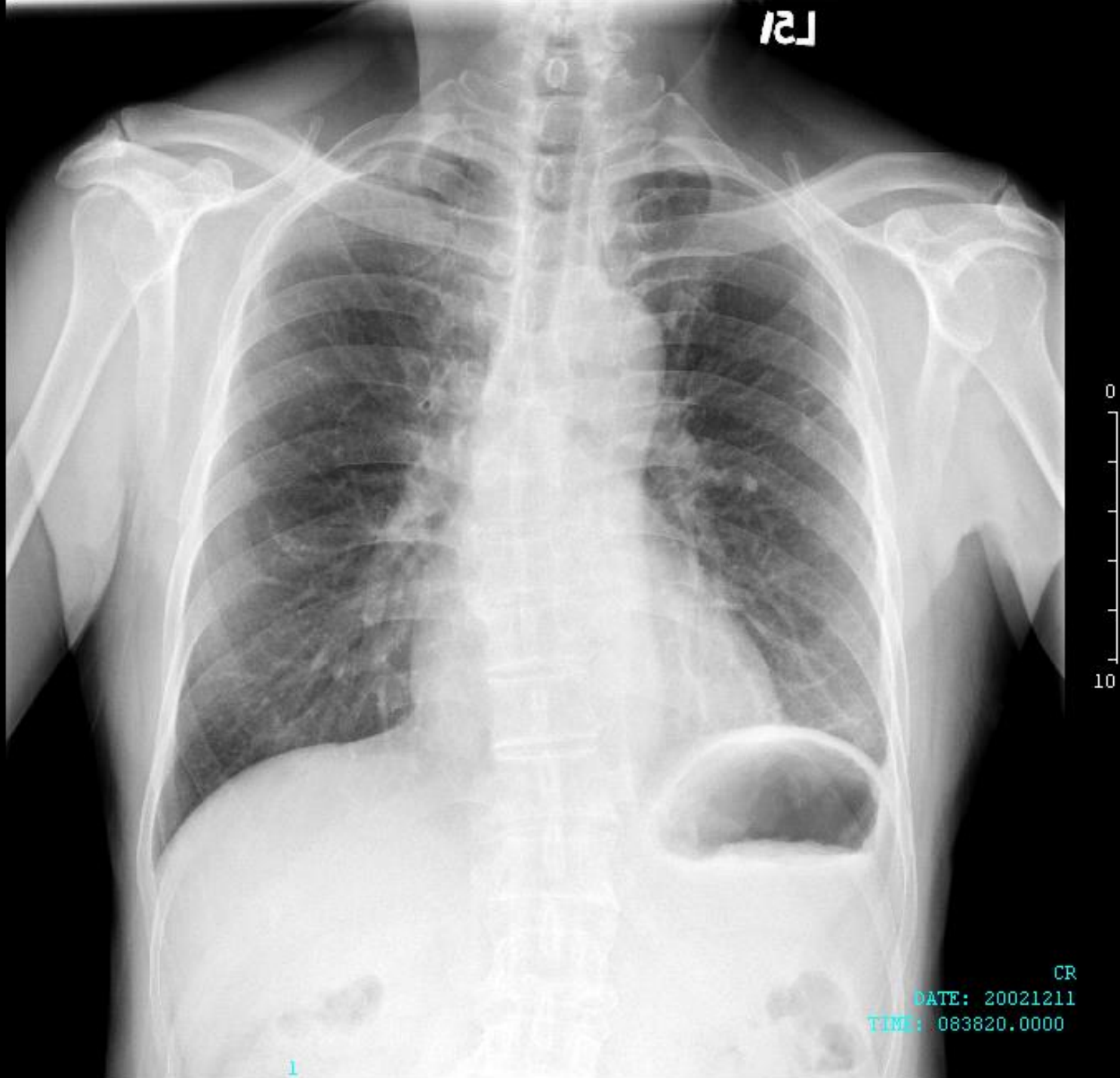
← sternum

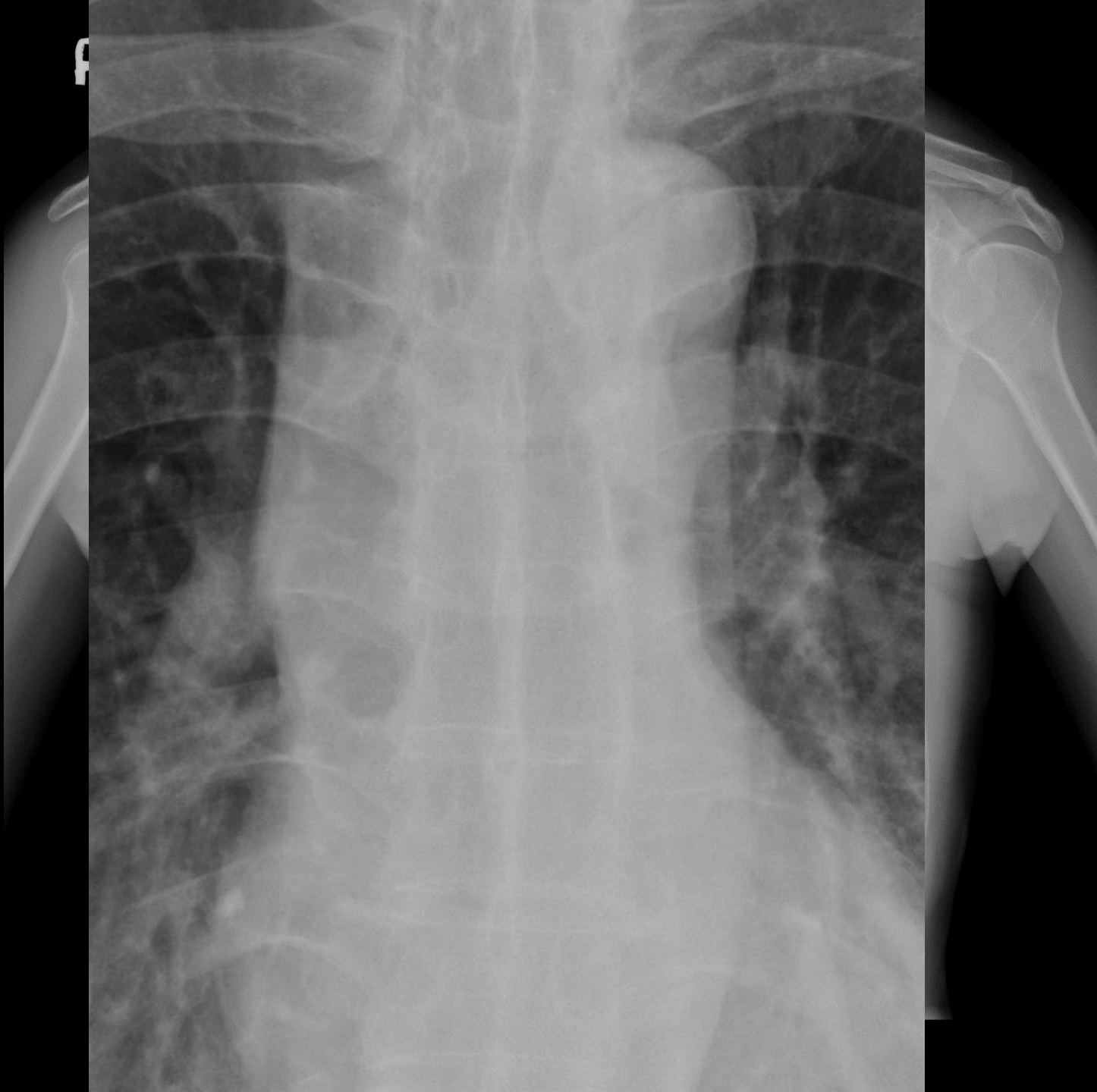
downward
改字"7"), which
parallel to each

sometimes angle

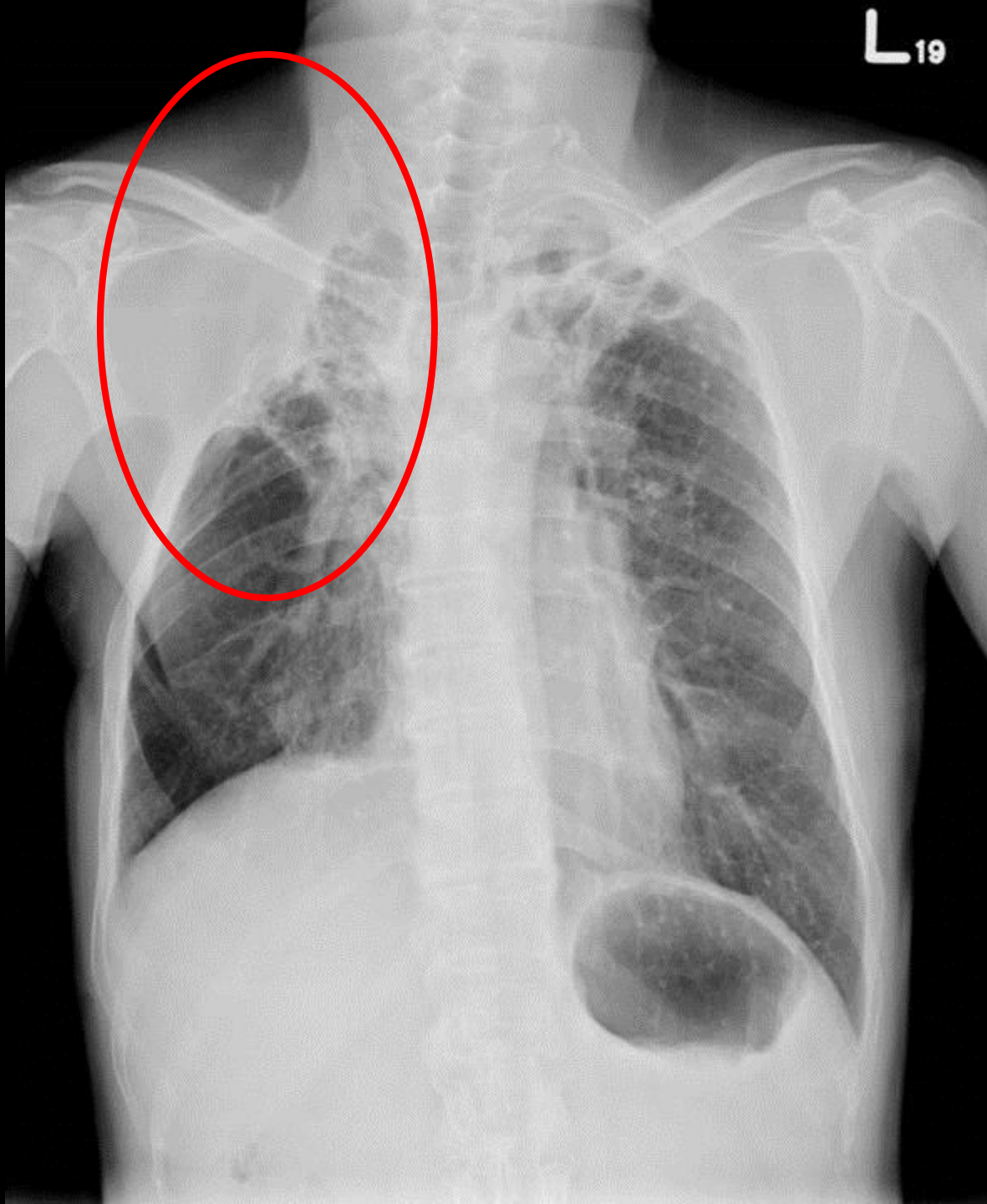
slightly upward.

Scoliosis





**AS with bamboo
spine**



Thoracoplasty

胸廓：Soft Tissue (Frontal View)

- Breast shadow
- Subcutaneous emphysema
- Subcutaneous abscess/cellulitis
- Neck mass/**soft tissue mass**
- Gastric bubble
 - Upper border > 2cm -- Subpulmonic effusion
 - Intra gastric mass -- Gastric ca.
 - Extragastic mass -- Spleen or kidney
 - Absence -- Hiatal hernia, achalasia



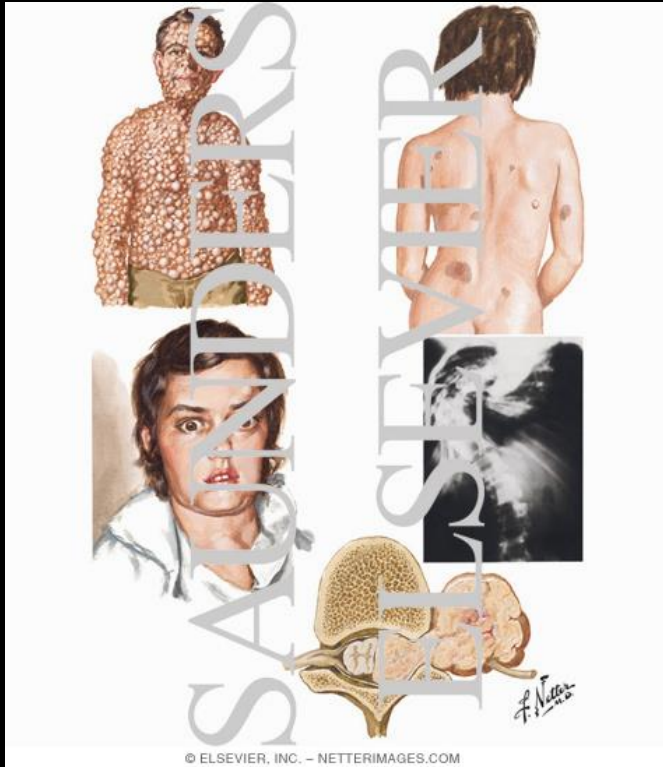
Mammoplasty

軟組織密度變化：Subcutaneous emphysema



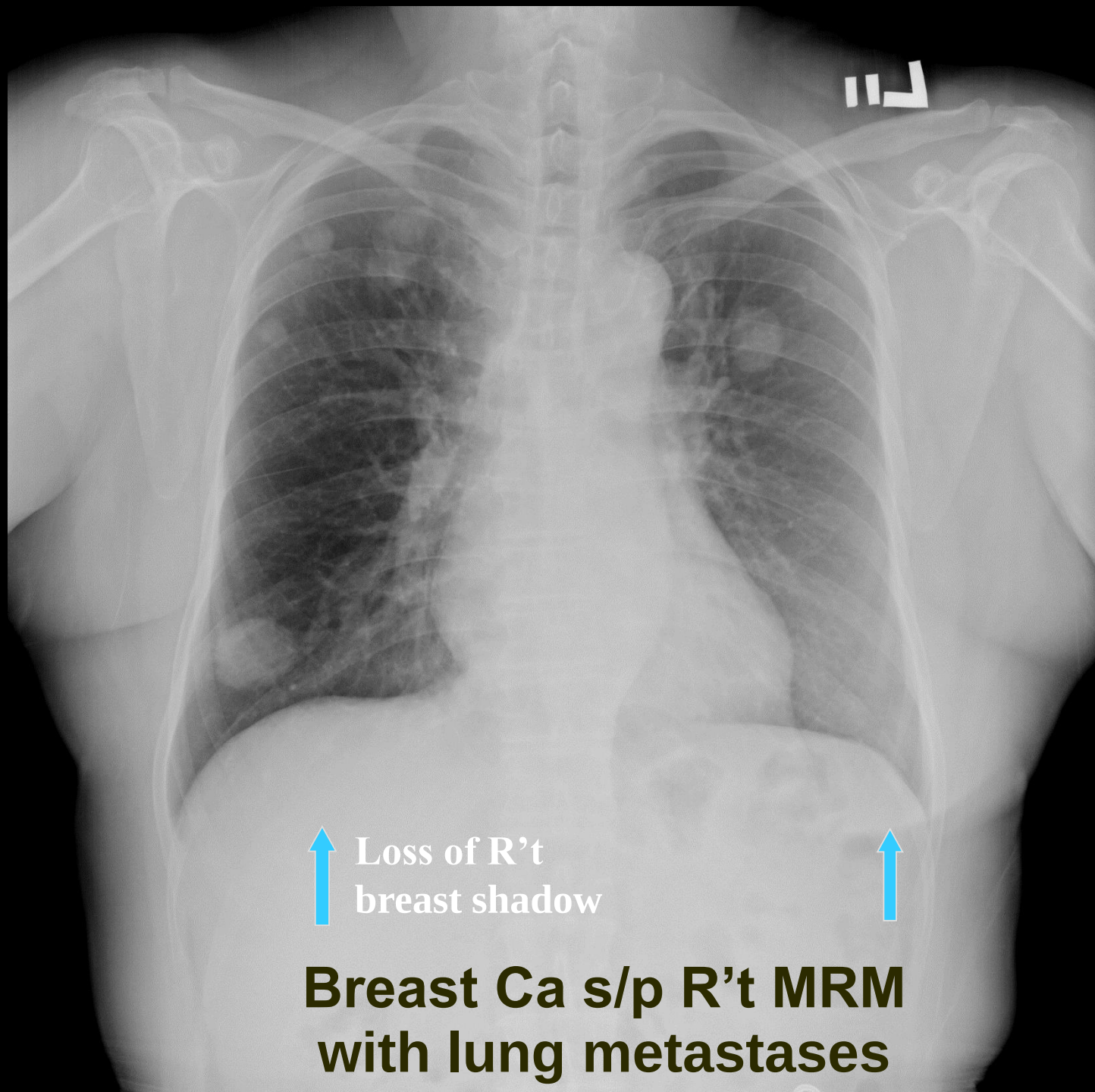
胸廓之軟組織：

**Neurofibromatosis
with lung
involvement**



Abnormal hemithorax density

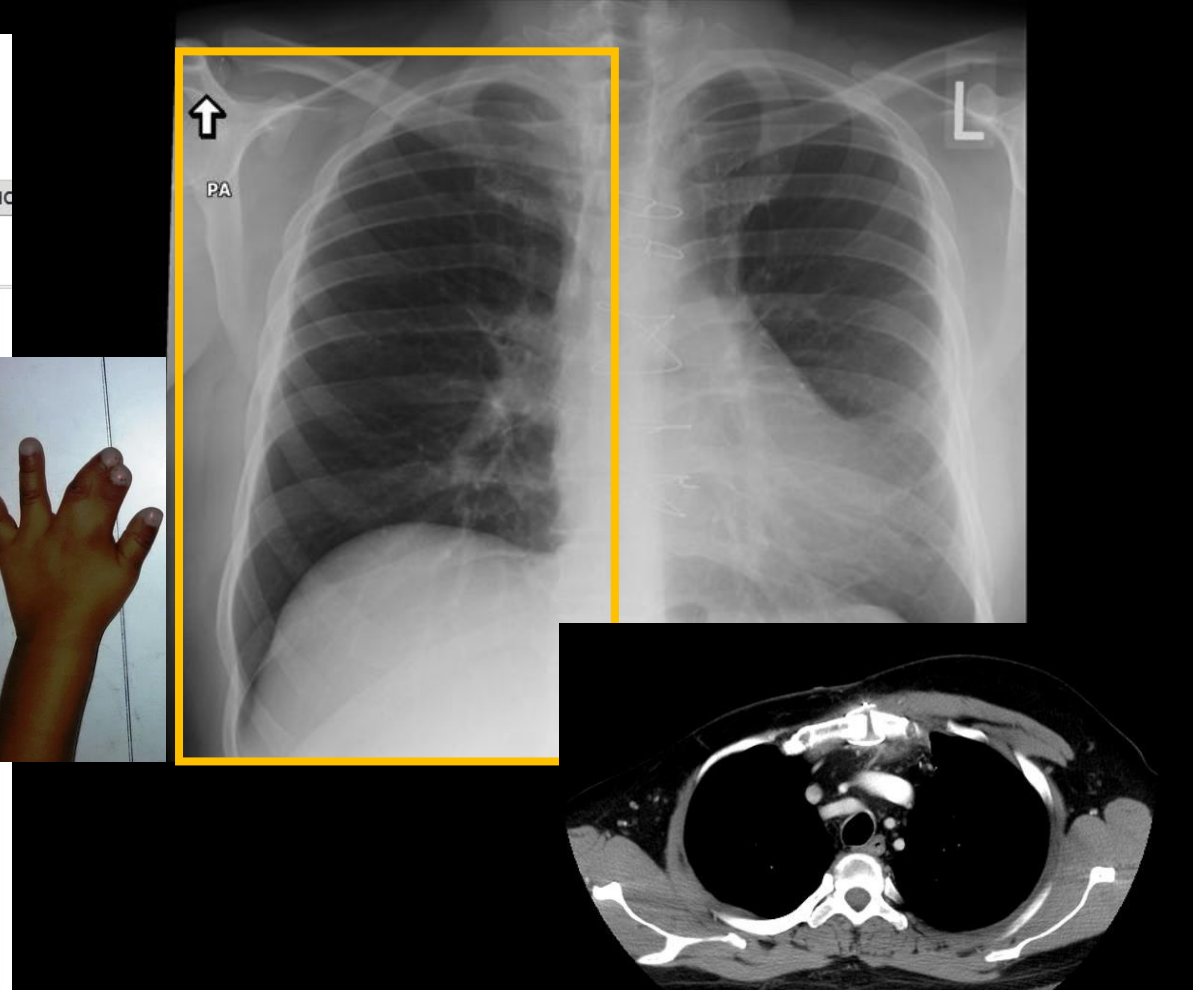
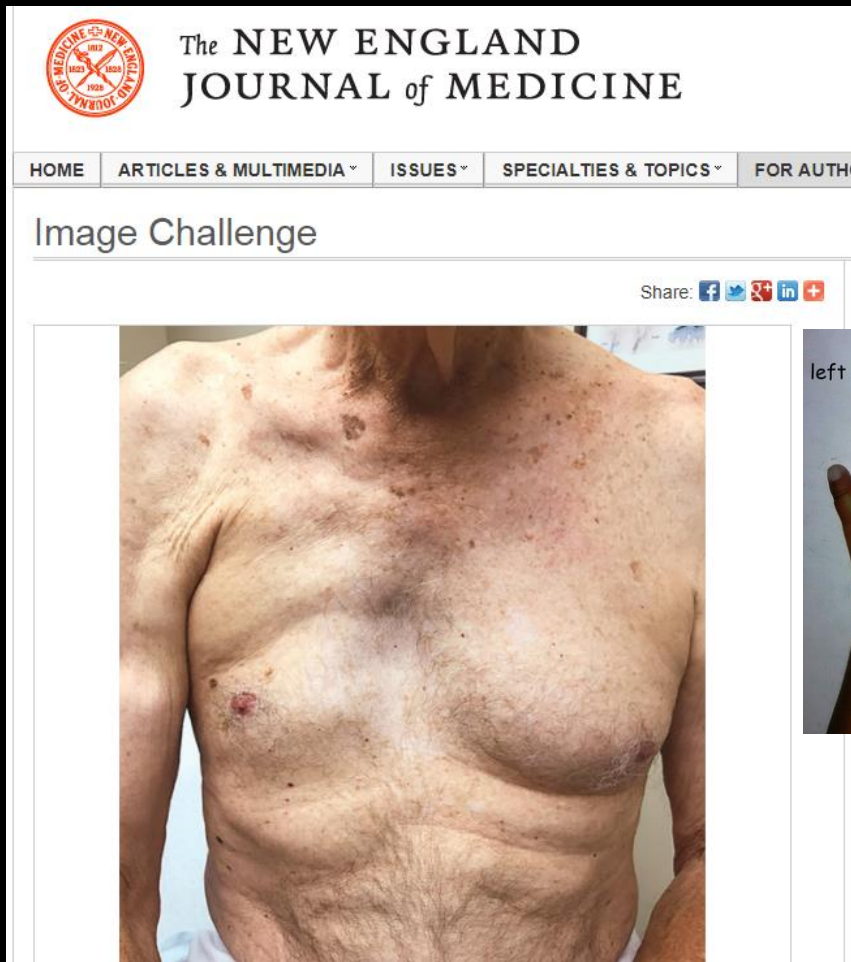
- 太白太黑都要注意
- 兩側相互比較
- 單側hemithorax density異常
 - lesion site是太白處or太黑處
- Increased opacity(太白)
 - Abnormal shadows
- Increased radiolucency(太黑): 由外而內D/D
 - 胸廓外: mastectomy, Poland's syndrome(少了大胸肌)
 - 肋膜: pneumothorax
 - Decreased vessel: pulmonary embolism(a), Pul. a. agenesis(a), Scimitar syndrome(v)
 - Air collection: endobronchial obstruction, Swyer-James syndrome emphysema, localized bullae



↑ Loss of R't
breast shadow

**Breast Ca s/p R't MRM
with lung metastases**

Unilateral hyperlucent hemithorax



Poland syndrome

(**absent pectoralis major muscle** and **brachydactyly** of hand)

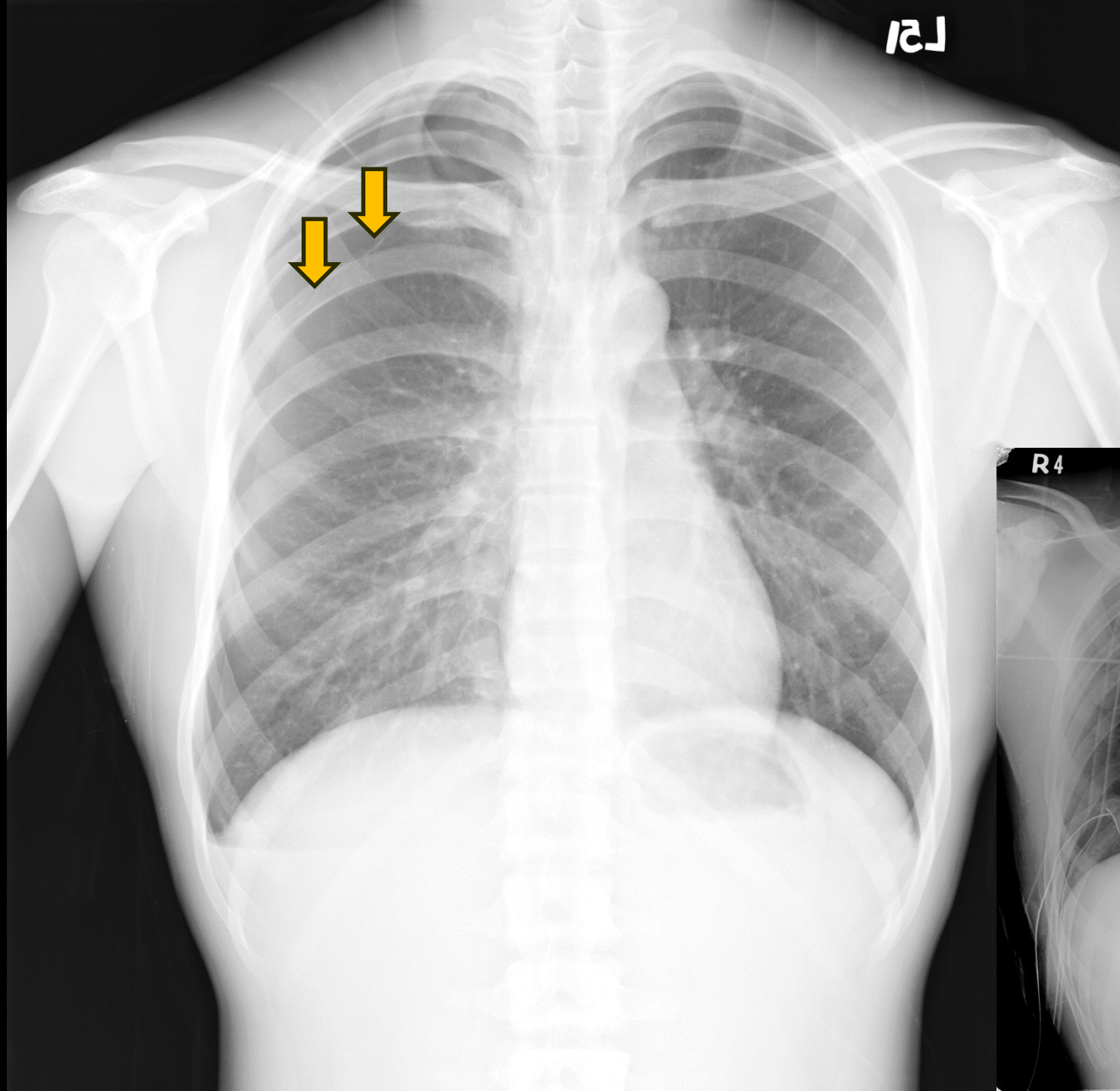
Pleura

- Pleural thickening / pleural fibrosis / fibrothorax / pleural plaque / pleural calcification
- Pneumothorax
- Pleural mass
- Pleural effusion
- Costophrenic (C-P) angle blunting
 - Pleural thickening
 - Pleural effusion

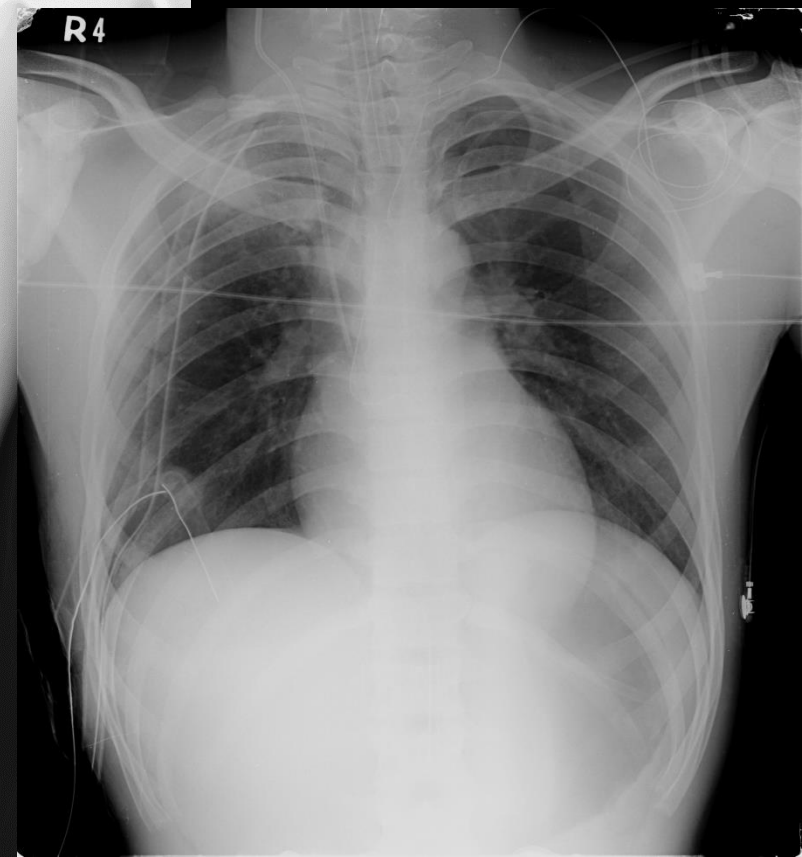


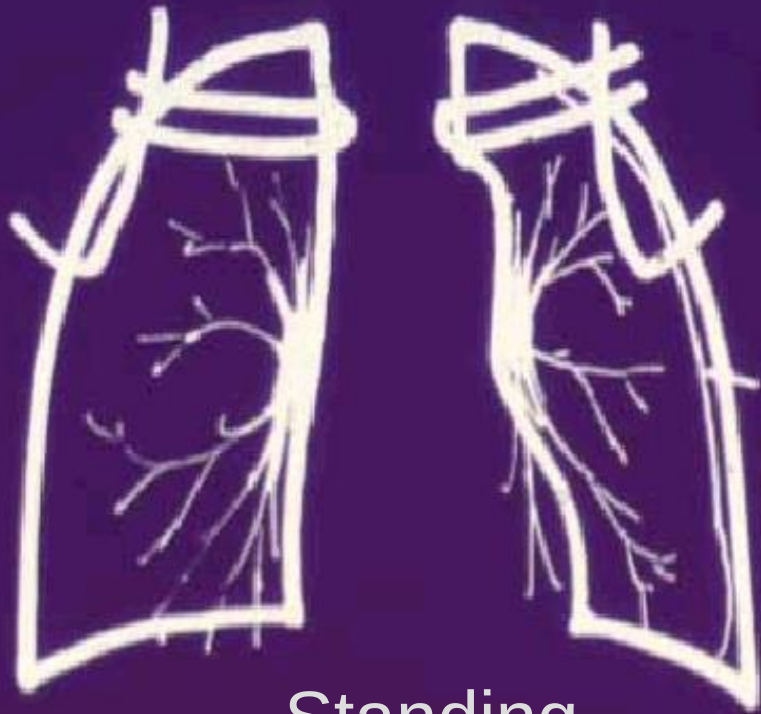
Skin folds

Pneumothorax



R't pneumothorax





Standing



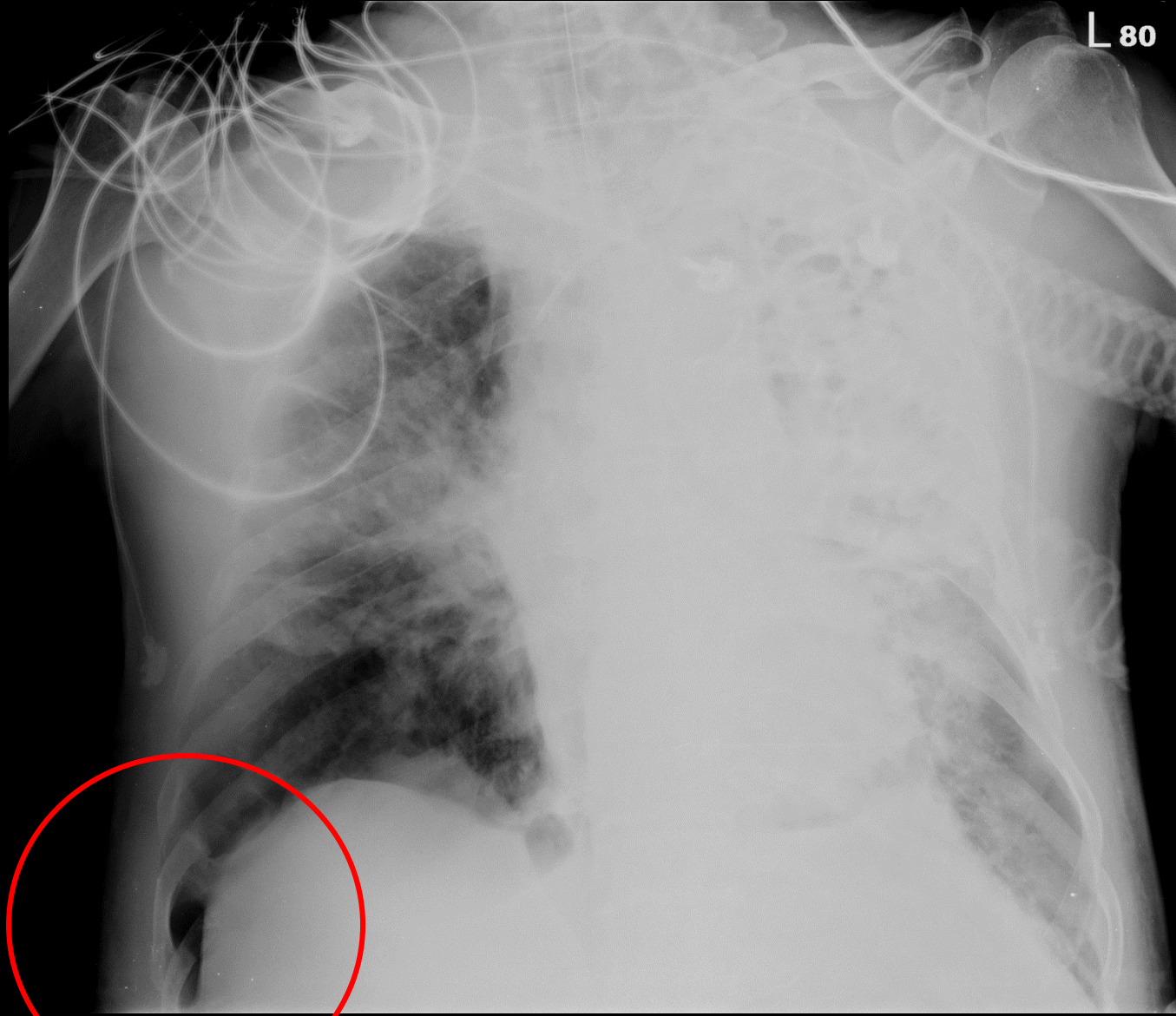
supine

air

Pneumothorax



Pneumothorax- **deep sulcus sign**



橫膈、橫膈下影像

■ 位置：前高後低, 右高左低, 內高外低

■ 右橫膈: 10~11 post. rib; 左橫膈: 略低 0.5-1 vertebral body(約1-2cm)

■ 最高點在內1/3處

■ 左側橫膈高於右側橫膈：異常

■ 肺部因素：L't lung volume reduction

■ 橫膈因素：diaphragmatic hernia, subpulmonic effusion

■ 腹腔內因素：lesion把L't diaphragm往上頂

■ 胃氣：

■ 距左橫膈 < 1cm; > 2cm要懷疑subpulmonic effusion

■ 胃內有沒有東西 (gastric Ca)

■ Gastric air不見：hiatal hernia, achalasia, 躺著照

■ Liver：

■ Liver abscess: air-fluid level within liver density

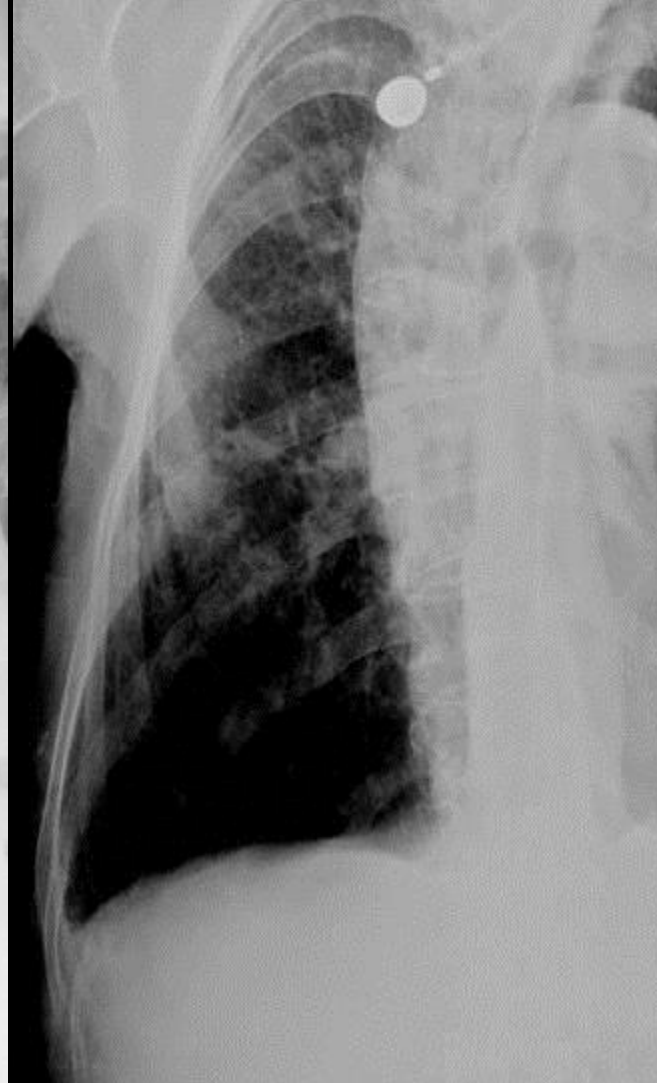
■ 利用腸氣(colon gas)可判斷肝脾大小

■ Subphrenic gas：PPU, subphrenic abscess, interposed colon



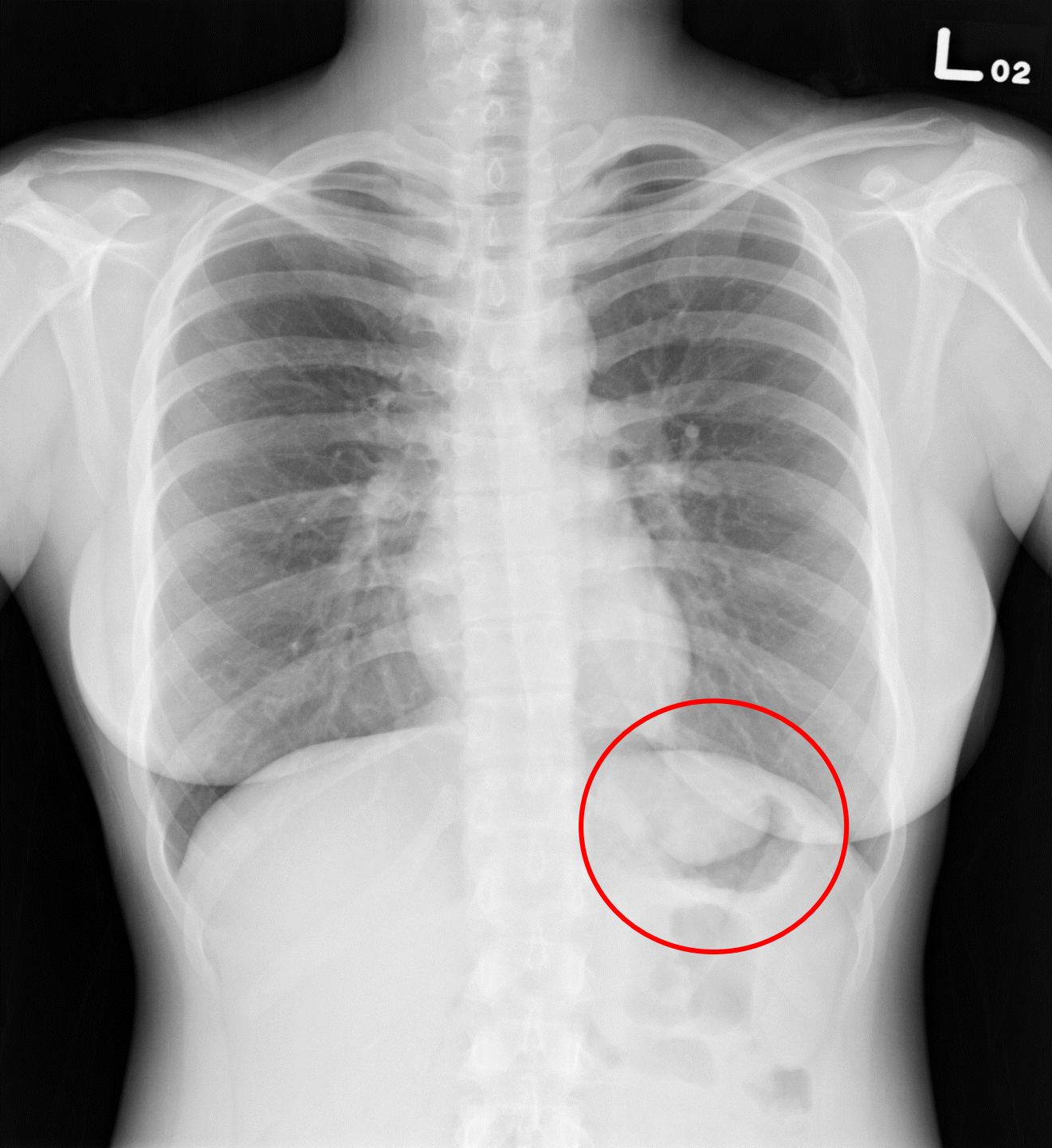
駝峰狀

Normal



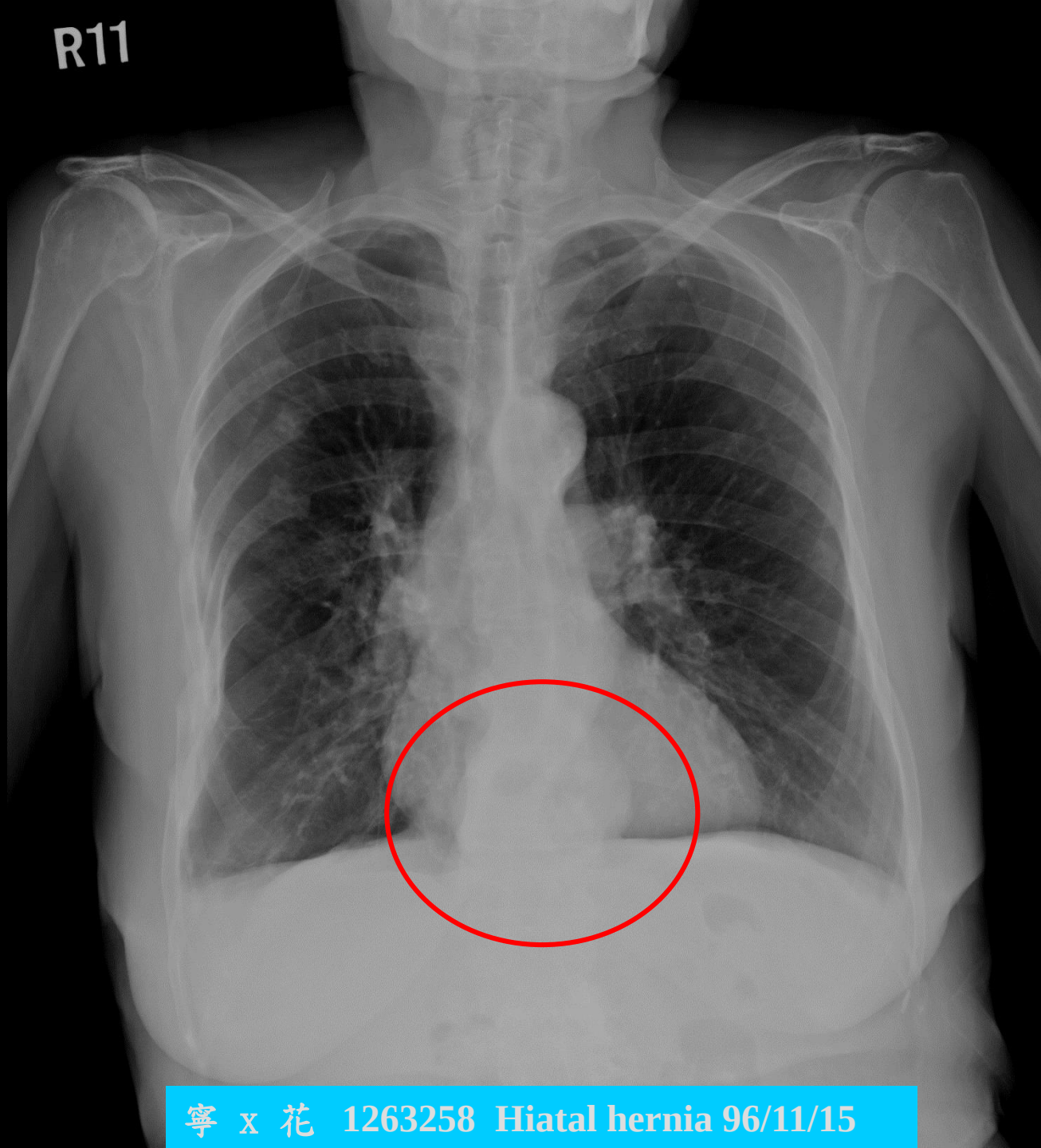
扁平狀

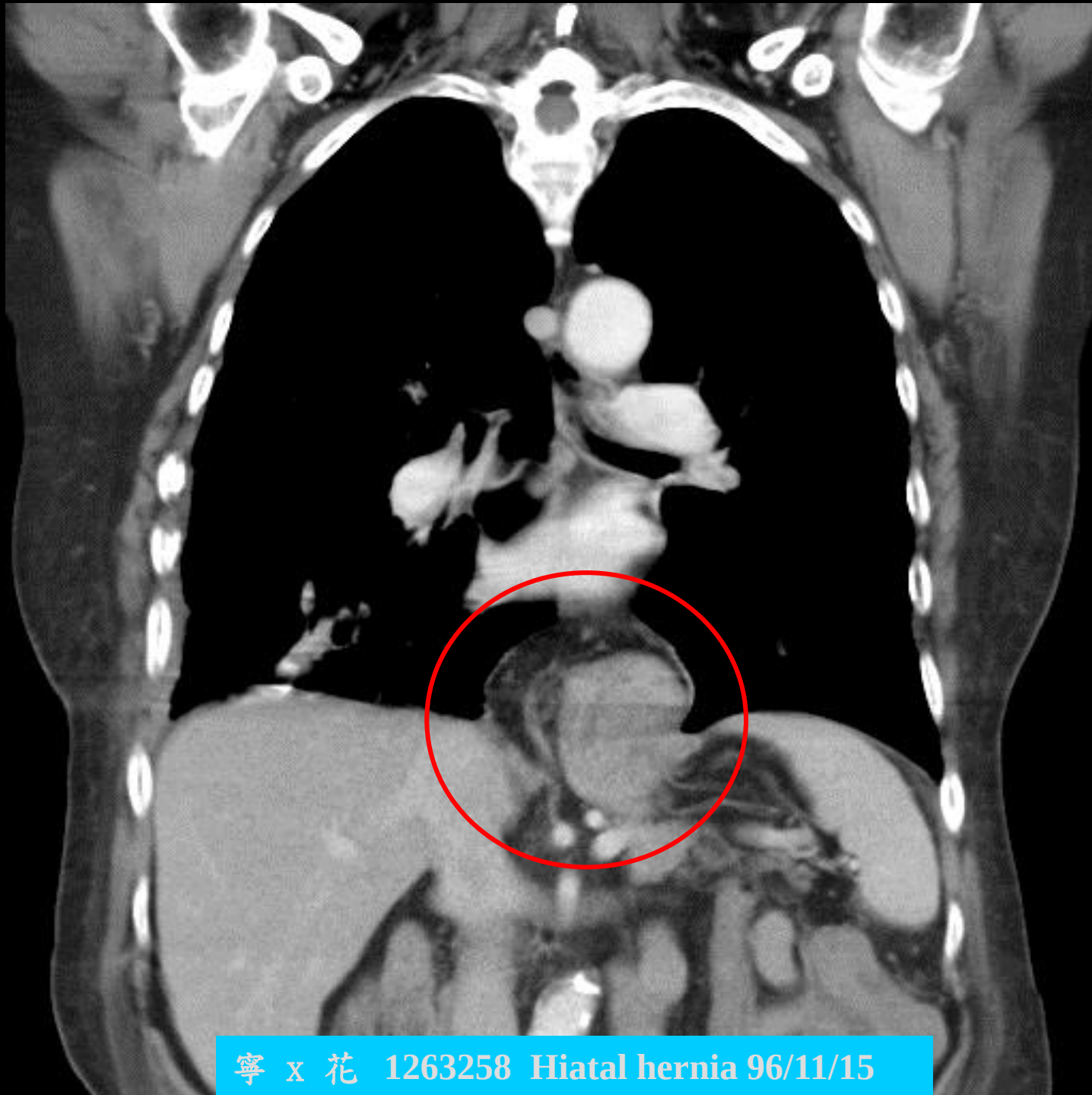
COPD



Gastric CA.

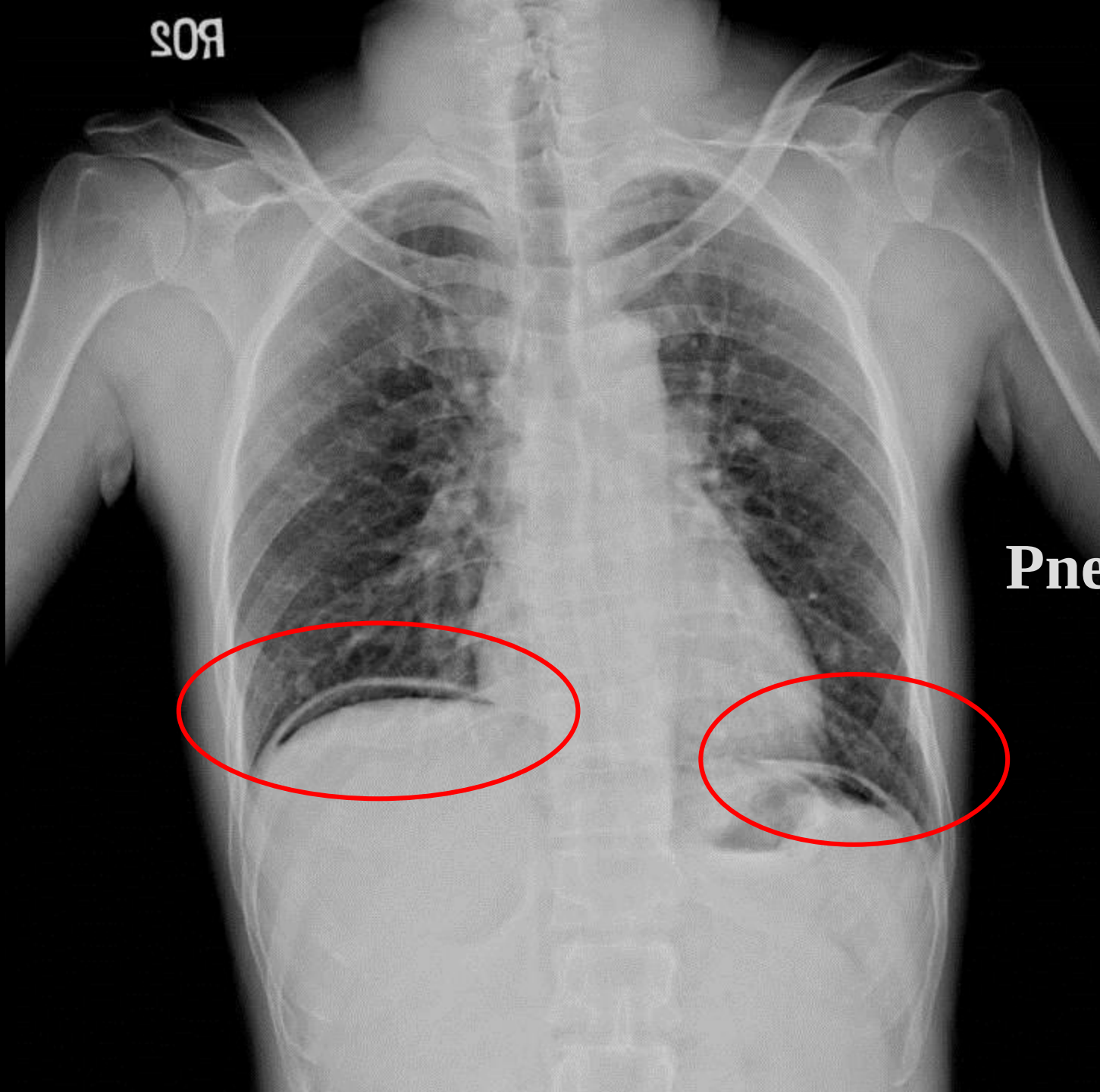
R11





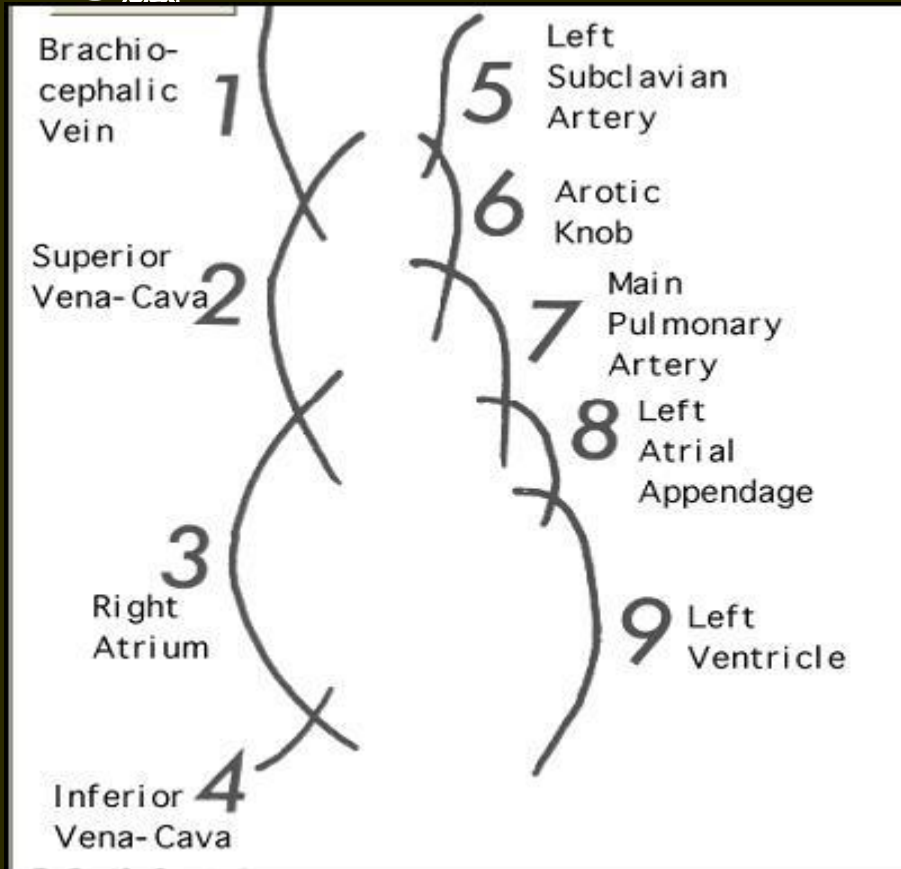
R09

Pneumoperitoneum



Mediastinum 縱隔

■ 心臟



■ 食道

■ 肺門



Mediastinum 縱膈

懷疑縱膈病灶-務必看側位照
上、前、中、後縱膈

心臟

大血管

Aorta

Pulmonary arteries

大氣道

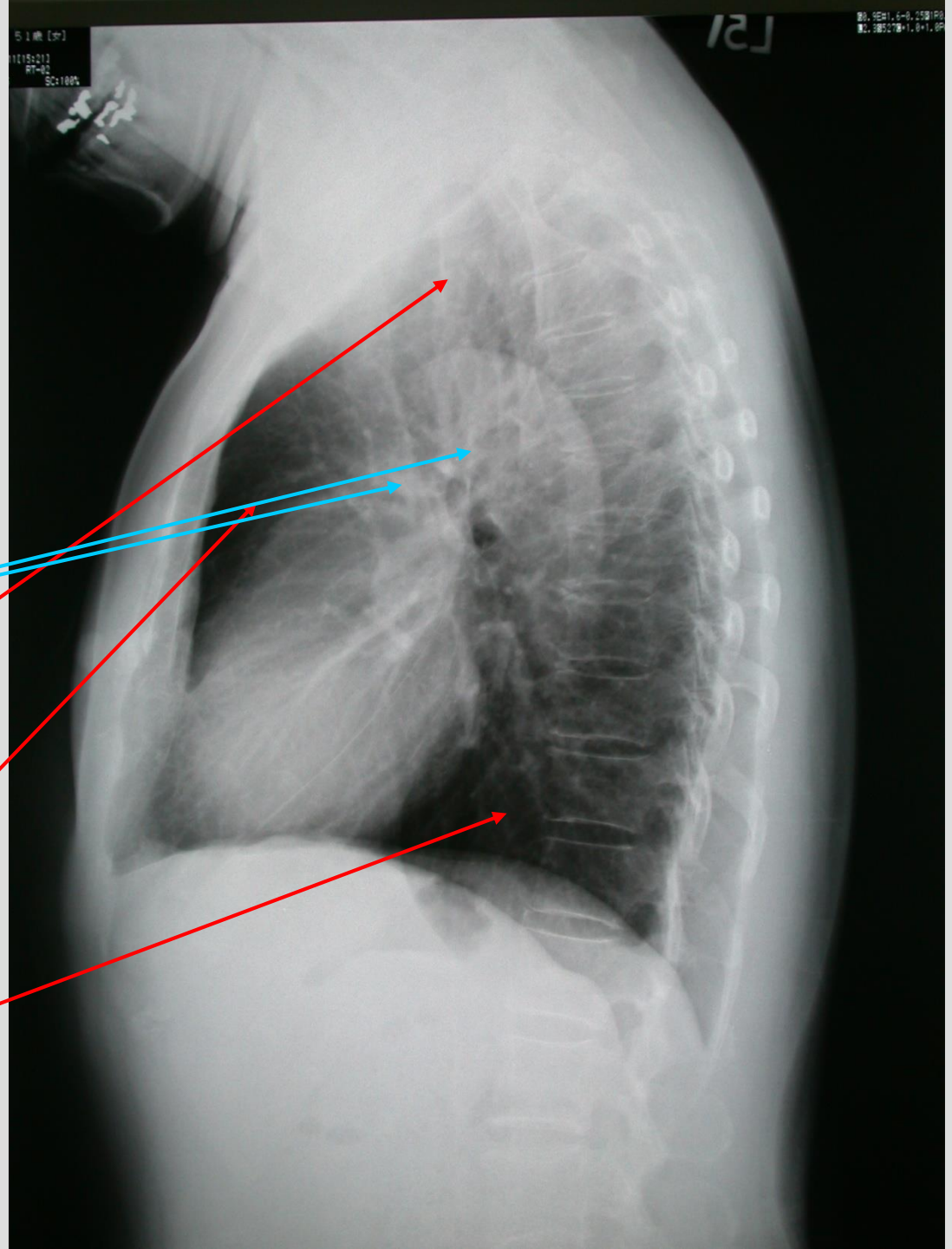
Posterior tracheal stripe

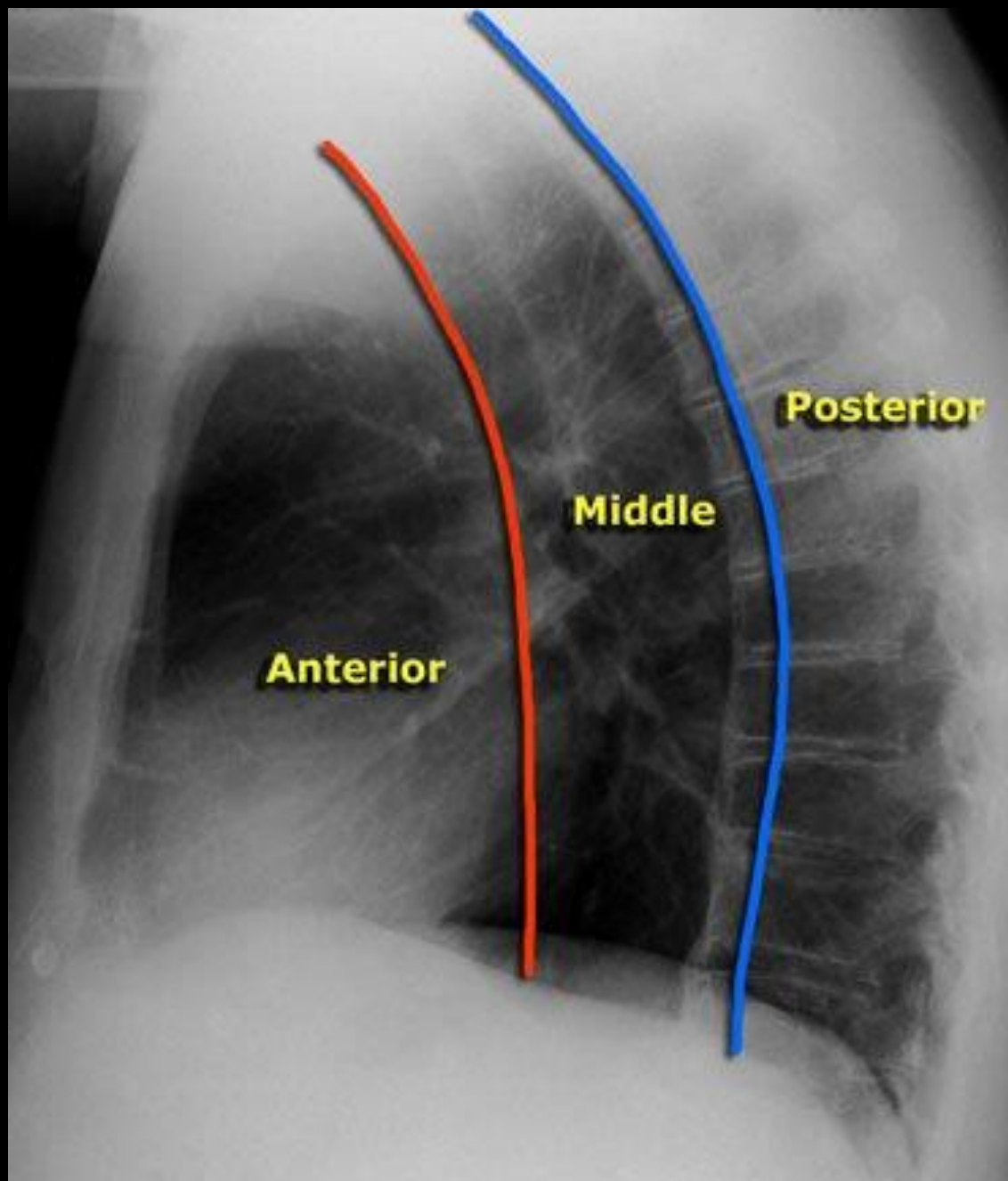
食道

肺門

Retrosternal triangle

Retrocardiac triangle





縱隔

前中後縱隔

Anatomy Landmarks

Anterior
Middle
Posterior

} mediastinum

- 氣管前緣-心臟後緣
- 椎體前緣向後1 cm

Mediastinum

- **Shift**

- **Widening**

 - Aortic aneurysm

 - Lipomatosis

 - Mediastinitis (air-fluid level)

- **Soft tissue density**

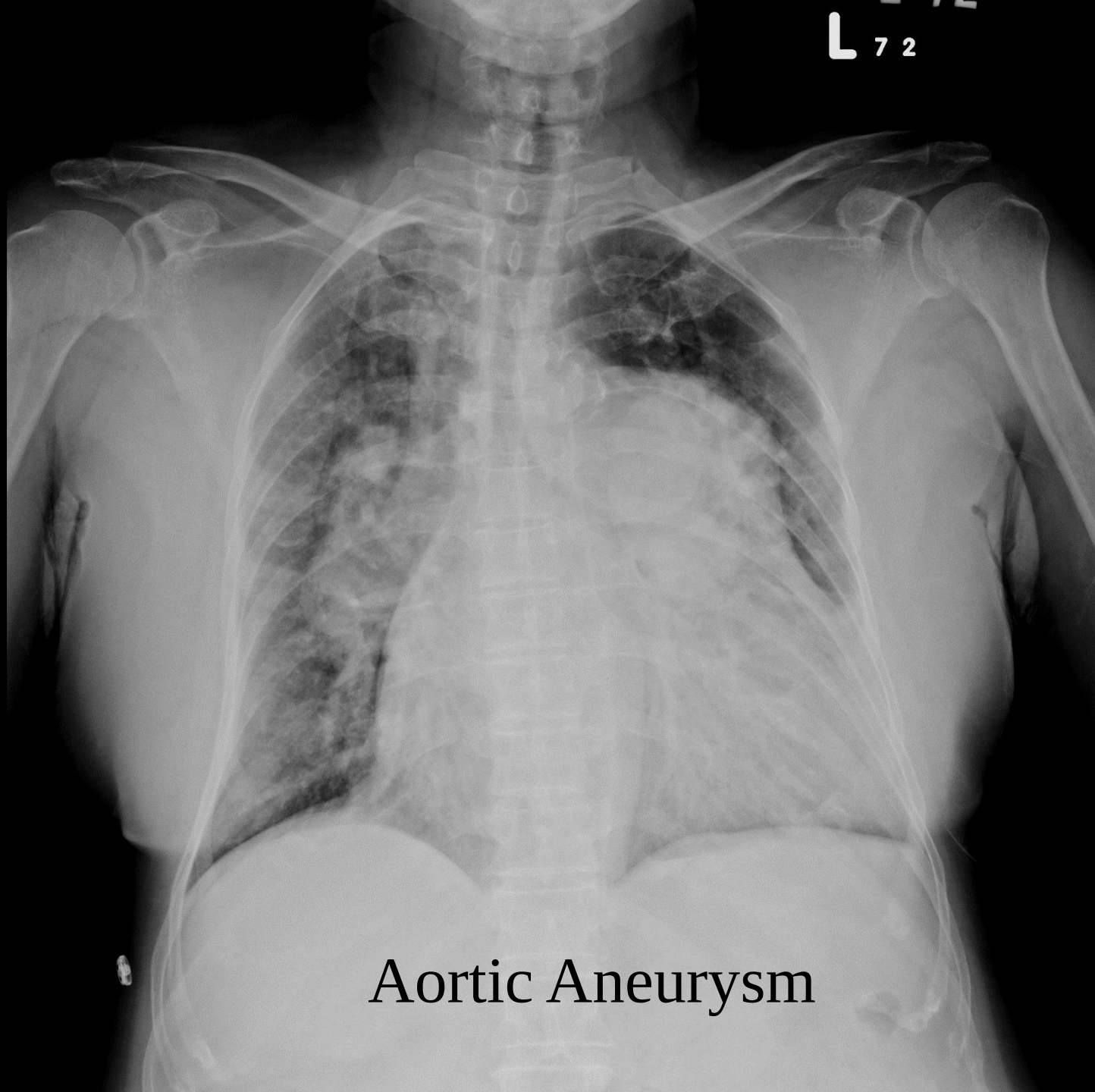
 - Mass, neoplasm

- **Air or air-fluid level**

 - Pneumomediastinum

 - 食道病變 : esophagus reconstruction, esophageal cancer, achalasia

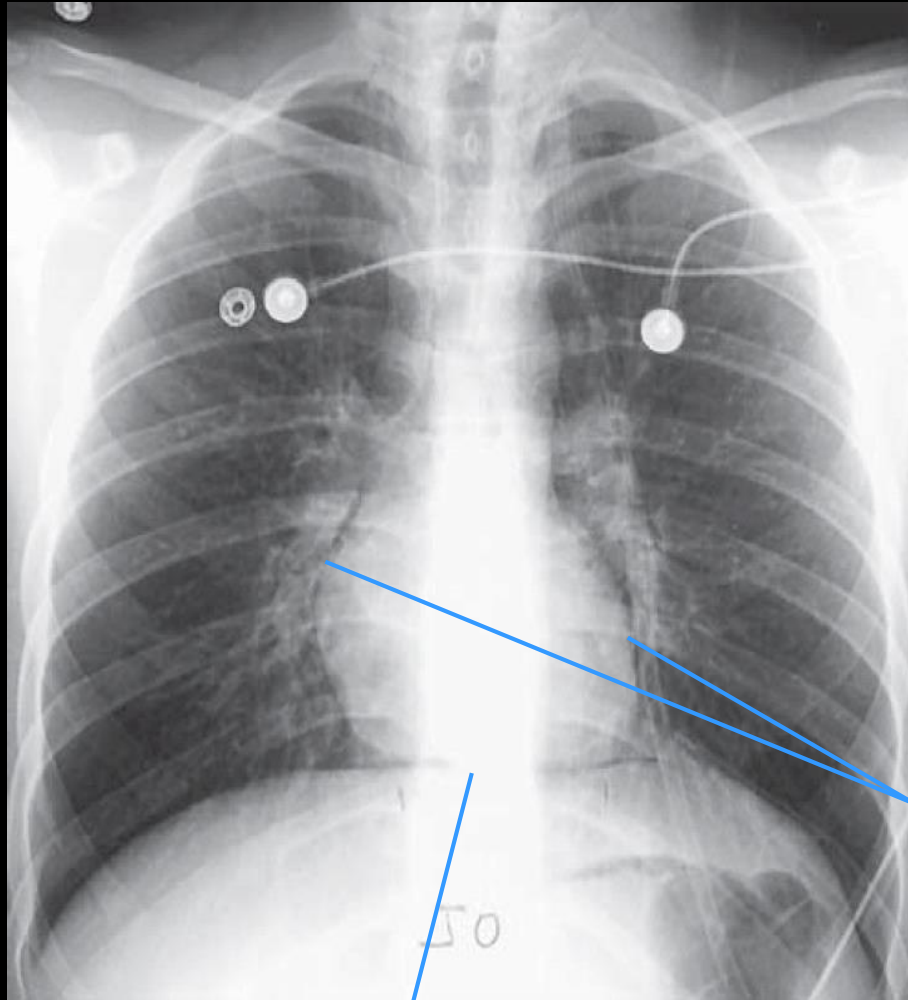
 - Hernia



Aortic Aneurysm

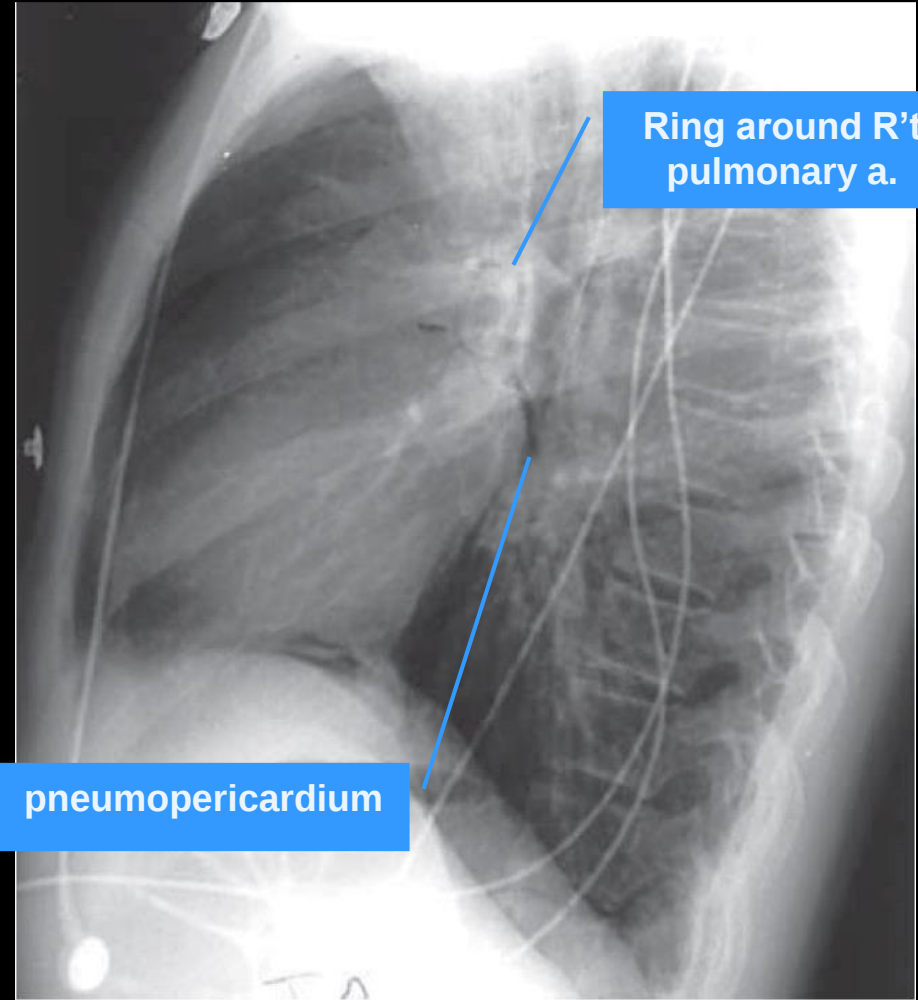
Continuous diaphragm sign

Ring around the artery sign



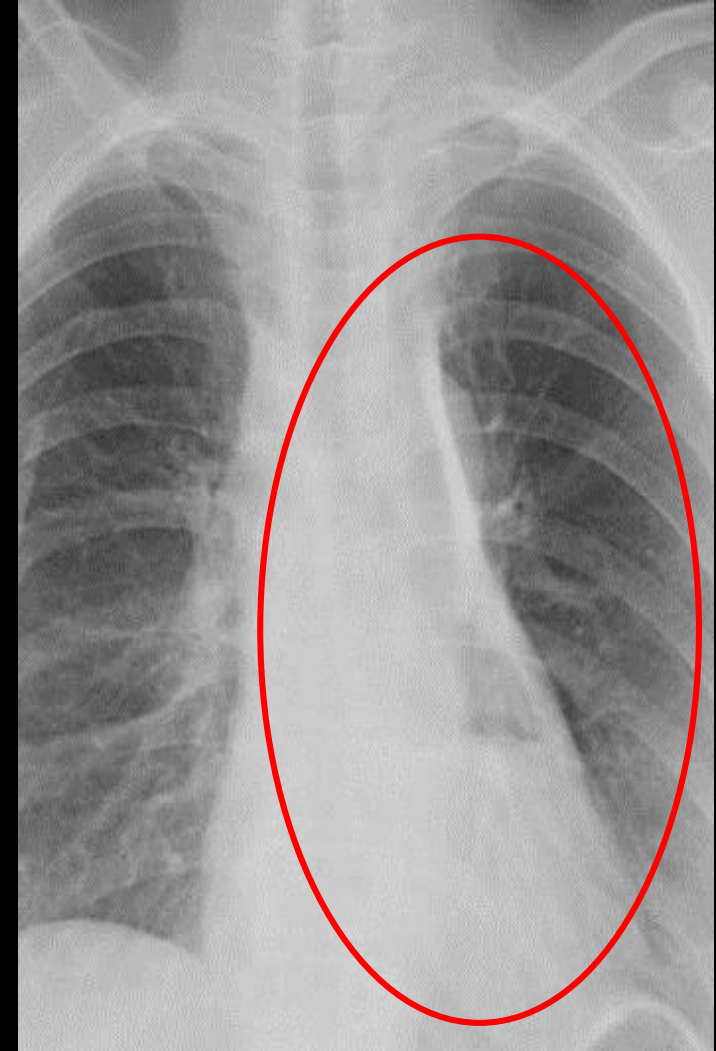
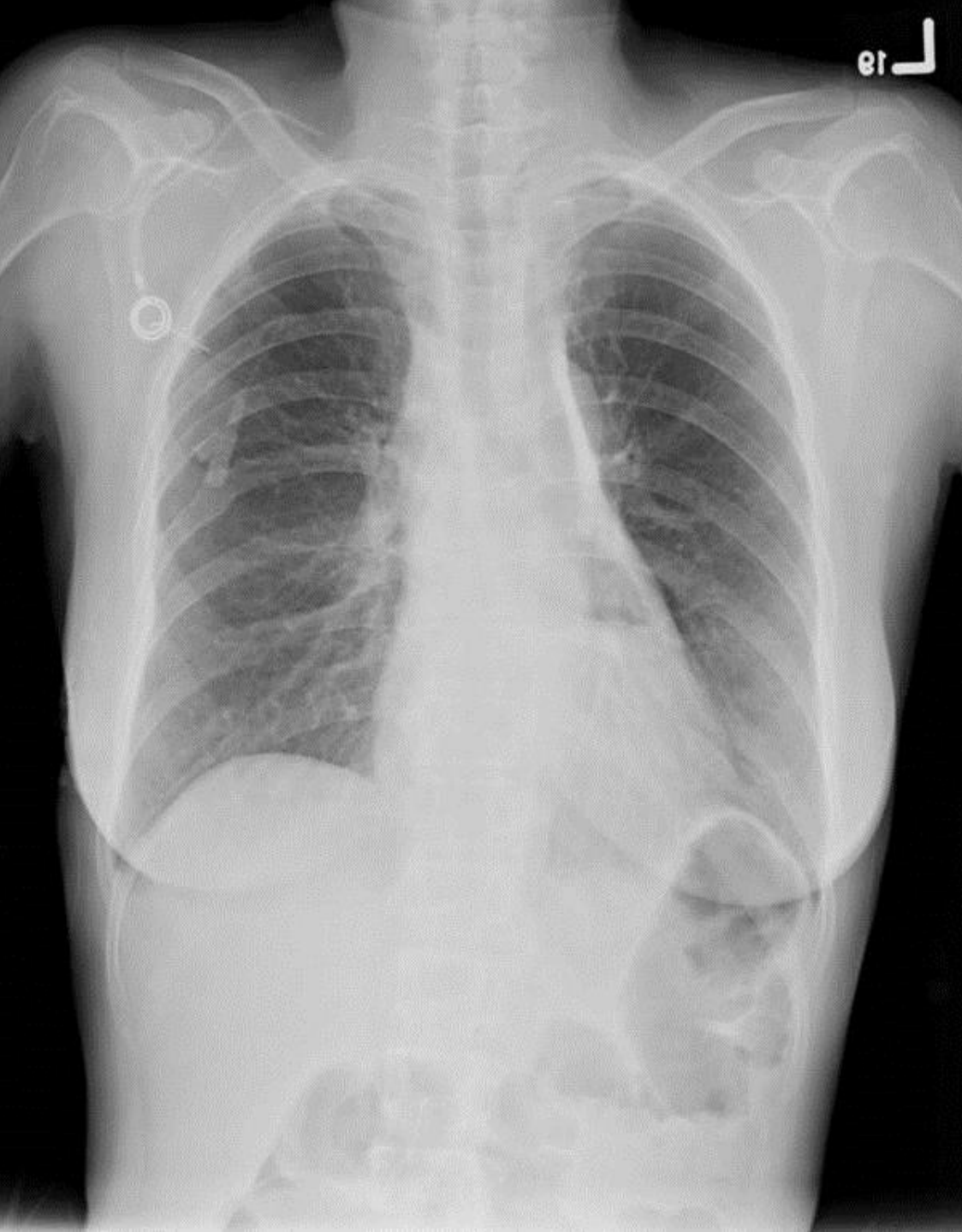
Continuous
diaphragm sign

→ air trapped posterior to the pericardium



Ring around R't
pulmonary a.

pneumopericardium



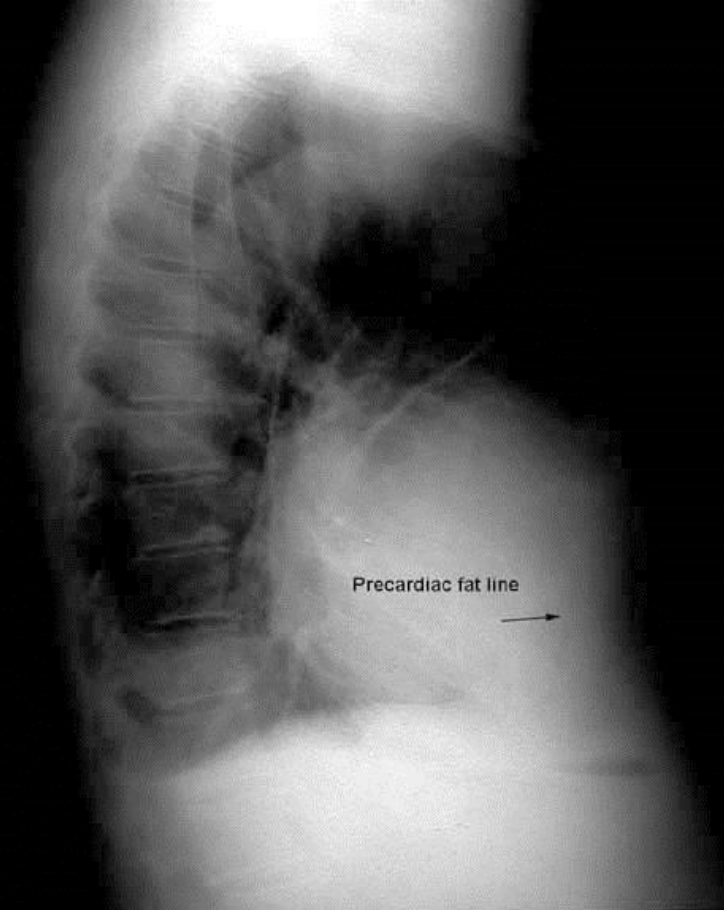
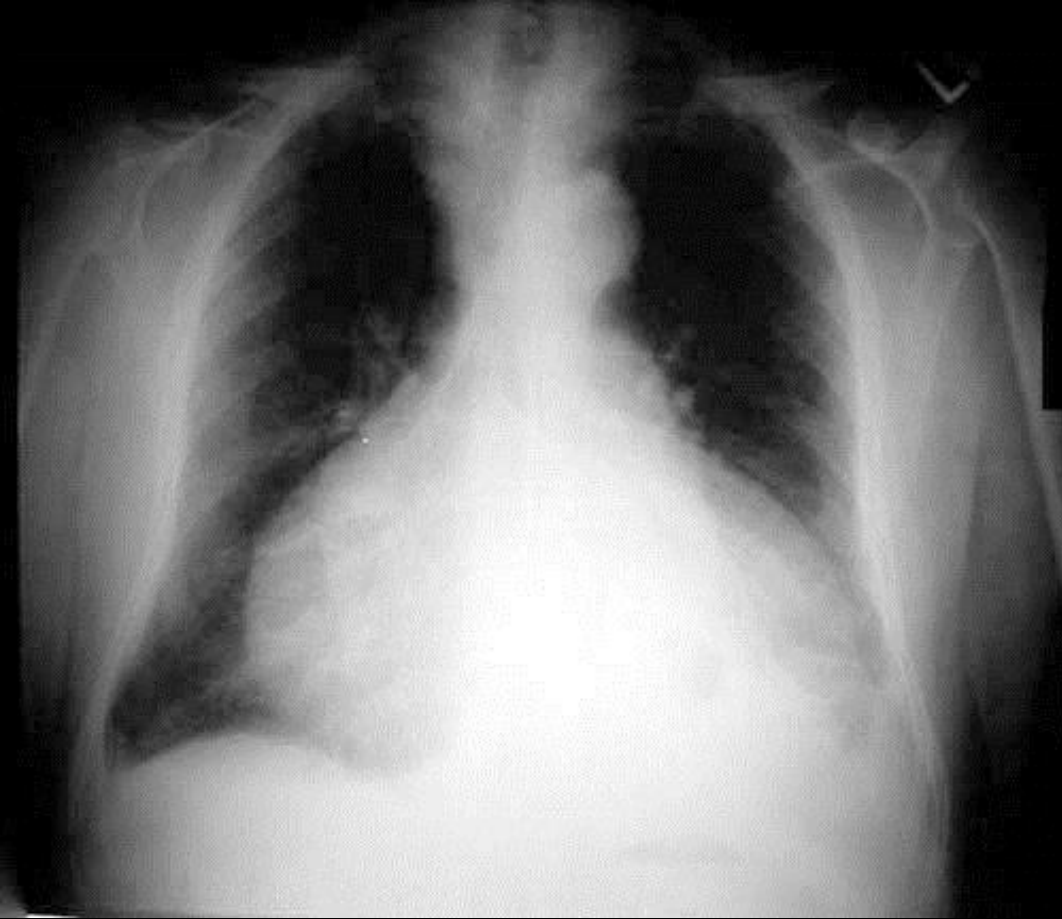
**Esophageal
Reconstruction**



Achalasia cardia

Heart

- Size change: Cardiothoracic (C-T) ratio
- Signs:
 - Water bag: Pericardial effusion
 - Boot-shaped: Tetralogy of Fallot (TOF)
 - Straight Lt heart border(Flat-waist sign) : LLL atelectasis
 - Double density of right heart border (Double contour sign): LAE
- Pericardiac mass: 心臟、橫膈、肺、其他縱膈腫塊
 - L: LV aneurysm
 - R: Morgagni hernia
 - R / L: Epicardial fat pad, pericardial cyst, diaphragmatic hernia, lung mass
- Pericardial calcification: constrictive pericarditis
- Retrocardiac density: 死角

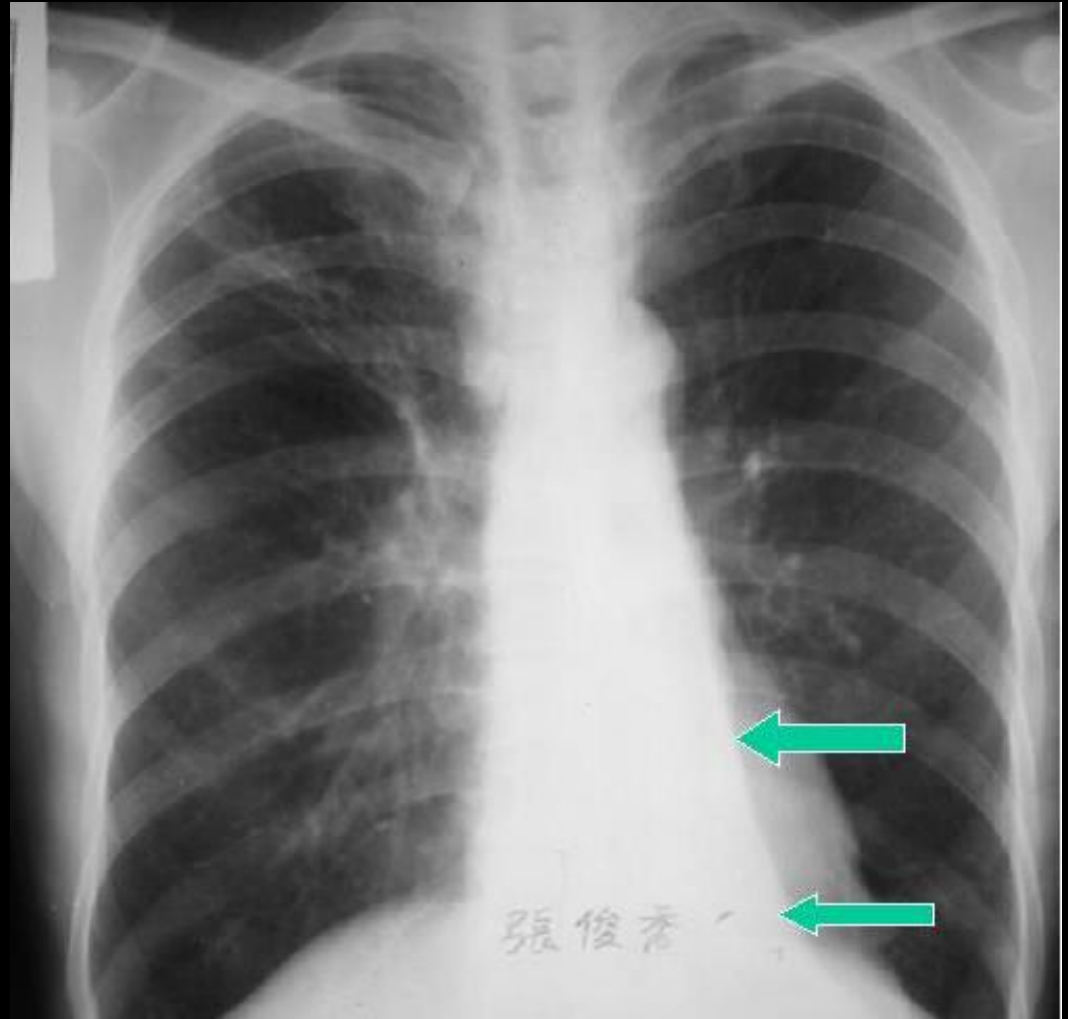


Pericardial Effusion

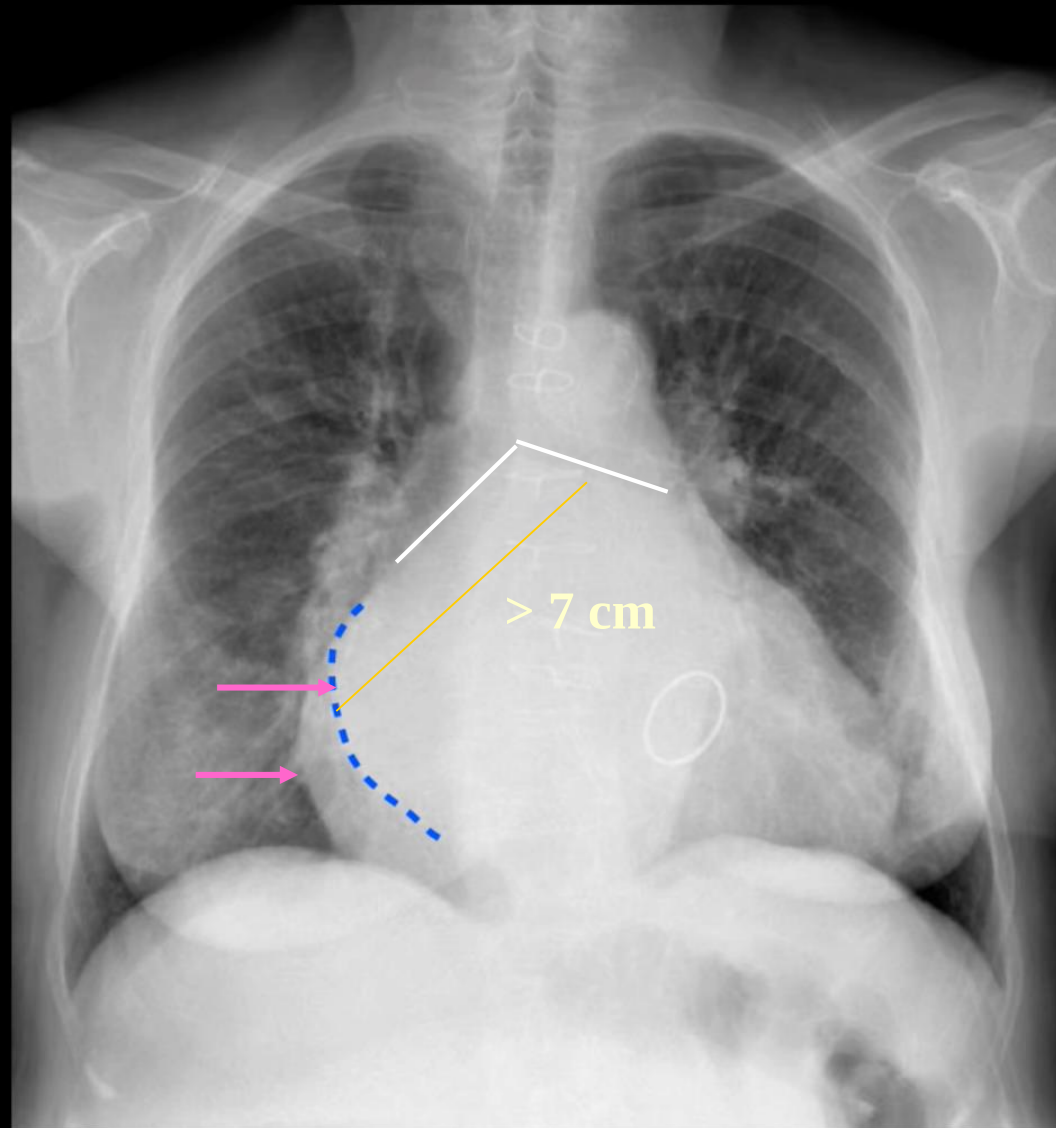
- Enlarged "cardiac" density
- Water bottle appearance
- Pulmonary olegemia
- Precardic fat line in lateral view below

Flat waist sign (LLL collapse)

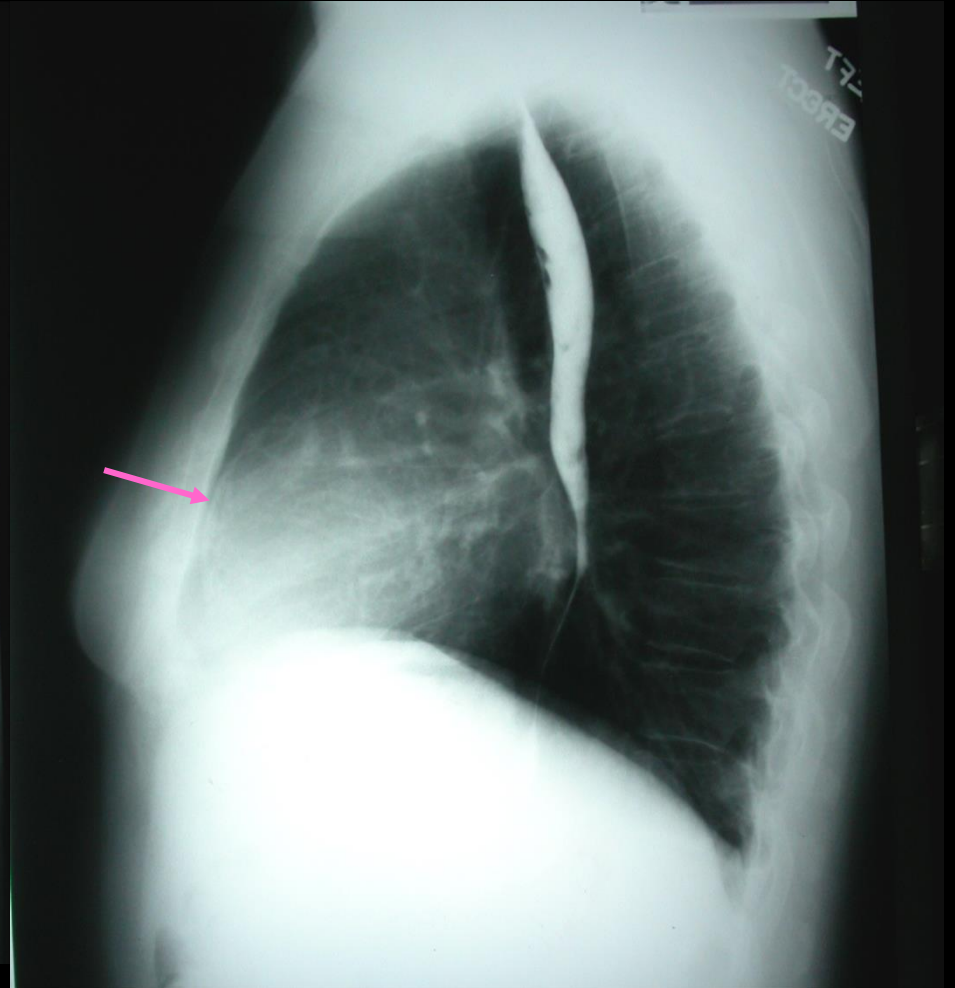
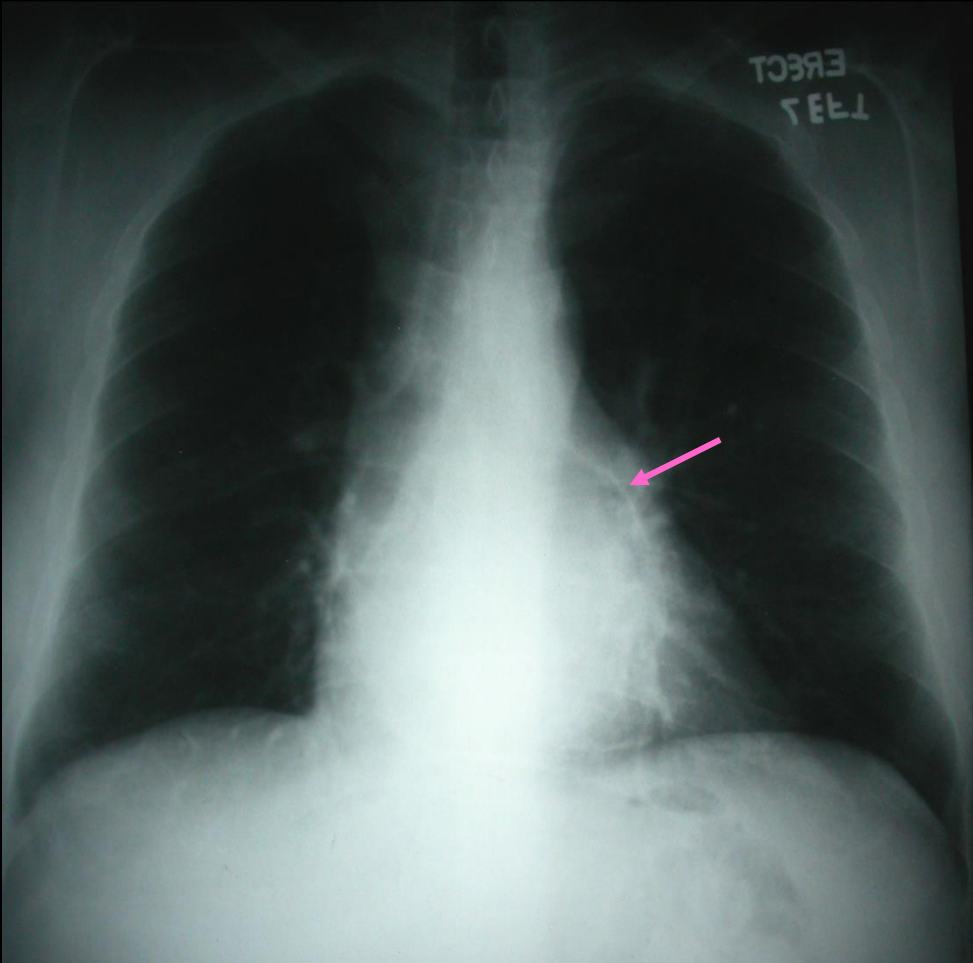
- 平腰徵
- 正常左邊的心臟邊緣成凹陷狀，而當 **severe LLL collapse** 時，除了 mediastinal shift 之外，心臟還會作輕微的 **right anterior oblique rotation**，以致於左側心臟的 normal concavity 消失，因而呈平坦狀。



LAE



Pericardial calcification: 50% of p't in constrictive pericarditis



Airway

■ Diameter change: (Normal < 2-2.5cm)

- Stenosis

- Dilate: tracheomalacia

■ Deviation:

- Pathological change

- Aortic notch compression

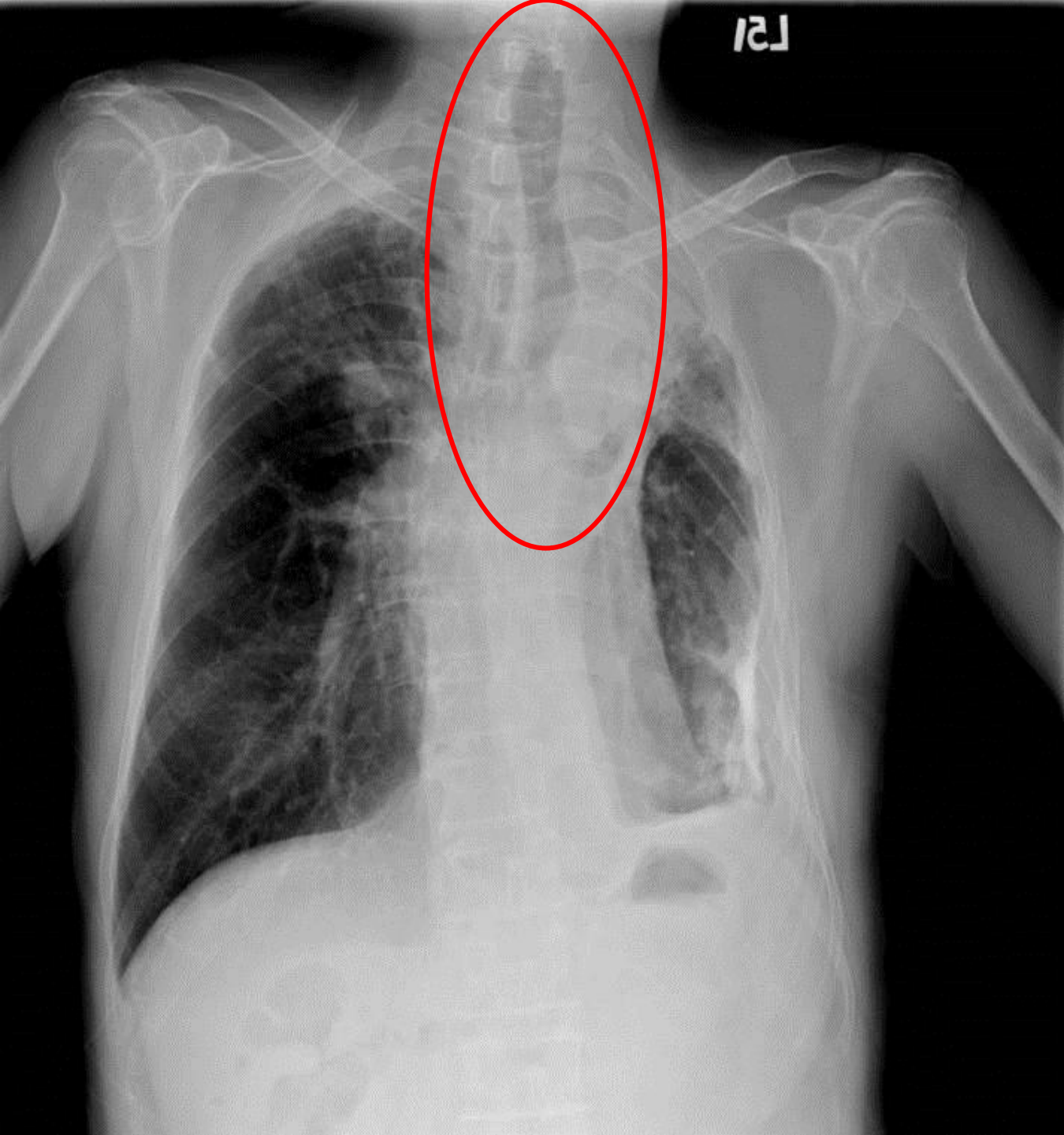
■ Tumor:

- Tracheal tumor; hamartoma; carcinoid tumor; cylindroma

■ Carina angle: (正常約75°; Rt : 30 °, Lt: 45 °)

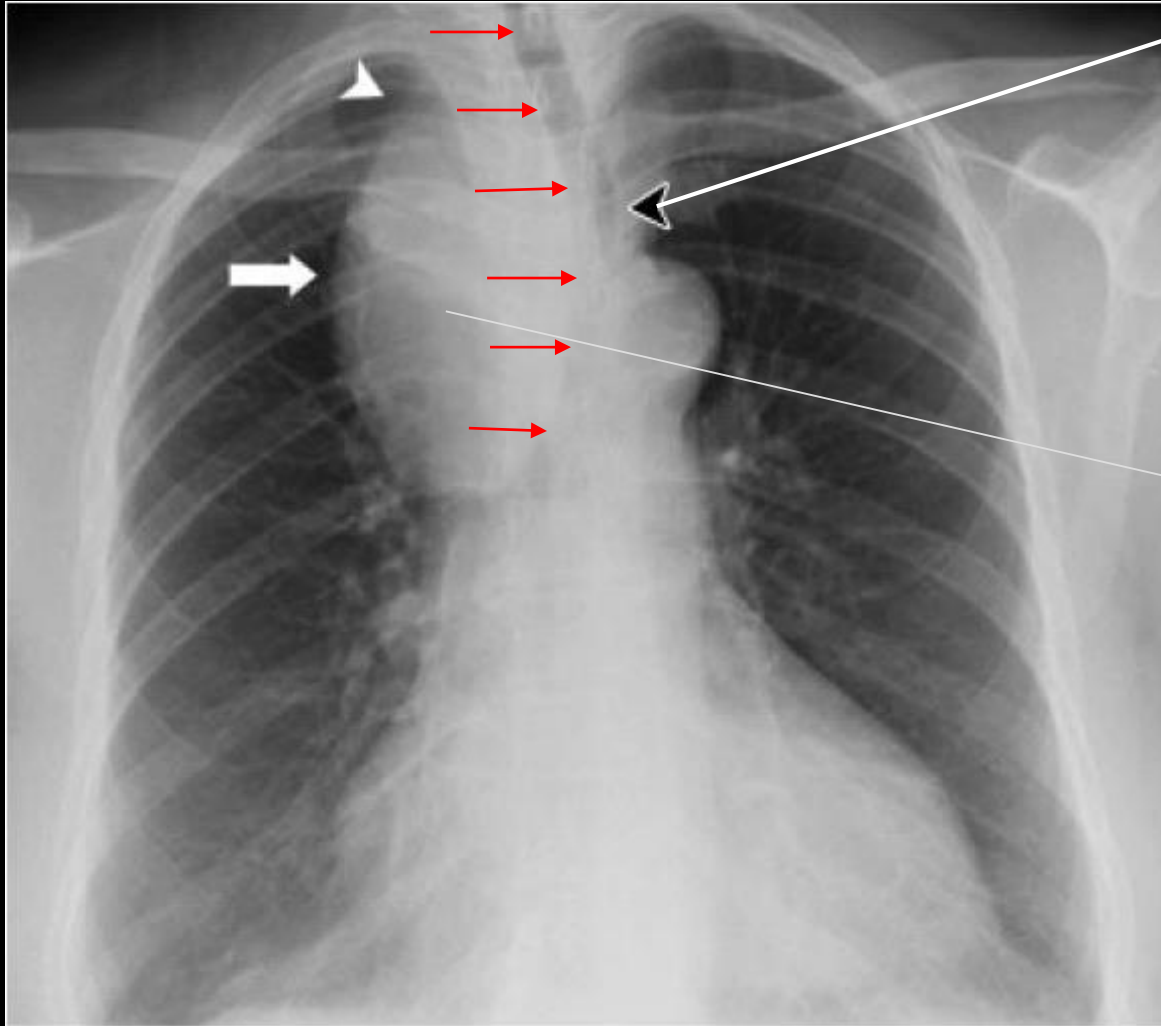
- < 60°: lower lobe volume reduction

- > 90°: upper lobe volume reduction, LAE, pericardial effusion, subcarinal LAP



LUL volume reduction

– Left deviation of trachea



Deviation of the trachea to the left

**Intrathoracic
Goiter**

Hilum

■ 觀察重點：

- 大小、位置、形狀、濃度(density)

■ 位置：

- 正常：左高於右(97% , 0.75-3cm , 左右等高(3%))

- 異常：右高於左

- 右側肺門：R't superior pulmonary vein 和 inferior limb of R't pulmonary artery 的 交點

- 左側肺門：upper margin of L't pulmonary artery trunk and LMB 的 中點

■ Hilum enlargement

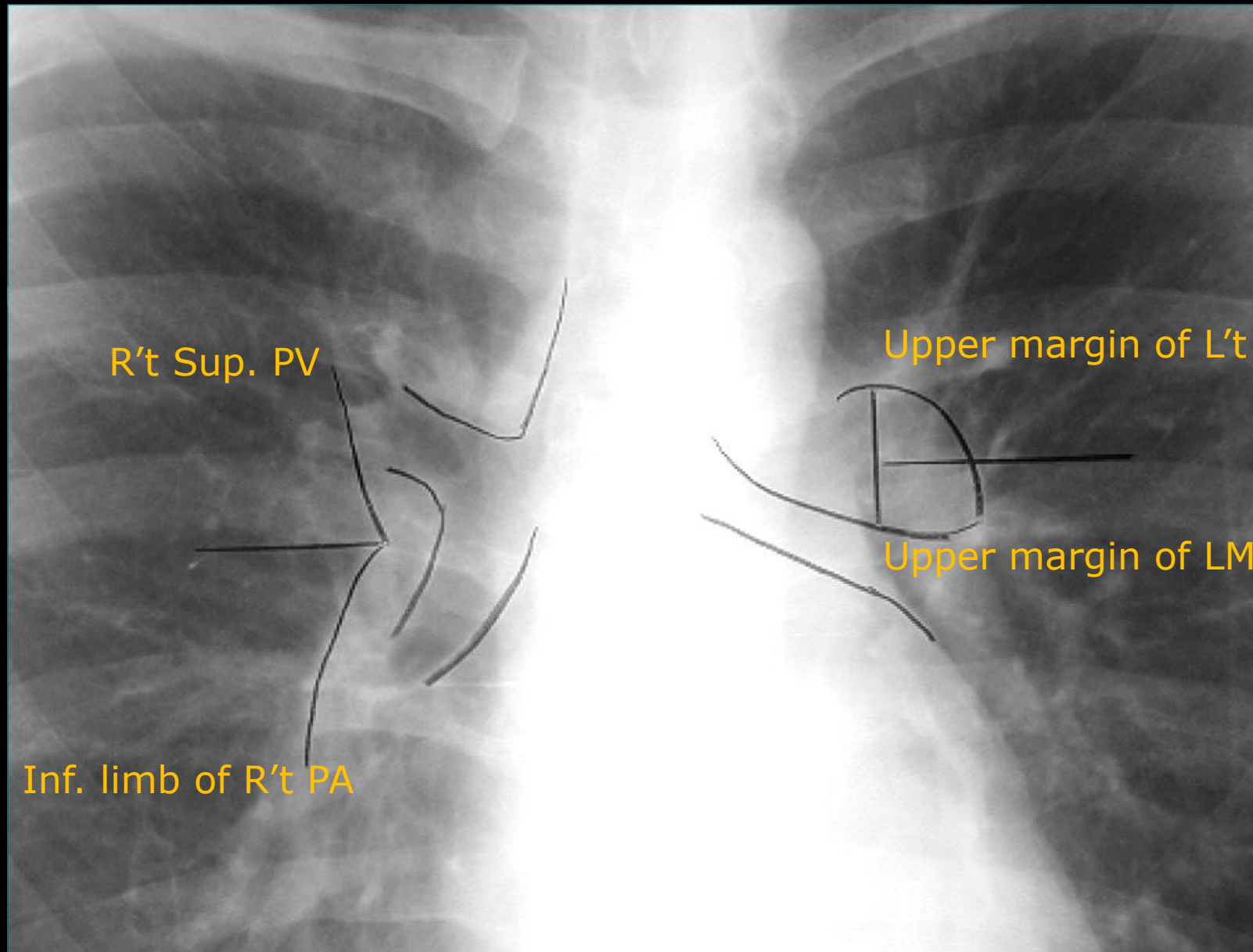
- Hilar lesion

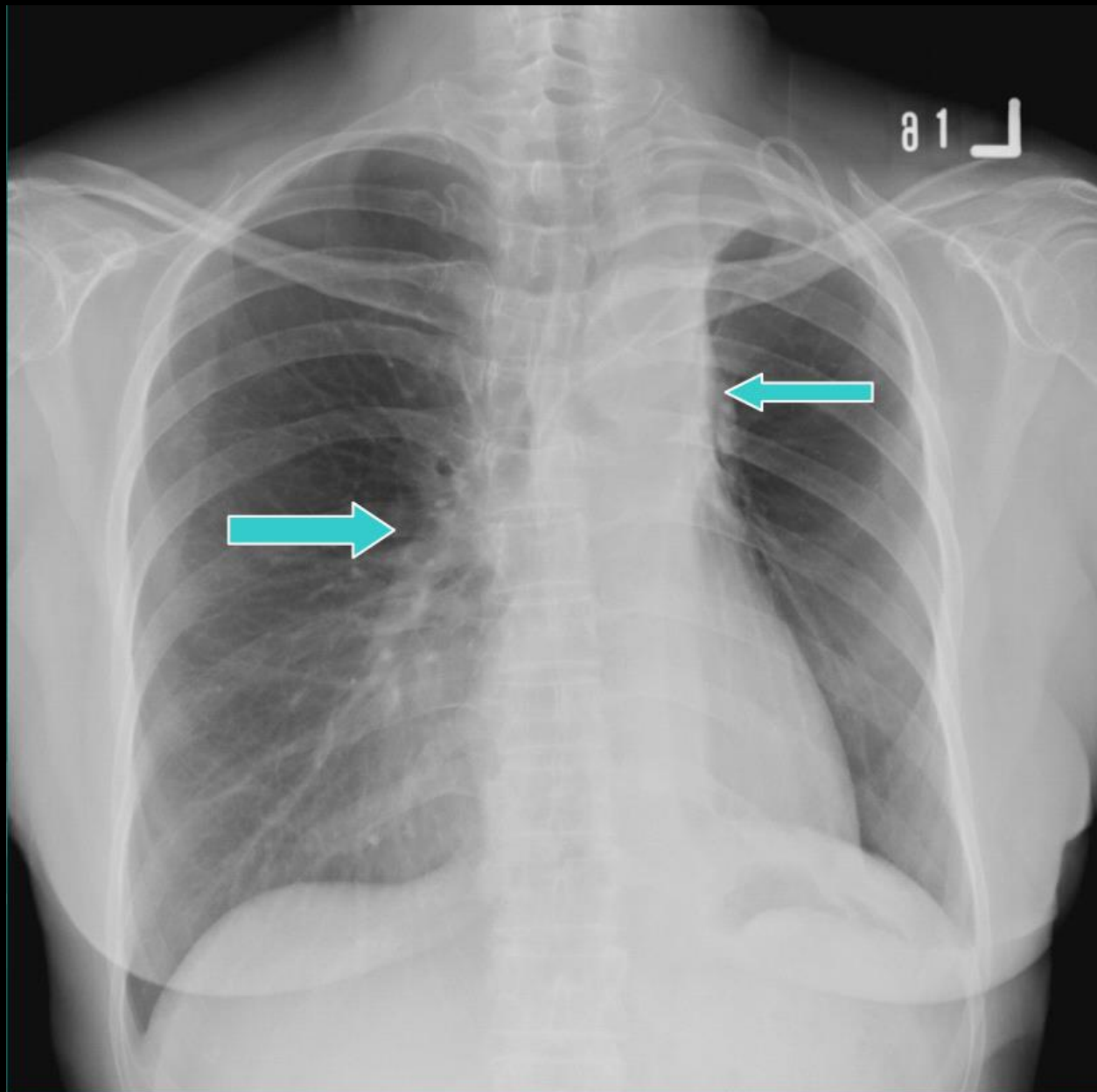
 - Vessel engorgement

 - Hilar LAP

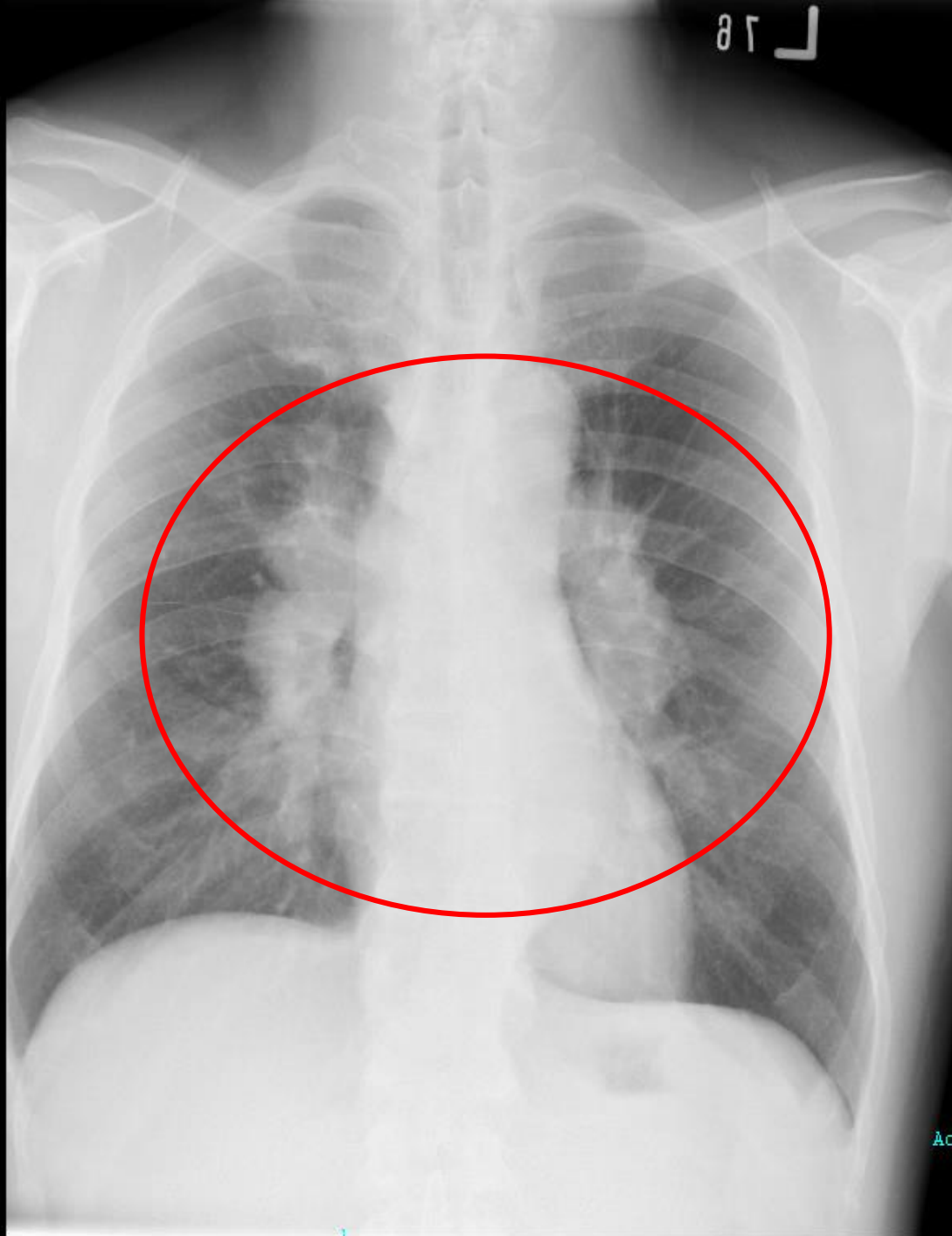
- Superimposed mass(lung, mediastinum)

肺門定位法



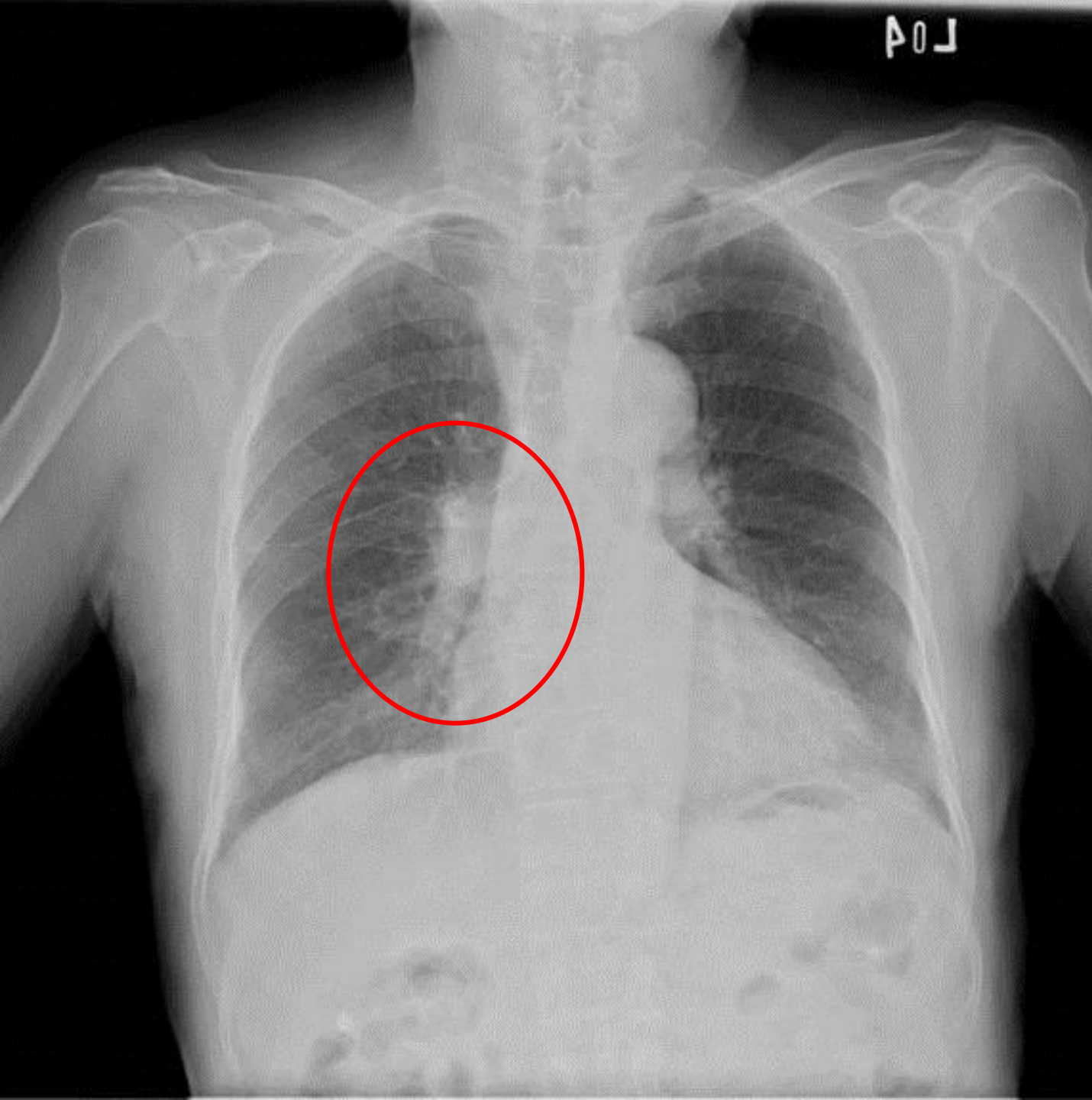


Elevation of Left hilum
Post-LUL lobectomy

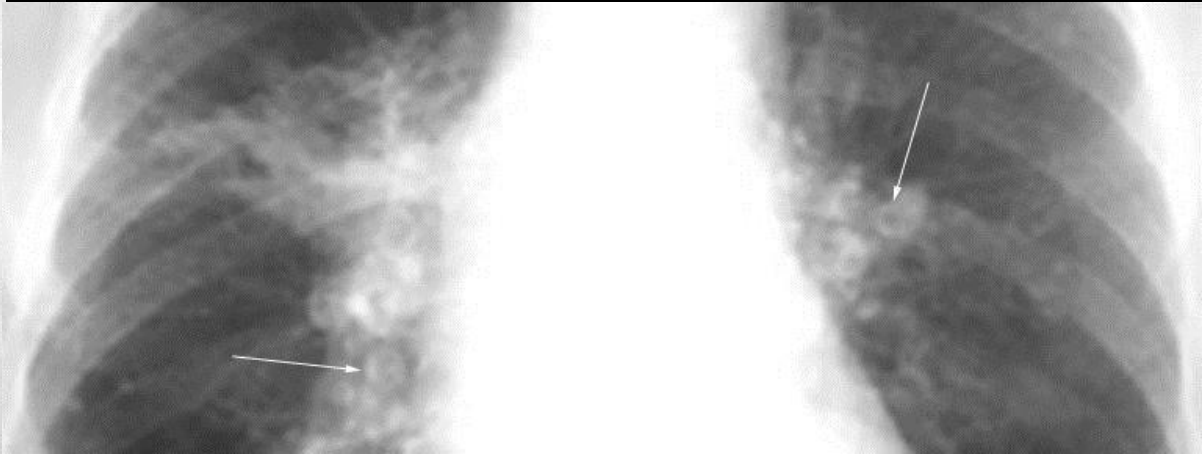
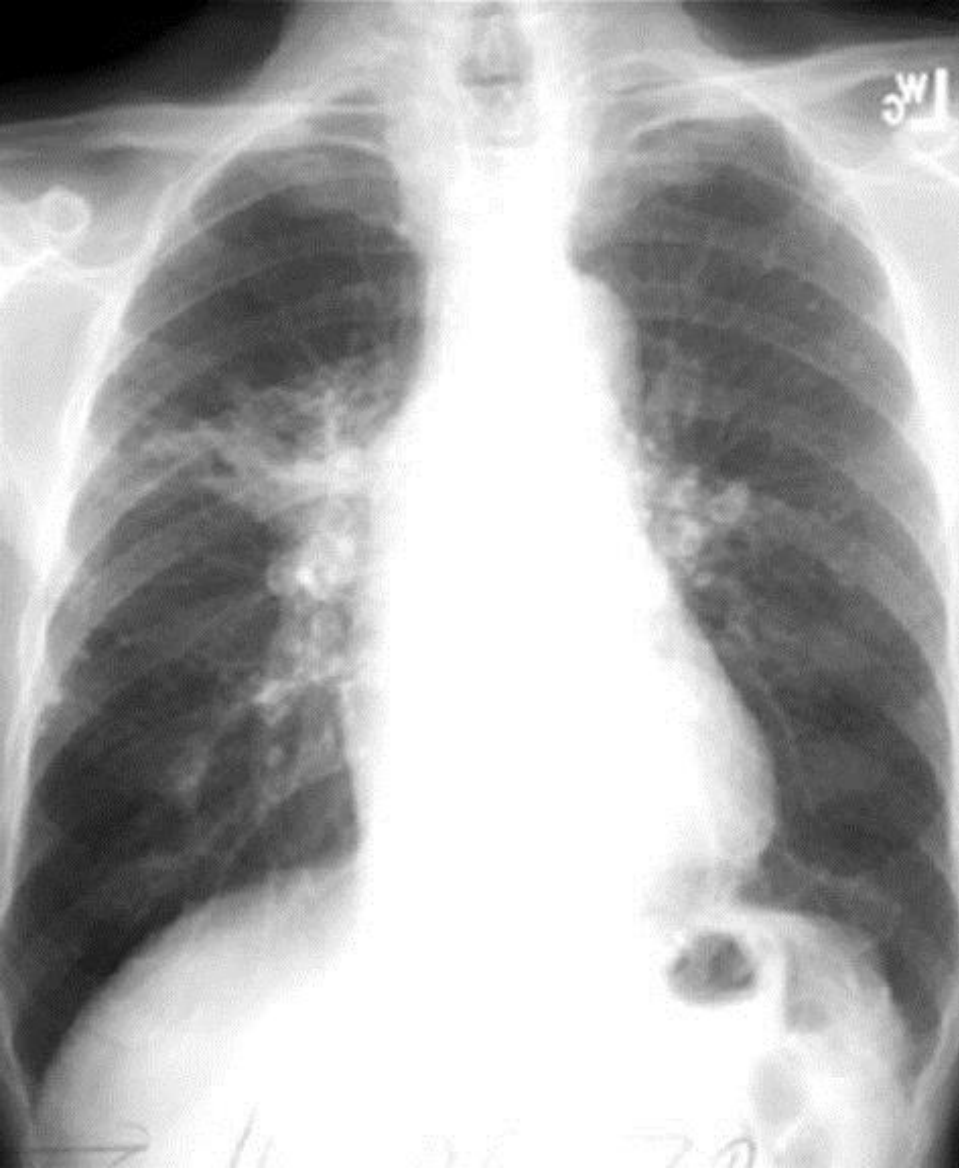


Sarcoidosis

Study
Patie
Accession N
Pati



Lung cancer



Silicosis

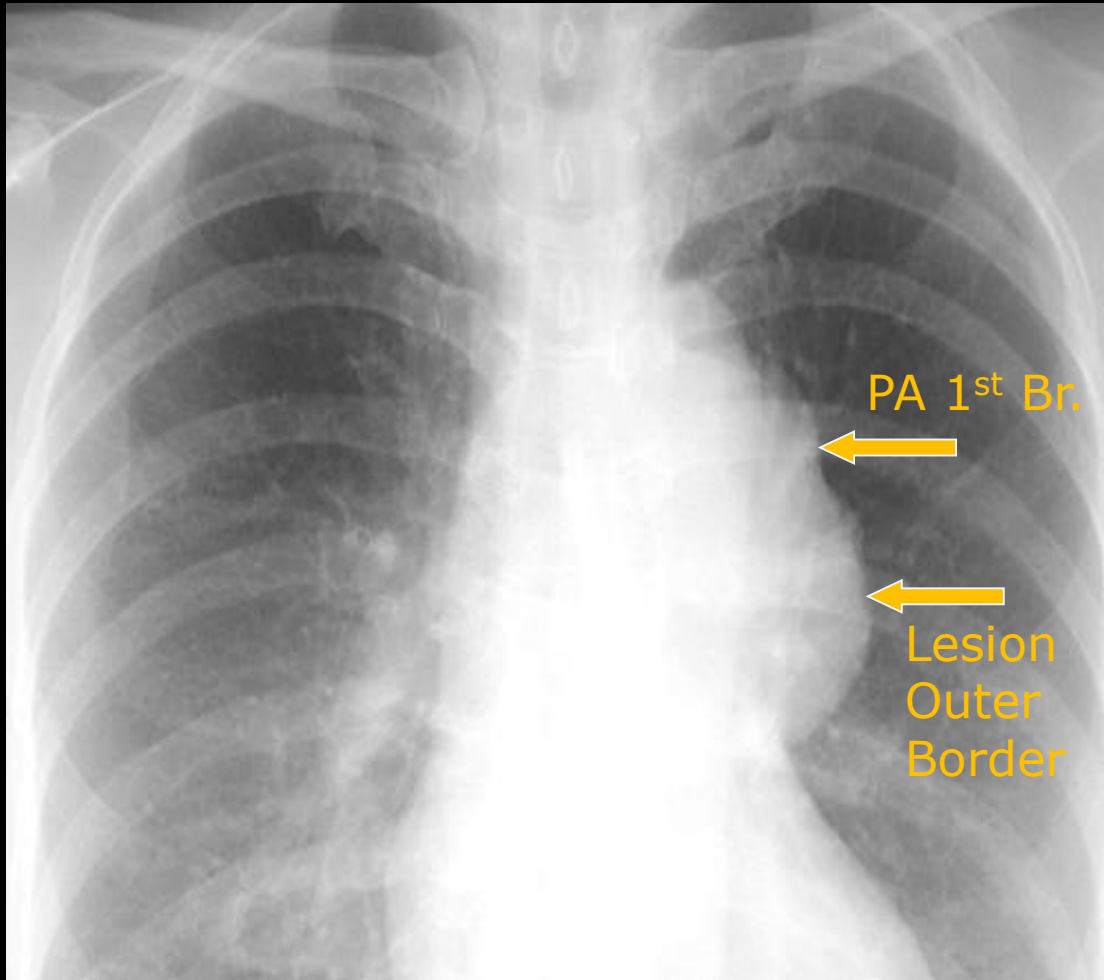
Egg Shell Calcification of hilar LAP

Hilum Overlay Sign

- 用來區分肺門附近的病灶是 mediastinal mass 或 cardiomegaly.
 - 觀念：98%正常人 pulmonary artery的第一個分支點(最內側的分支)，位在心臟邊緣或稍外側，即使在cardiomegaly or pericardial effusion亦是如此。只有2%的正常人，此分支點位於心臟邊緣內側且距心臟邊緣1cm以上。
 - 應用：
 - 若pulmonary artery的第一個分叉點在lesion外緣的內側且大於1cm以上
 - favor mediastinal mass

Hilum overlay sign

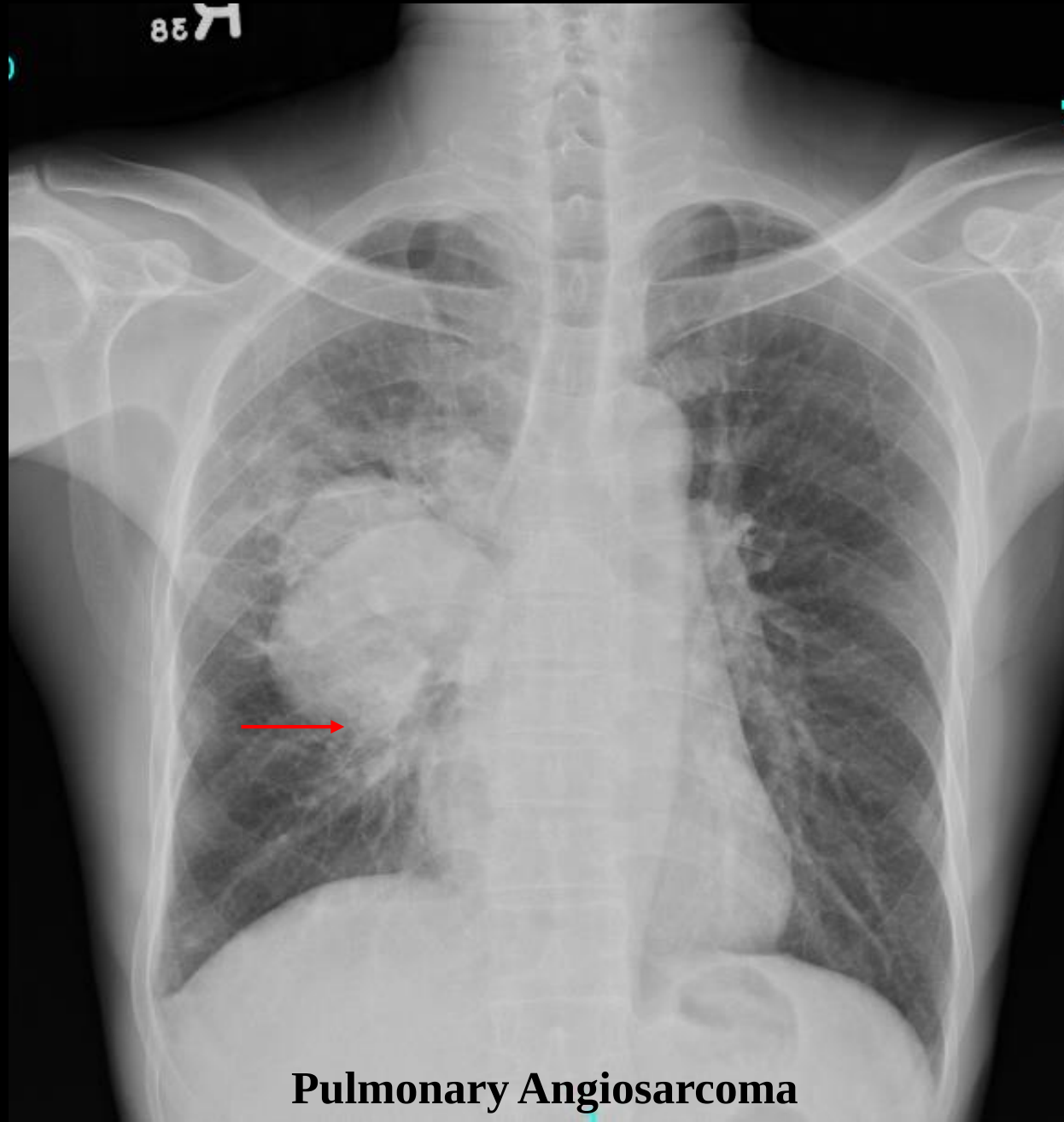
Dx: thymoma



Hilum Convergence Sign (Vascular Shadow in Mediastinum)

- 用來區分肺門腫大是否因pulmonary artery 變大而造成
- 假如血管進入肺門1cm內即消失，則代表肺門腫大是因engorged pulmonary artery造成 (ex. pulmonary hypertension)
- 若血管進入肺門仍未消失，則代表肺門處的腫瘤所造成。

Hilum Convergence Sign

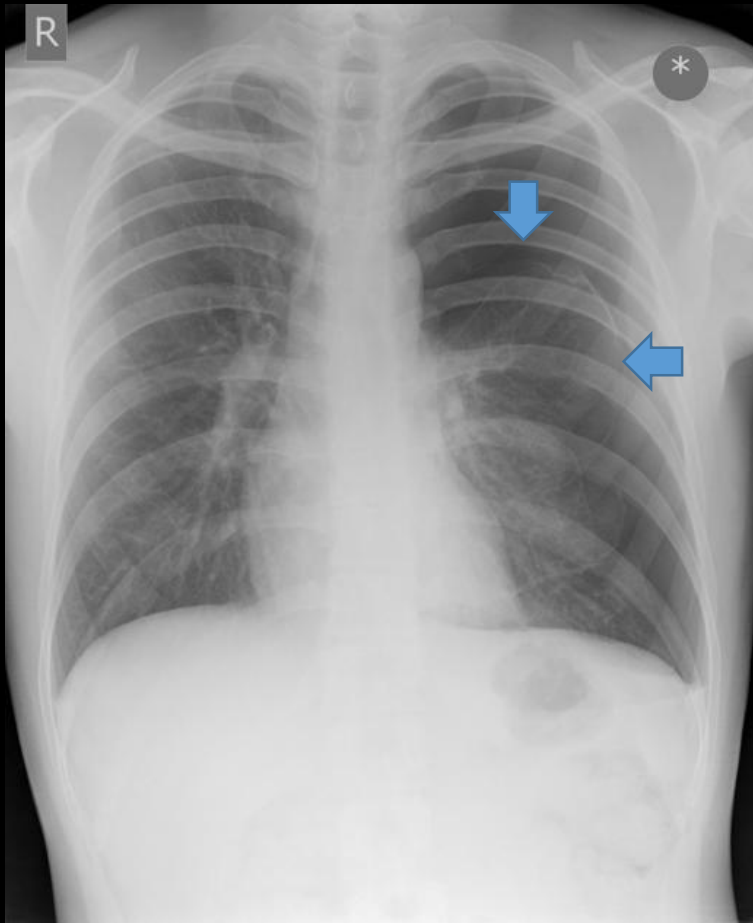


Pulmonary Angiosarcoma

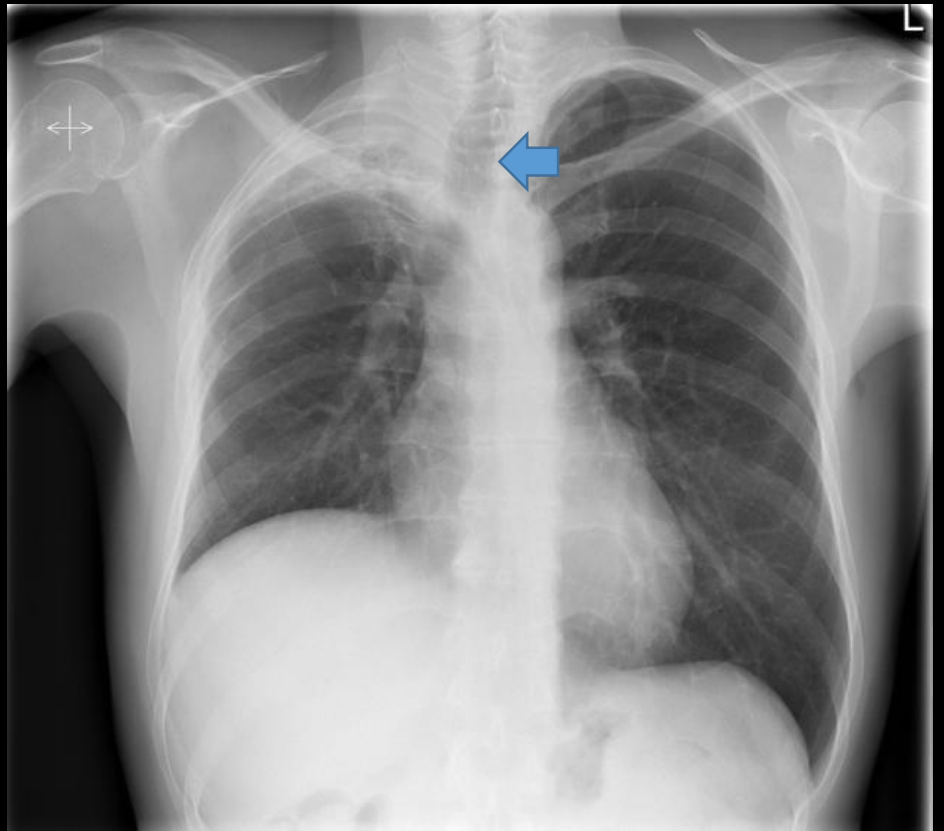
Lung Fields

- 太白太黑都要注意
- 兩側相互比較
- 單側hemithorax density異常
 - lesion site是太白處or太黑處
- Increased opacity(太白)
 - Abnormal shadows
- Increased radiolucency(太黑): 由外而內D/D
 - 胸廓外：mastectomy, Poland's syndrome(少了大胸肌)
 - 肋膜：pneumothorax
 - Decreased vessel: pulmonary embolism(a), Pul. a. agenesis(a), Scimitar syndrome(v)
 - Air collection: endobronchial obstruction, Swyer-James syndrome emphysema, localized bullae

Unilateral hyperlucent hemithorax



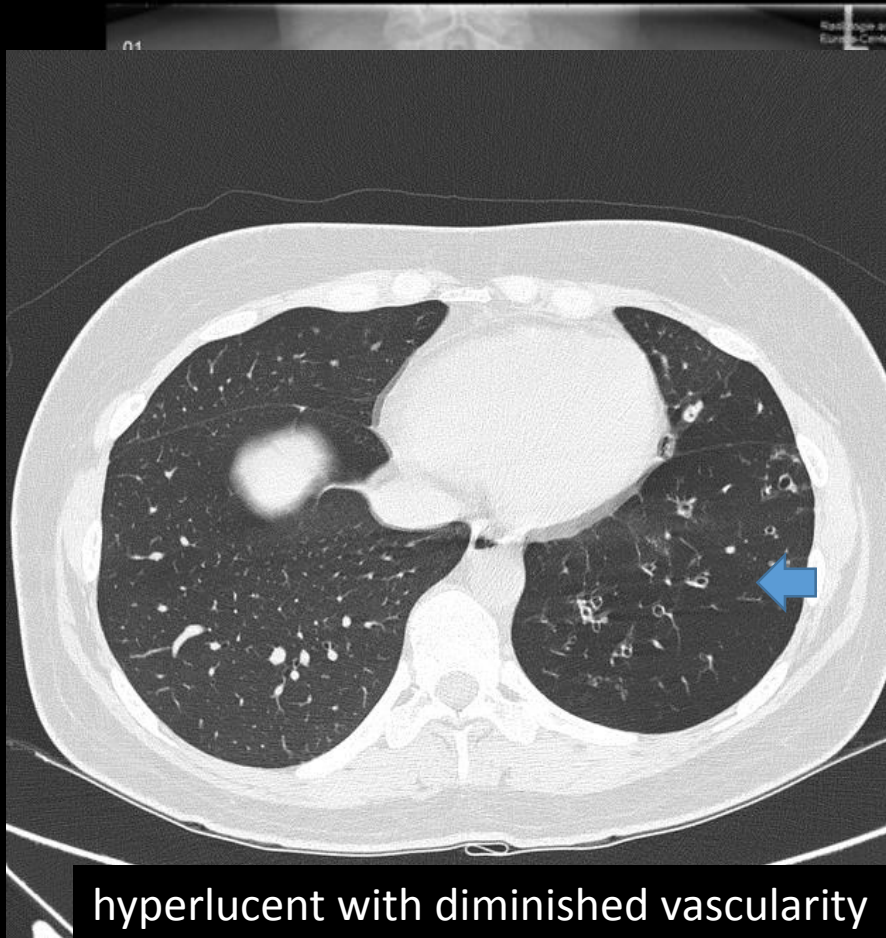
Left pneumothorax



Compensatory hyperinflation

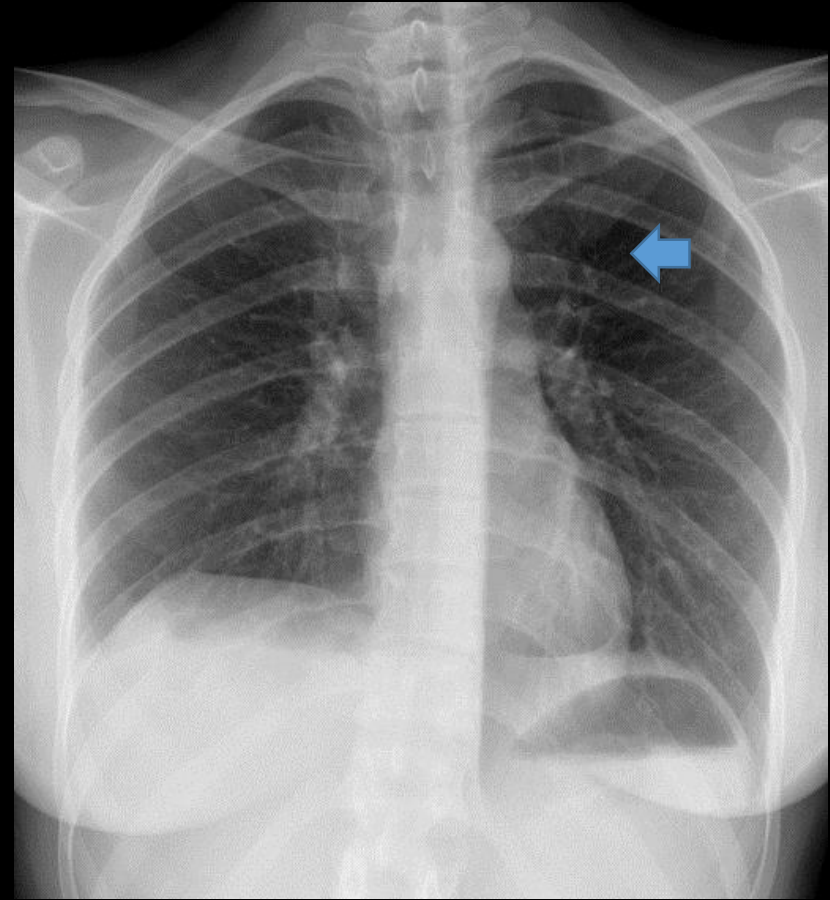
Unilateral hyperlucent hemithorax

Hx of viral RTI in early childhood



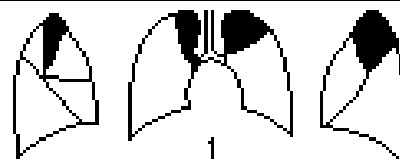
hyperlucent with diminished vascularity

Swyer-James syndrome



Pulmonary embolism
(Westermarck sign)

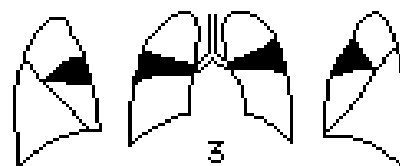
LUNG – SEGMENTAL ANATOMY



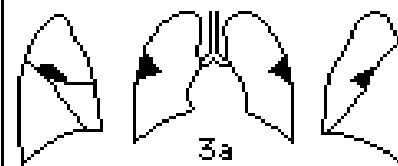
Right apical segment of upper lobe
Left apical-posterior segment of upper lobe



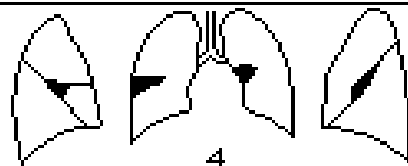
Right posterior segment of upper lobe
Left apical-posterior segment of upper lobe



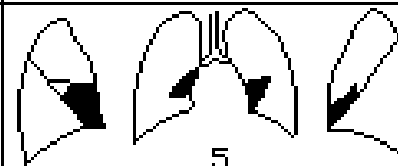
Right and left anterior
segment of upper lobe



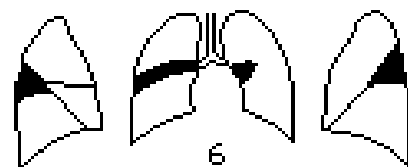
3a
Right and left
axillary subsegment



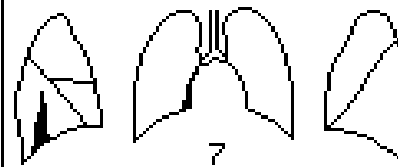
Right lateral segment of the middle lobe
Left superior lingular segment



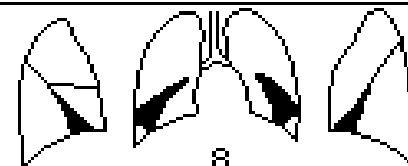
5
Right medial segment of the middle lobe
Left inferior lingular segment



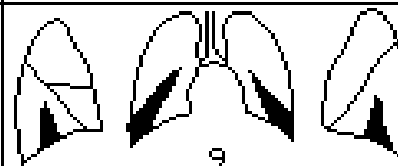
6
Right and left superior
segment of the lower lobe



7
Right medial
segment of the lower lobe



8
Right and left anterior
basal segment of the lower lobe

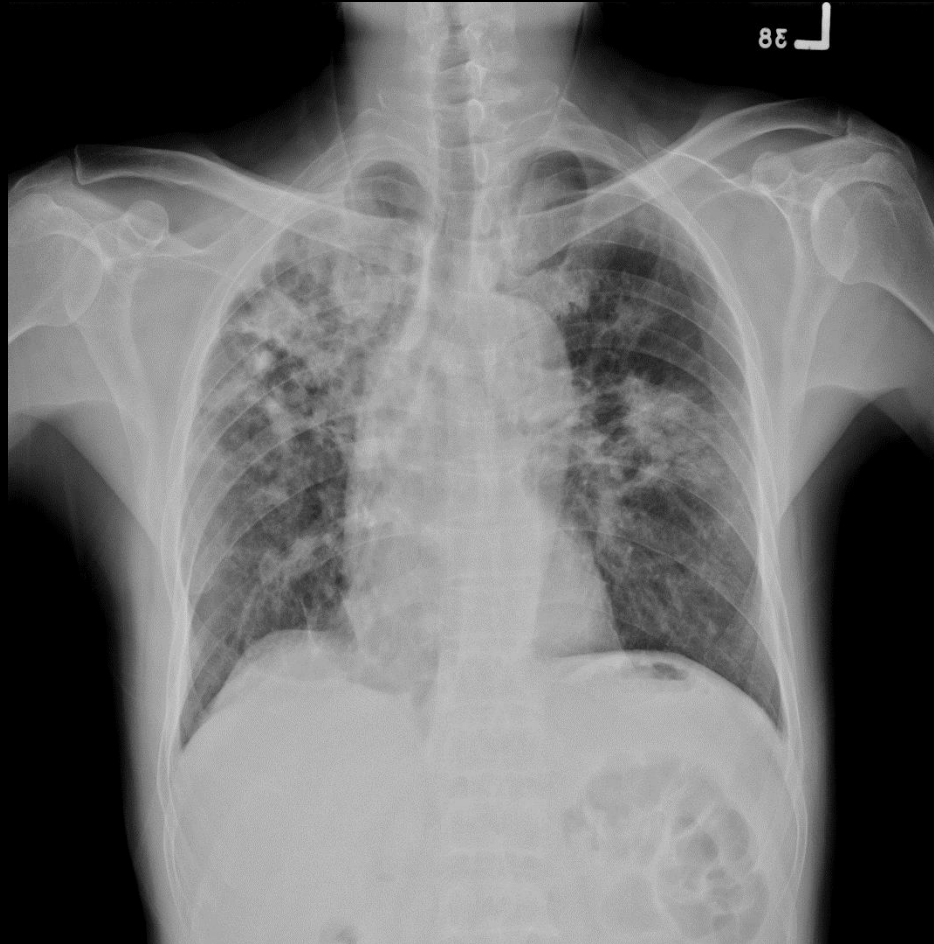


9
Right and left lateral basal
segment of the lower lobe



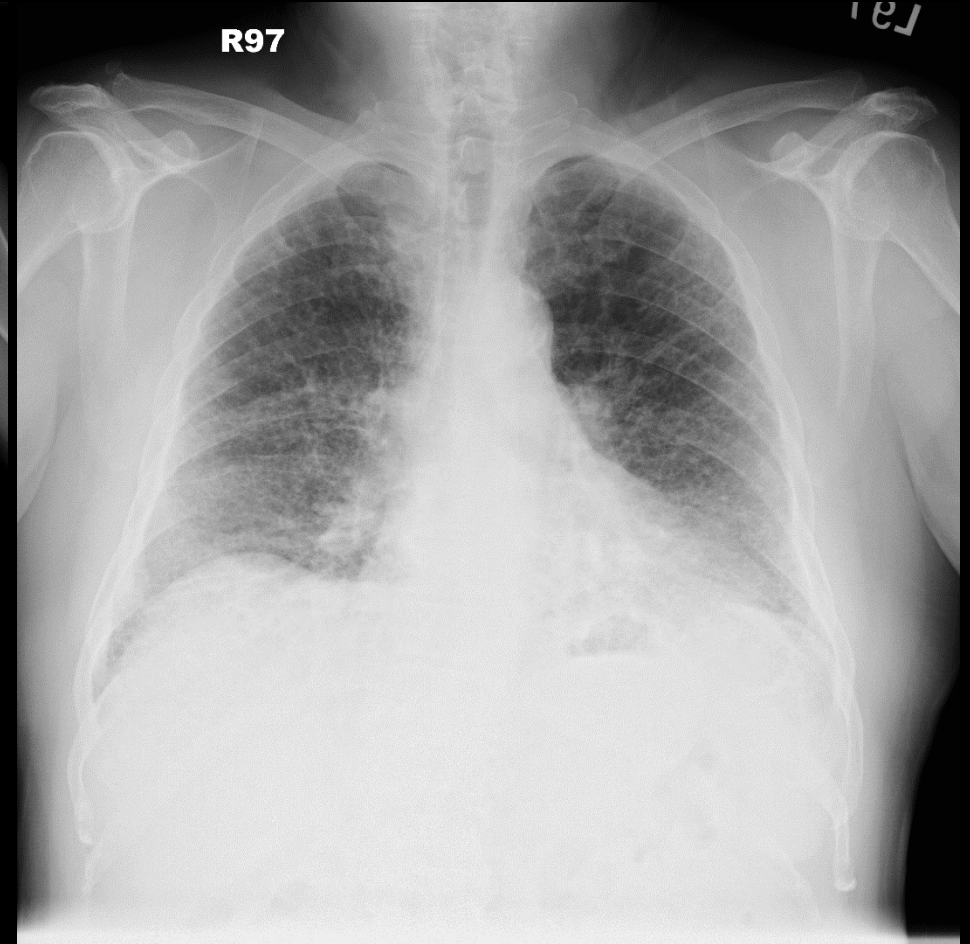
10
Right and left posterior
basal segment of the lower lobe

Alveolar pattern



Pulmonary TB

Interstitial pattern



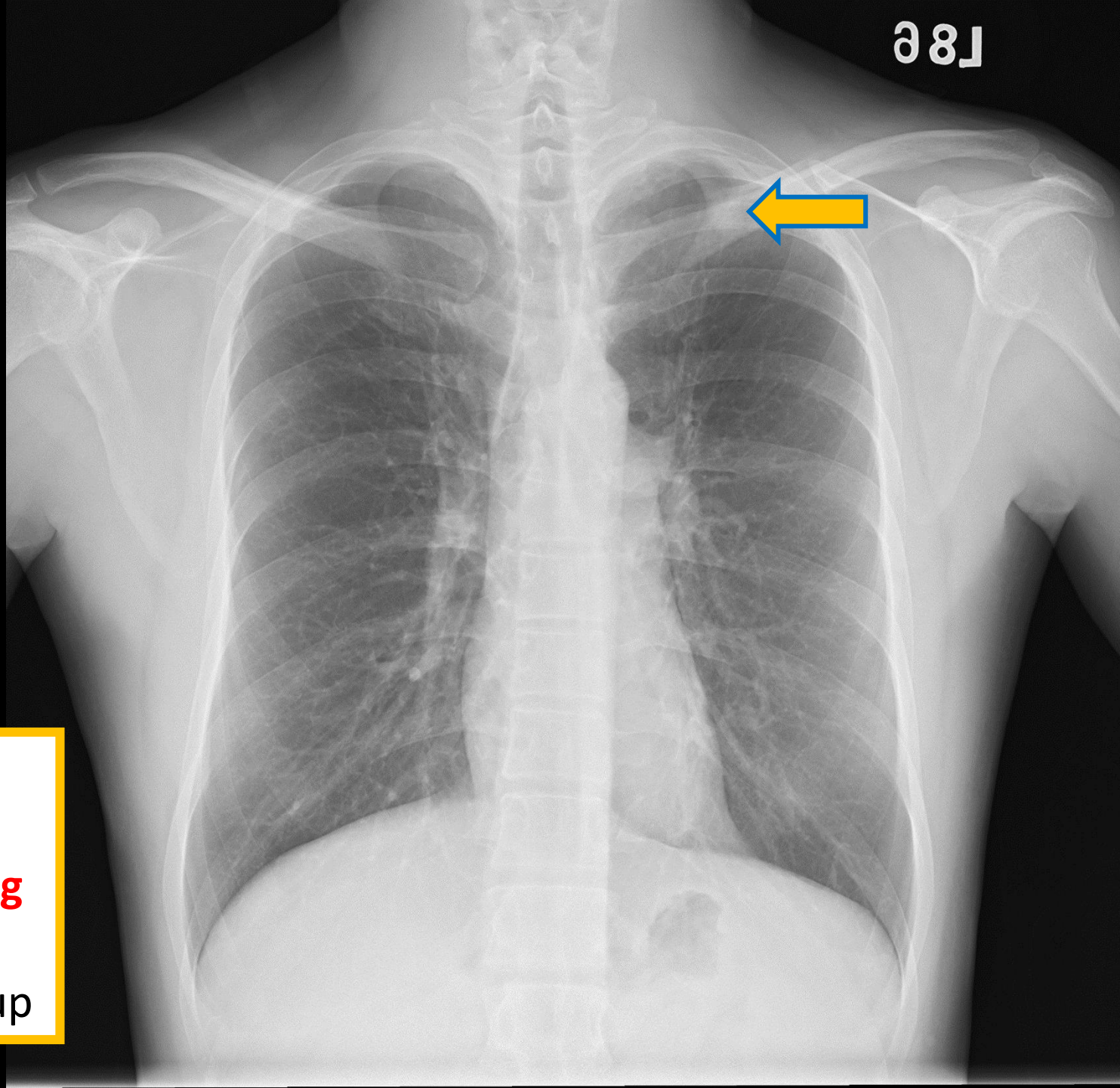
IPF

盲點：常見的判讀陷阱(四大死角)

- Bilateral Apex (bone overlapping)
- Large Airway
- Retrocardiac region
- Bilateral lung bases (especially sub-diaphragm)

盲點：常見的判讀陷阱(四大死角)

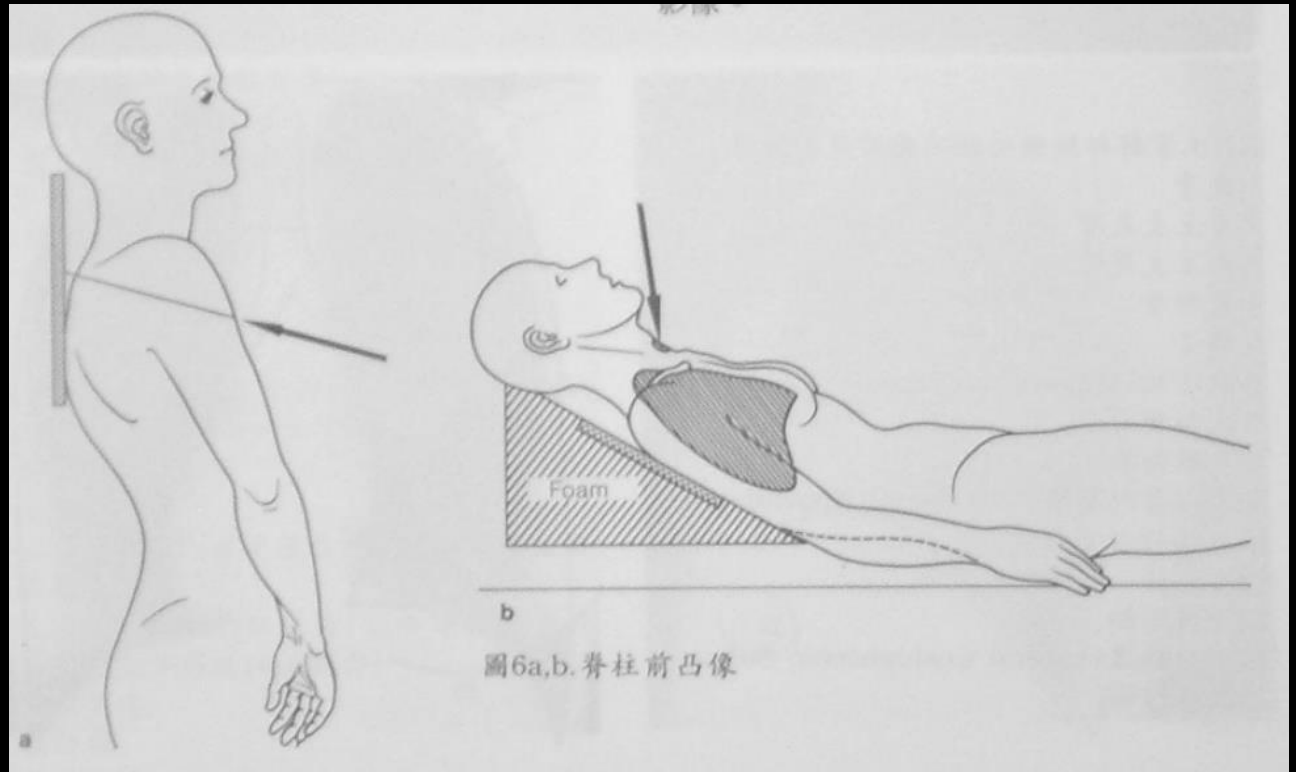
- Bilateral Apex (bone overlapping)
- Large Airway
- Retrocardiac region
- Bilateral lung bases (especially sub-diaphragm)



39 y/o male,
Incidentally
finding of **a lung
nodule** during
physical checkup

Lordotic view

- 彎曲身體上半部(約30度)使背後的肩部靠近片匣
- 用來確認肺尖、RML/Lingular lobe等被肋骨遮蓋住的病灶



Lordotic View

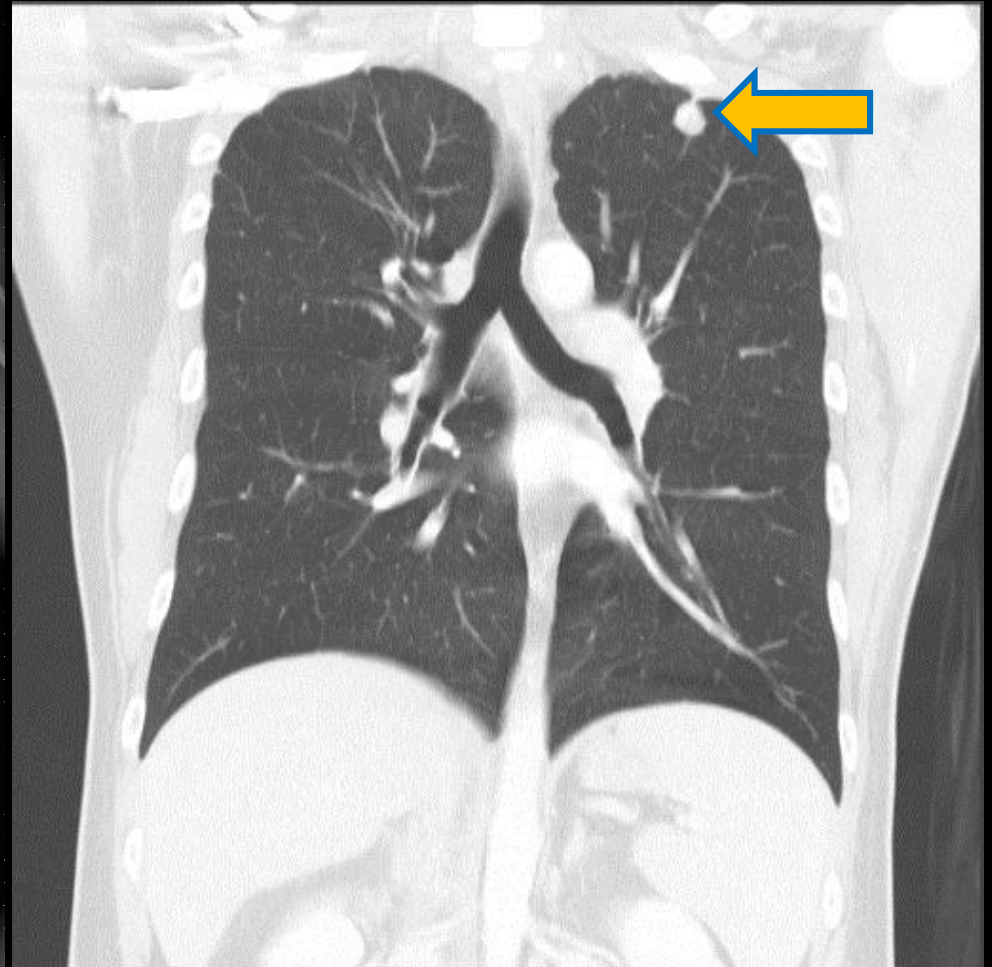
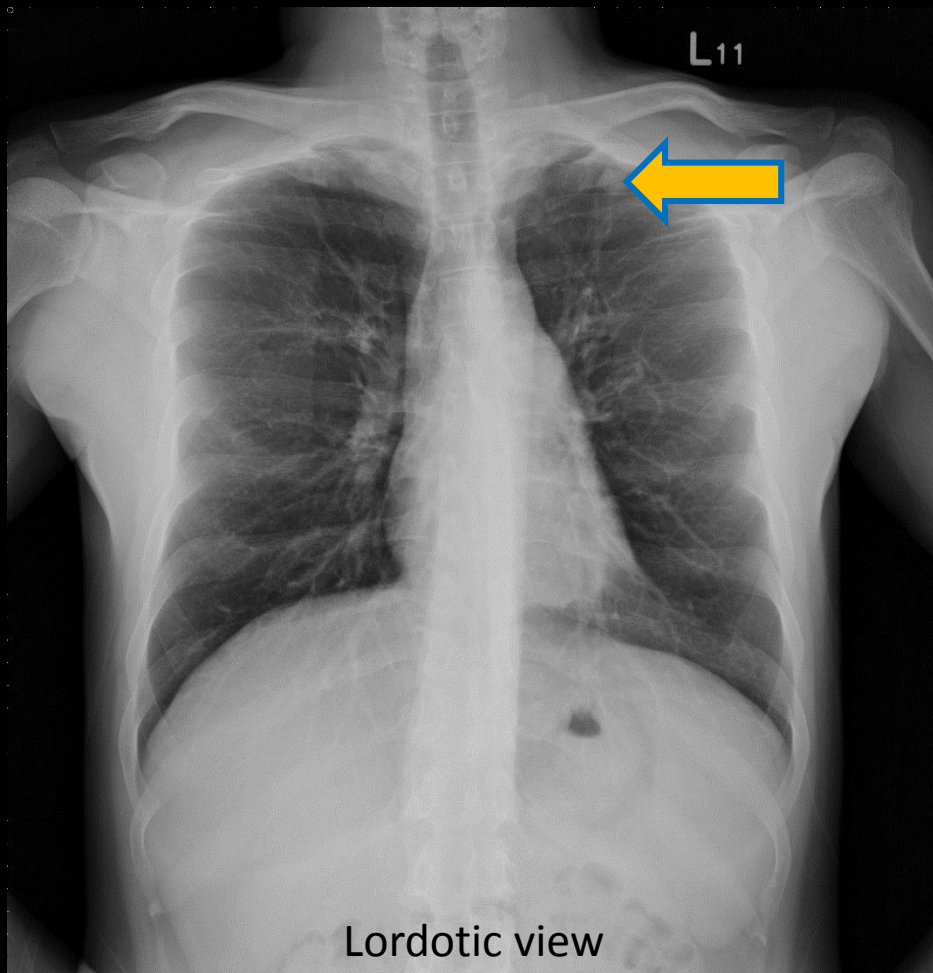


07.03.2005 10:42

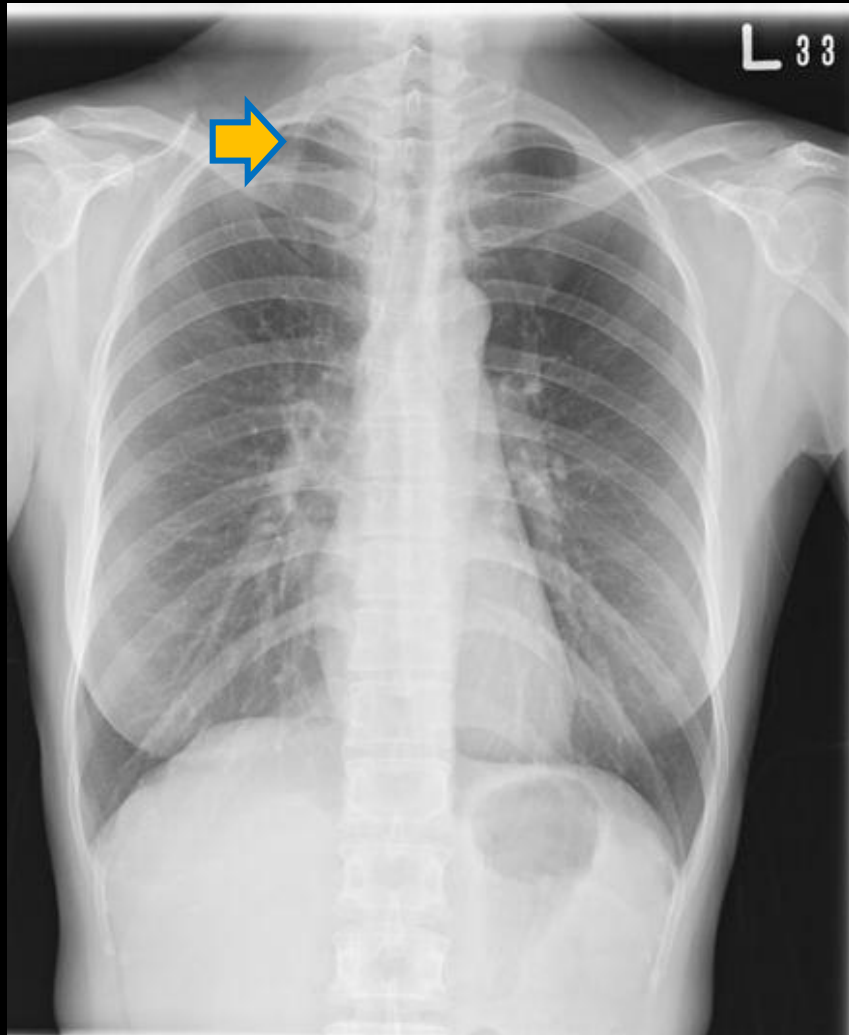
Left apex tumor,

s/p CT-guided biopsy, pathology : necrosis, fungi(+), r/o aspergilloma

Chart No. : 26499887

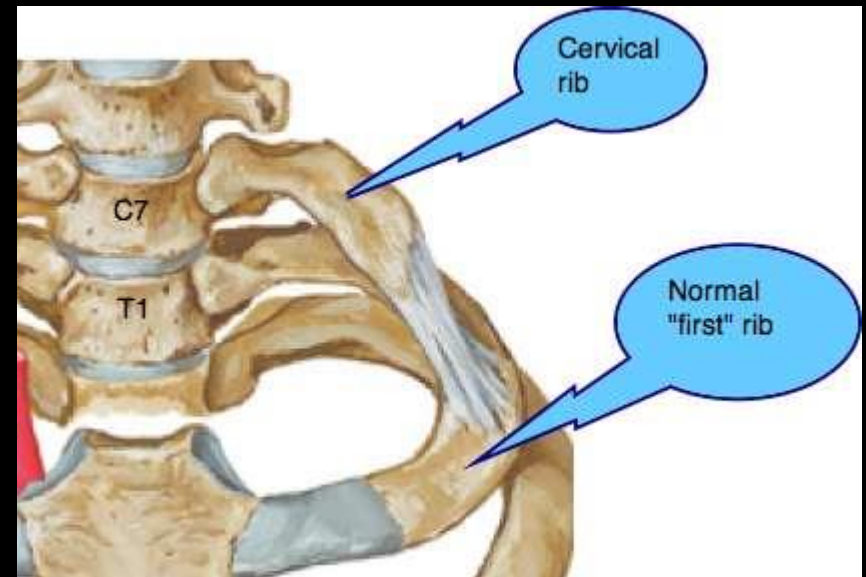


Easy missing lesions in lung apex



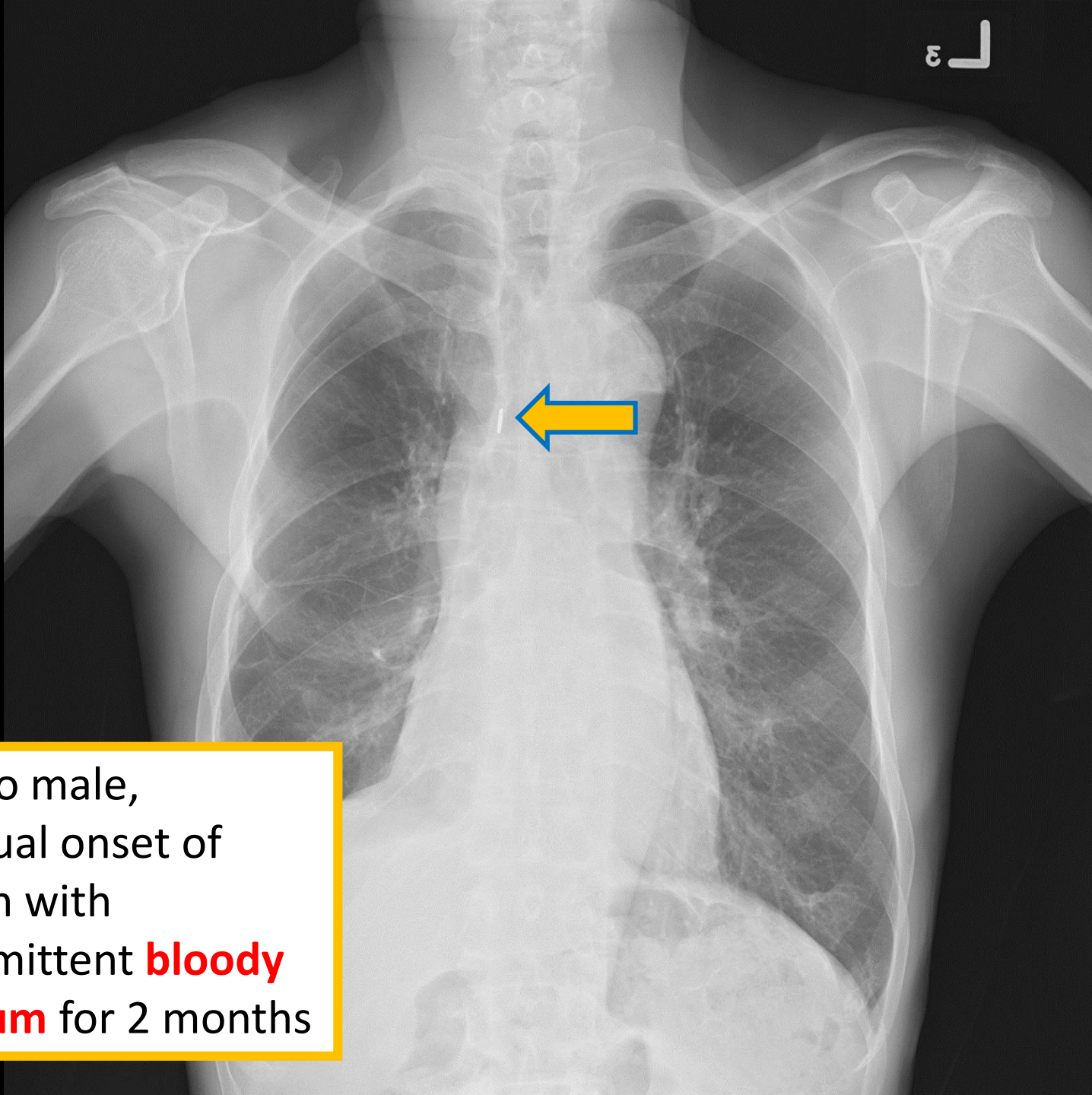
45/F, no symptom

Cervical rib

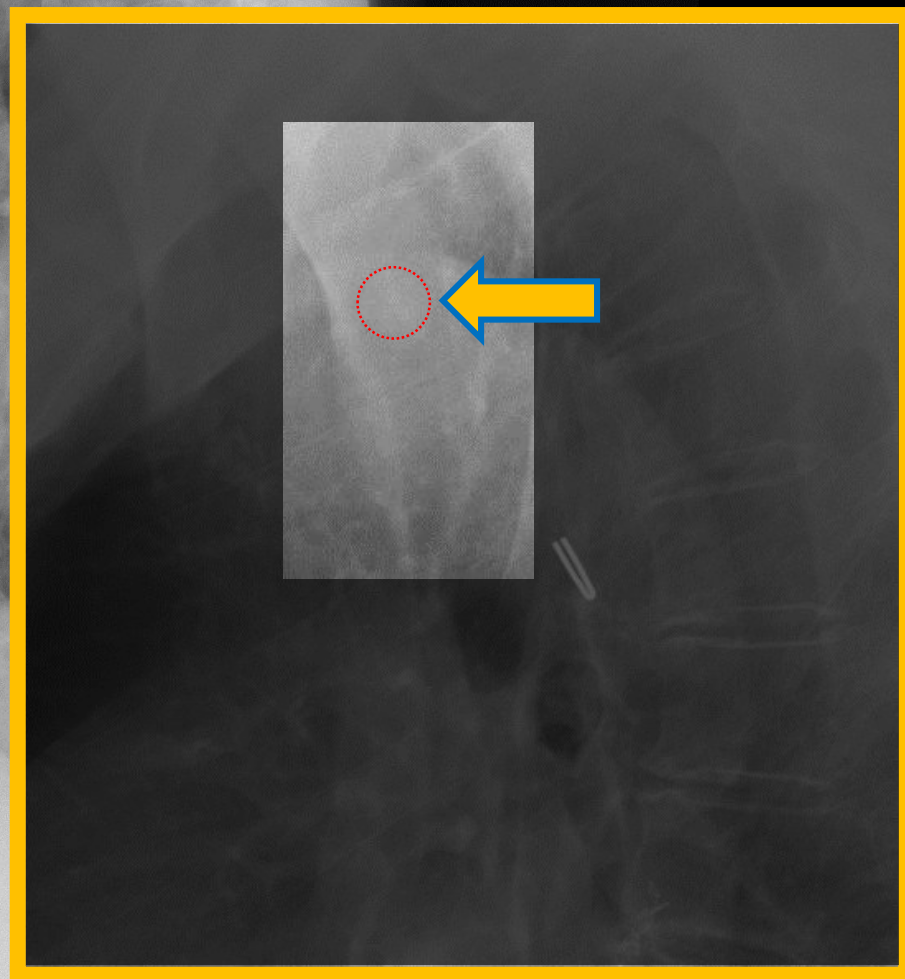
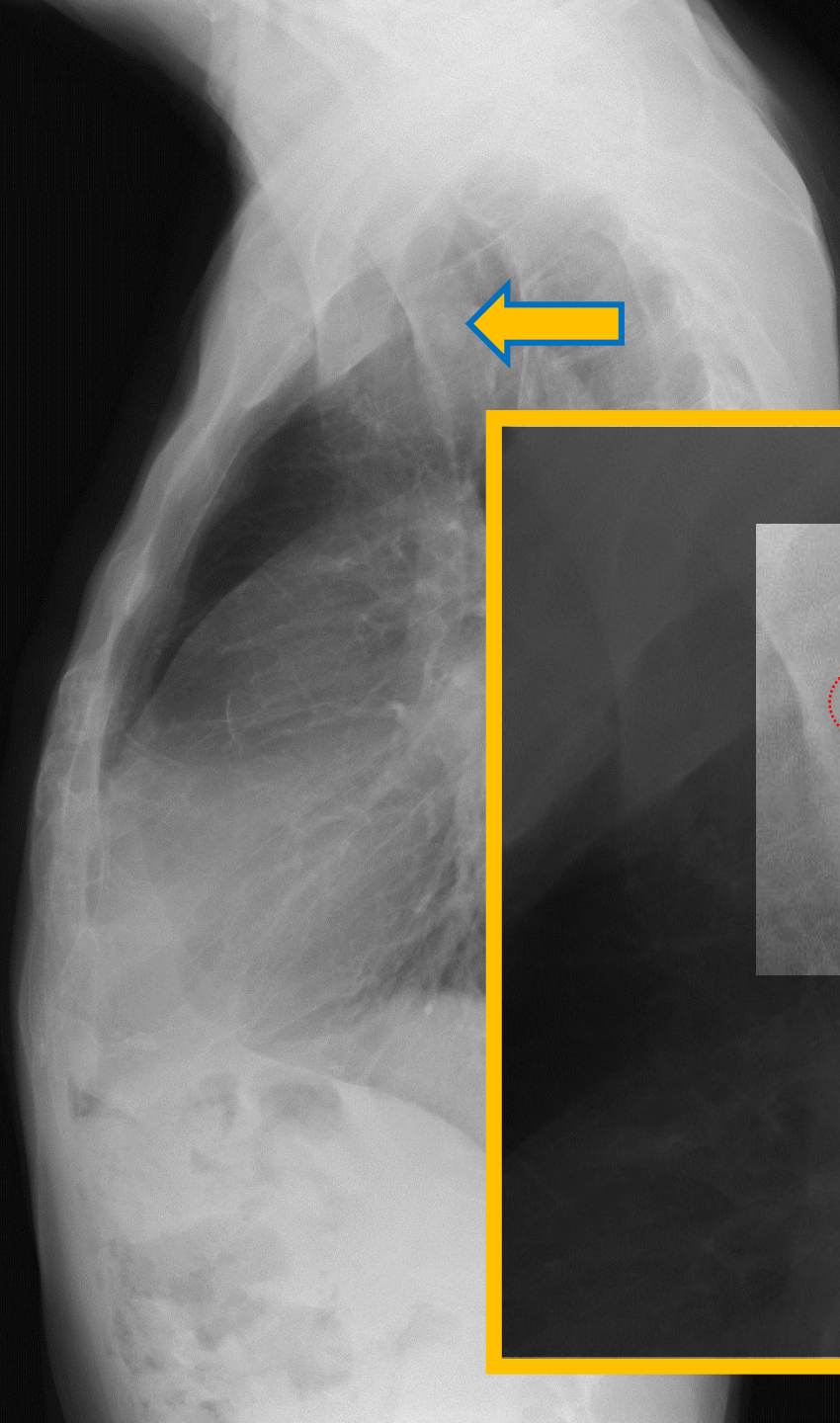


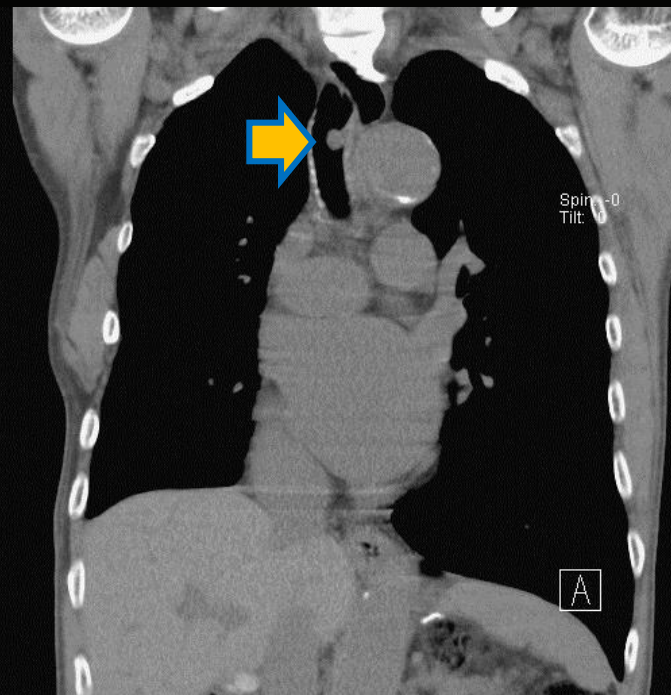
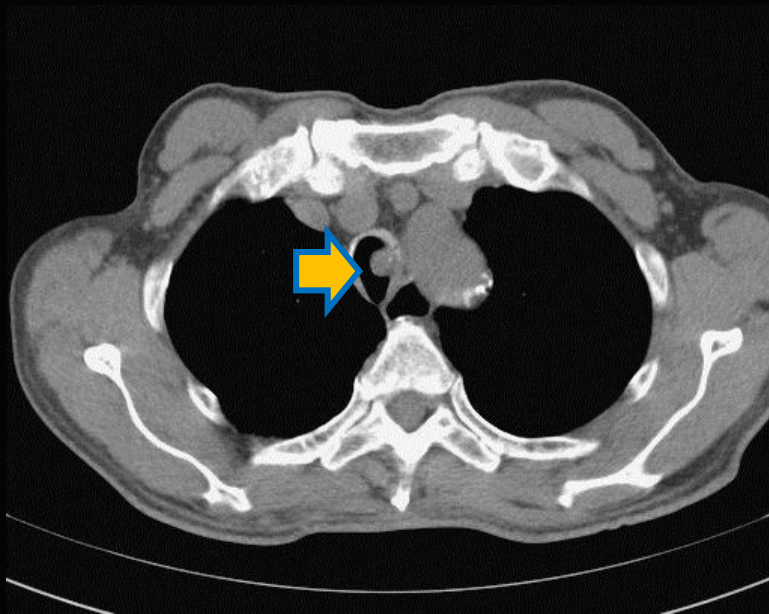
盲點：常見的判讀陷阱(四大死角)

- Bilateral Apex
- Large Airway
- Retrocardiac region
- Bilateral lung bases (especially sub-diaphragm)



71 y/o male,
Gradual onset of
cough with
intermittent **bloody**
sputum for 2 months

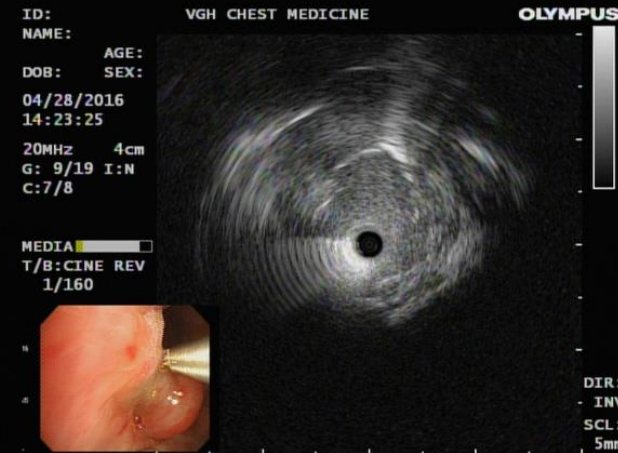




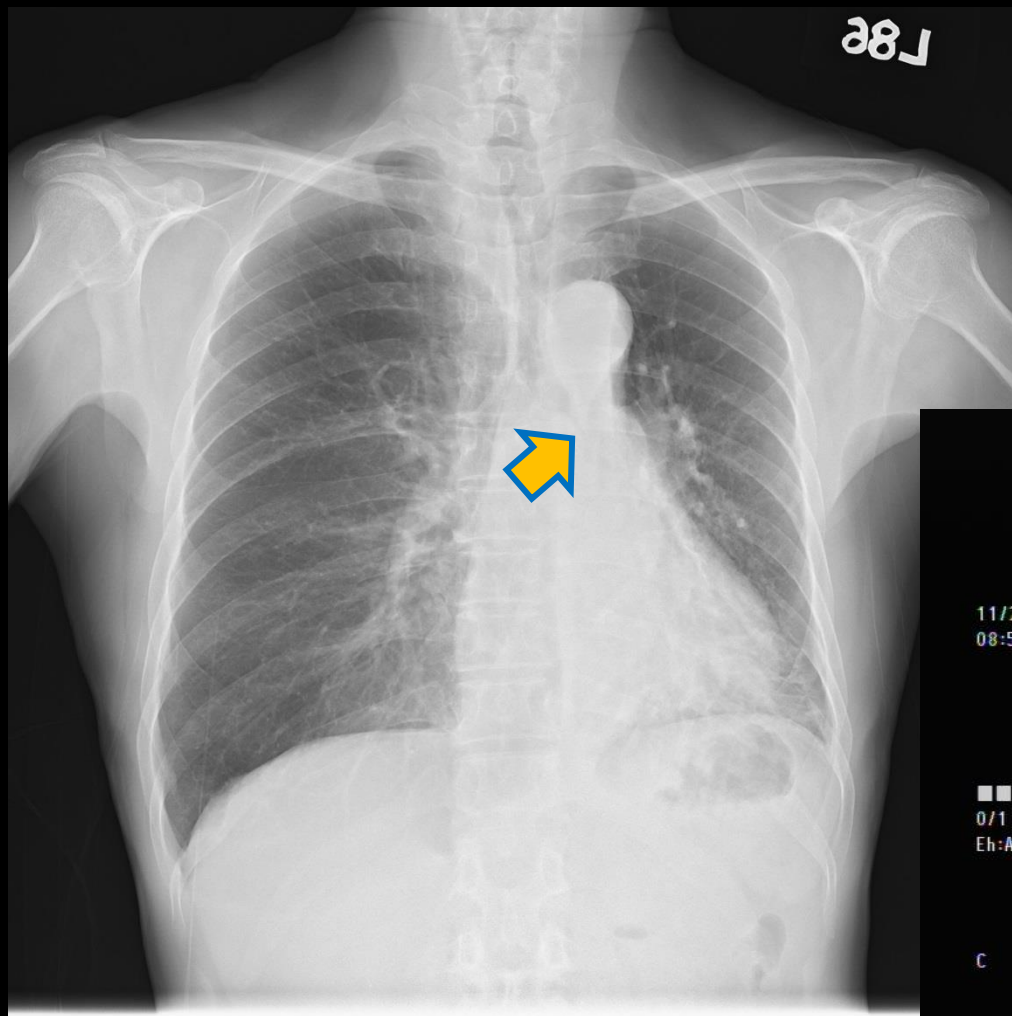
Case 3 :

Tracheal tumor s/p segmental resection, with local recurrence

Chart No. : 3538032



Easy missing lesions in large airways



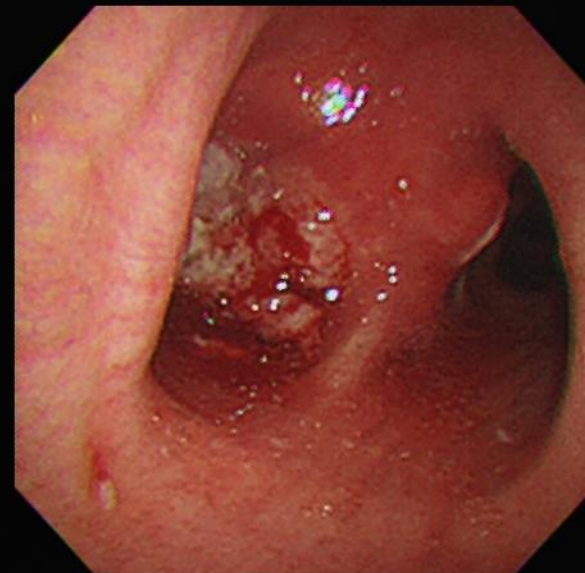
71/M, r/o COPD with AE

**SqCC of lung with
LMB narrowing**

11/28/2017
08:56:43

0/1
Eh:A5 Ce:0

C



盲點：常見的判讀陷阱(四大死角)

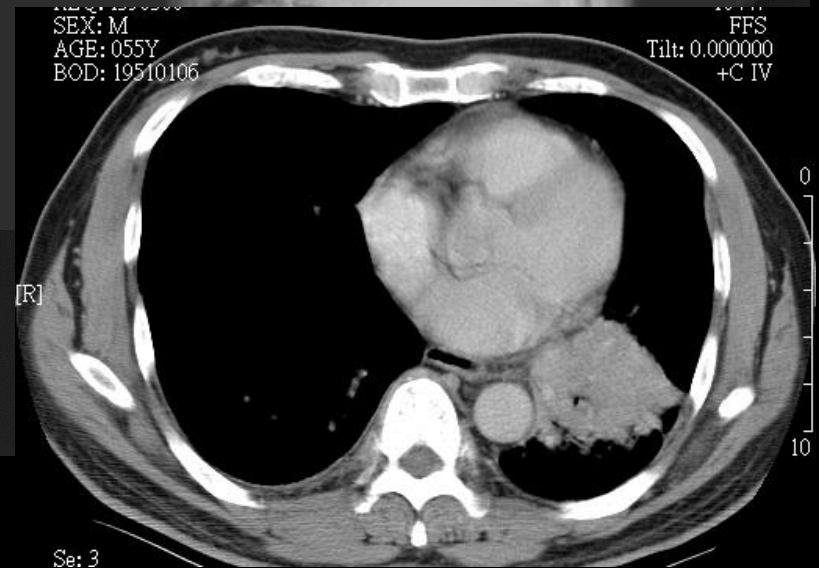
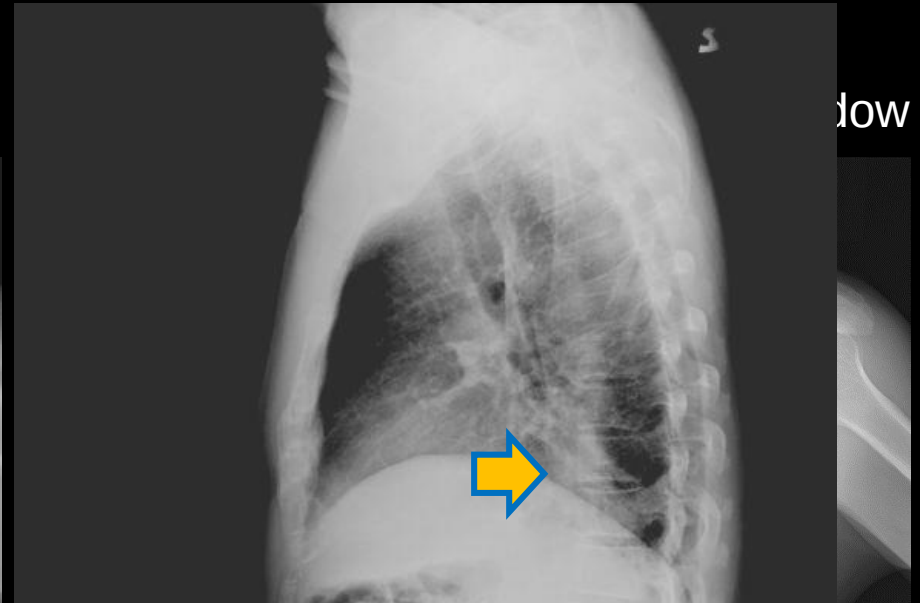
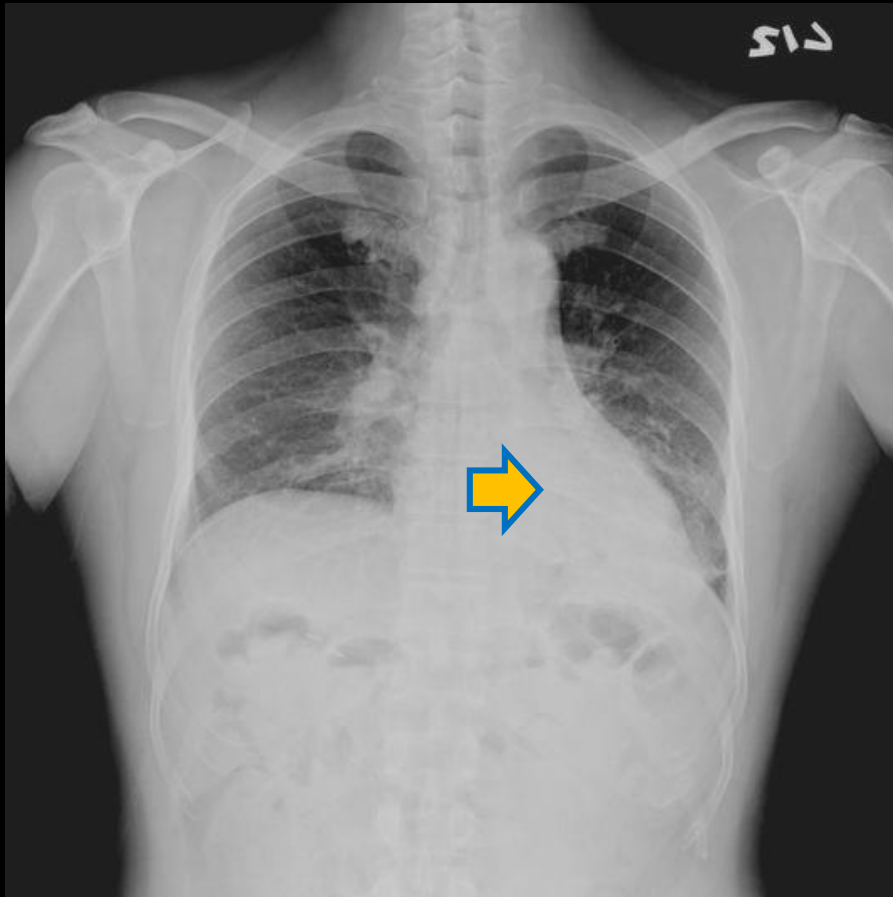
- Bilateral Apex (bone overlapping)
- Large Airway
- Retrocardiac region
- Bilateral lung bases (especially sub-diaphragm)

Retrosternal and retrocardiac space

- 正常這兩個地方是clear的，而兩者的透亮度大約相同。如有顯著不同，則表示可能其中之一有病變。
- Anterior mediastinal lesion時常可以在retrosternal space看見。
- Retrocardiac lesion在PA view不易identify，但是在lateral view則容易許多。
- Retrocardiac lesion在PA view中的線索是
loss of normal vascular shadow over this region

Easy missing lesions in retrocardiac area

66/M, incidentally finding of abnormal CxR

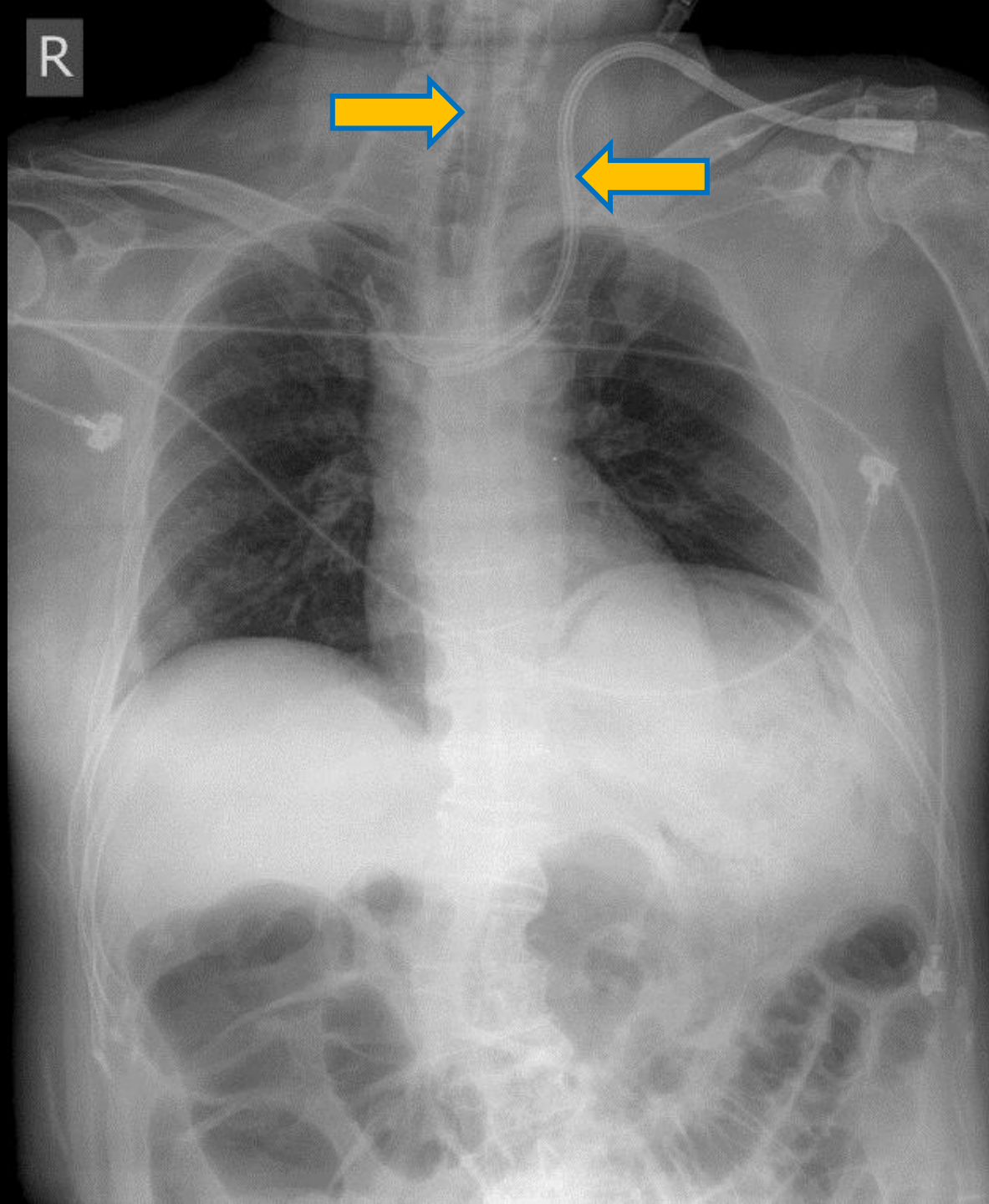


Adenoca of lung, LLL

盲點：常見的判讀陷阱(四大死角)

- Bilateral Apex (bone overlapping)
- Large Airway
- Retrocardiac region
- Bilateral lung bases (especially sub-diaphragm)

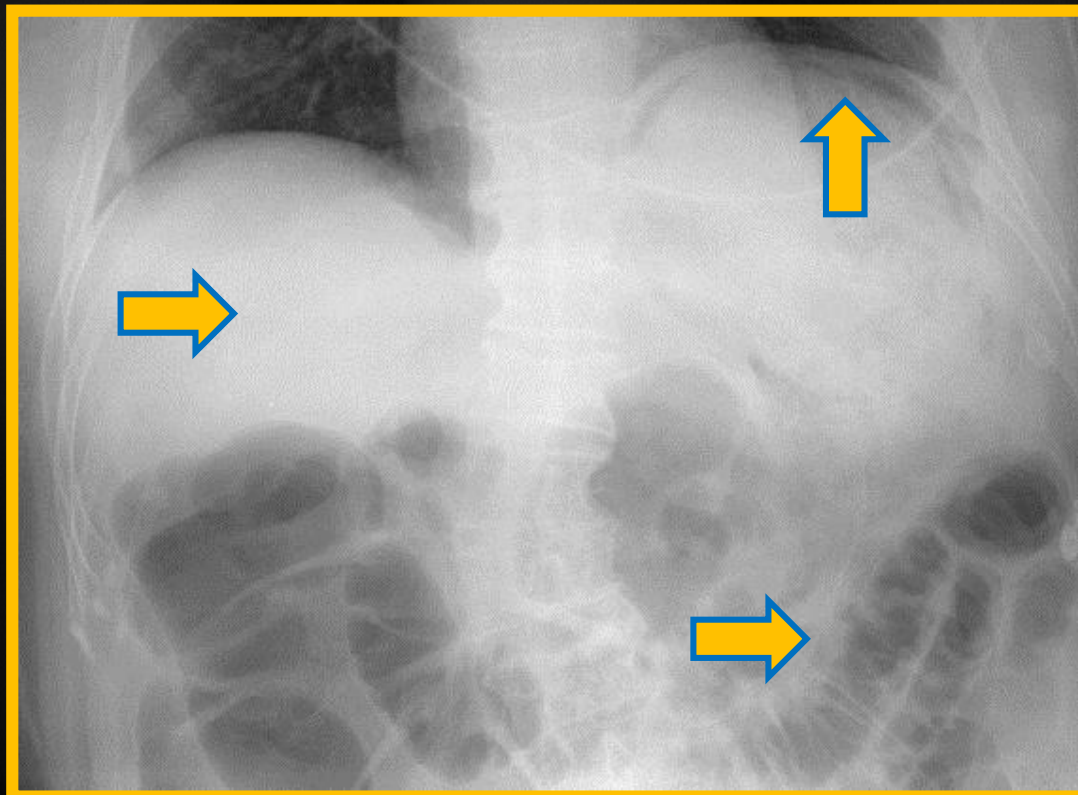
R



55 y/o female,
Drowsy
consciousness
with BP drop
during H/D

R

55 y/o female,
Drowsy
consciousness
with BP drop
during H/D

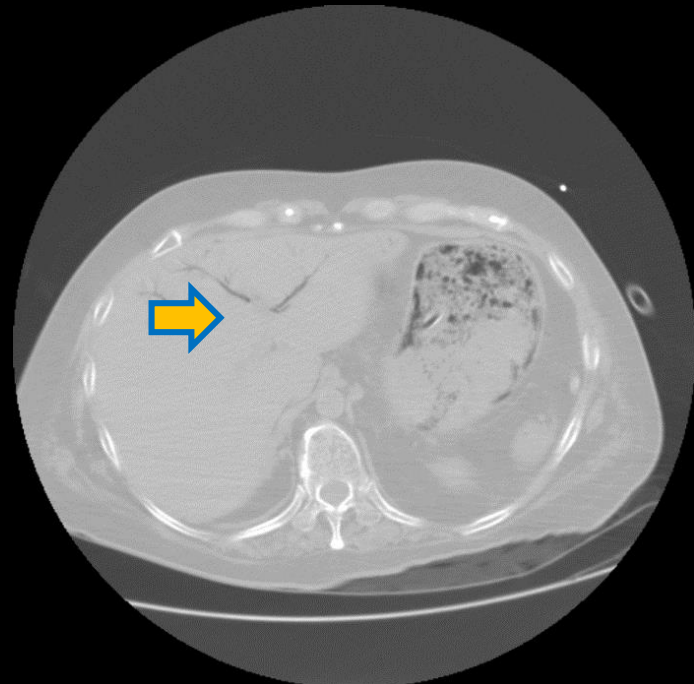




Diagnosis:

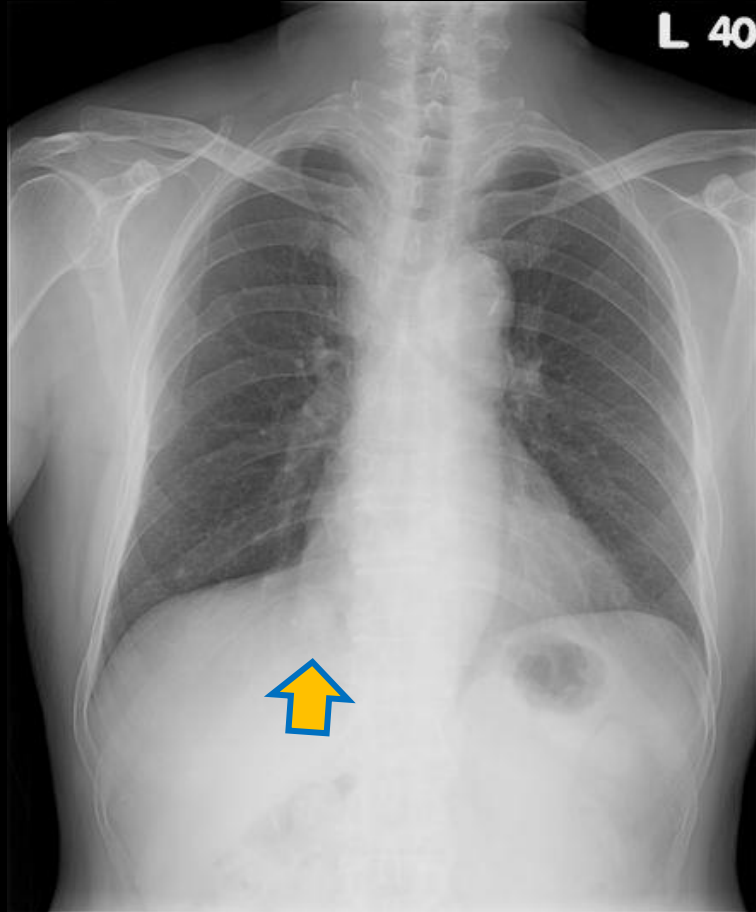
- **Ischemic bowel with emphysematous gastritis, portal vein gas**
- ESRD under H/D
- Resp. failure s/p ETT+MV

Chart No.: from Yu-Li VH,
kindly provided by Dr. *Chao-Neng Yang*

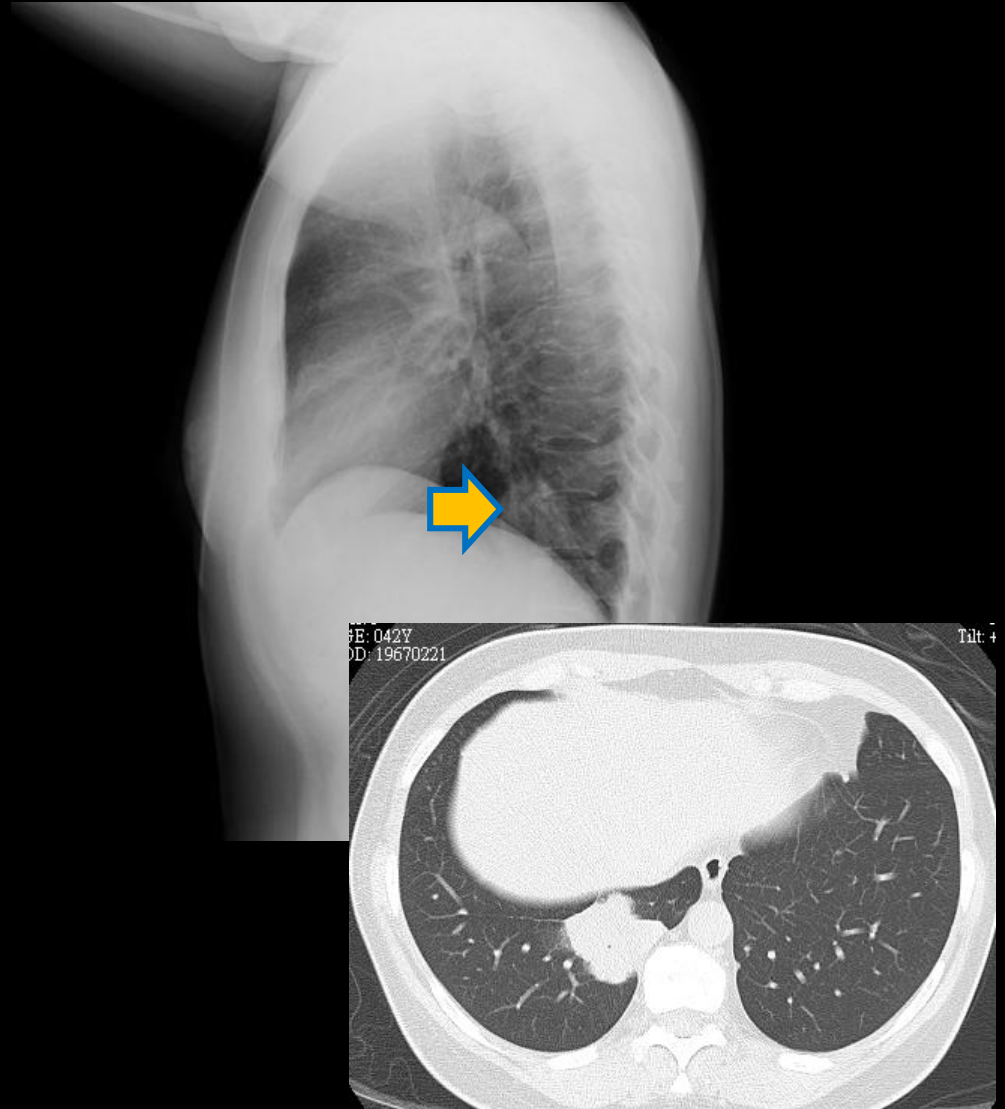


Easy missing lesions in sub-diaphragm area

50/F, bloody sputum for 6 months



Adenoca of lung, RLL



盲點：常見的判讀陷阱(四大死角)

特色：跟軟組織/骨頭重疊

- Bilateral Apex (bone overlapping)
- Large Airway
- Retrocardiac region
- Bilateral lung bases (especially sub-diaphragm)

胸部X光片之判讀要領

■ 片子：良好

- 照相品質
- 病人姿勢
- 基本資訊

■ 知識：

- 了解正常解剖學與影像
- 以patterns & signs作鑑別診斷
- 熟悉疾病之典型表現，再學習其多樣化表現

■ 技巧：

- 固定的判讀程序，避免遺漏。
- 利用不同階段的X光片，以病灶的時序變化作鑑別診斷
- 利用不同的照像技術
- 參考臨床資料

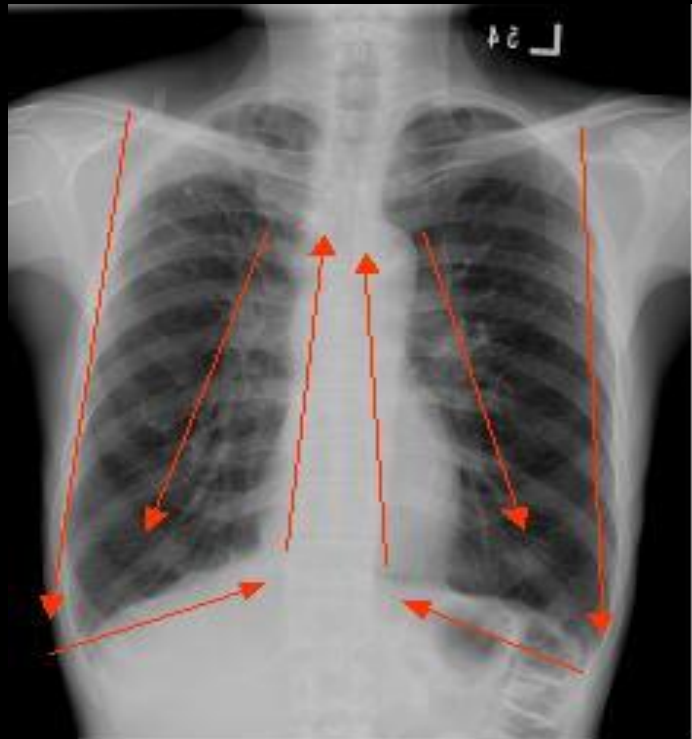
系統性的判讀(1)

蕭主任游泳姿勢說

1. 胸廓及其外軟組織
2. 橫膈及腹部器官
3. 縱膈
4. 大氣道
5. 肺門
6. 肺區(肺裂、肺紋及支氣管分支)

Felson: **T**here **A**re **M**any **L**ung **L**esions

1. T(thorax):胸廓及其外軟組織
2. A(abdomen):橫膈及腹部器官
3. M(mediastinum):縱膈，含大氣道和肺門
4. L(單側肺區):肺裂、肺紋及支氣管分支
5. L(兩側肺區左右比較)



應該注意的重點，以Felson建議的順序

■ Thorax:

- Bone: 形狀、濃度(osteolytic, osteoblastic)、trabecula
- Soft tissue: breast完整性、皮下氣腫、mass

■ Mediastinum

- 寬度(變寬：食道、大血管、lipomatosis、mass)、位移、異常空氣(食道疾病、pneumomediastinum、mediastinitis)
- Airway: 位置、intraluminal、carina angle(<60 or >90異常)
- 食道：異常的air column
- 心臟：大小、形狀、後面
- 肺門：大小、形狀、位置、濃度

■ Abdomen:

- 橫膈：形狀、位置、C-P angle、橫膈下(subdiaphragm)
- 肝臟：hepatomegaly, liver abscess
- 胃氣(gastric bubble): 與L't hemidiaphragm距離、intra gastric mass、extragastric (splenomegaly)、loss of gastric bubble(hiatal hernia, achalasia, 躺著照)

■ Lung

- 肋膜：變厚、氣胸、長水、mass
- 肺紋
- 左右比較

■ 最後再檢查一次死角：apex、airway裡面、心臟後面、橫膈下面

Easy missing points on CxR

- **左右** : situs inversus
 - **咪咪** : s/p mastectomy, pectoris major loss
 - **Airway** : endobronchial tumor
 - **Bone** : left apex tumor overlapping with 1st rib
 - **Cardia**: retrocardial area
 - **Diaphragm** : PPU, gastric cancer, lower lung cancer
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- 給胸專考生的提醒: 要留時間**寫**findings跟診斷

Thank you for your attention



蕭逸函



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