Radiology for GPs – How I report my foreign workers CXR?

PULMONARY FIBROSIS

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Dr Rahman

Criteria 2 – Pulmonary Fibrosis

2	Pulmonary Fibrosis	Pulmonary Fibrosis	All cases are unsuitable	Unsuitable
		Curvi-linear shadows	>2 linear lines or >3mm thickness, irrespective of the length	Unsuitable
			Neck shadows, skin folds, or inferior accessory fissures	Suitable
		Plate atelectasis	>3mm thickness	Unsuitable

- 1. All cases of pulmonary fibrosis are UNSUITABLE.
- 2. Curvi-linear shadows of >2 linear lines or >3mm thickness (irrespective of the length) are UNSUITABLE.
- 3. Curvi-linear shadows of 1 or 2 linear lines or <3mm thickness are SUITABLE.
- 4. Neck shadows, skin folds or inferior accessory fissures are SUITABLE.
- 5. Plate atelectasis with >3mm thickness are UNSUITABLE.

Fig 2.1: Linear coarse shadows in right upper zone. This is right apical fibrosis - UNSUITABLE.

Why pulmonary fibrosis is not suitable?

Pulmonary fibrosis is permanent replacement of lung parenchyma by connective tissue and depending on the degree, may lead to functional impairment. It can be caused by a variety of insults (infectious and non-infectious) and tuberculosis is one of them.

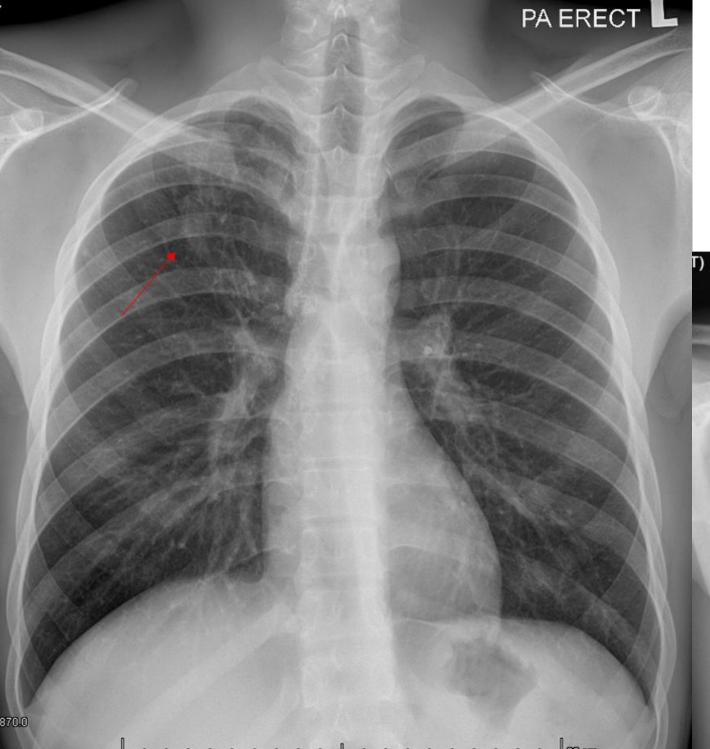


Fig 2.2: Linear coarse shadows in left upper zone. This is left apical fibrosis - UNSUITABLE.

Where is the most common site for pulmonary fibrosis?

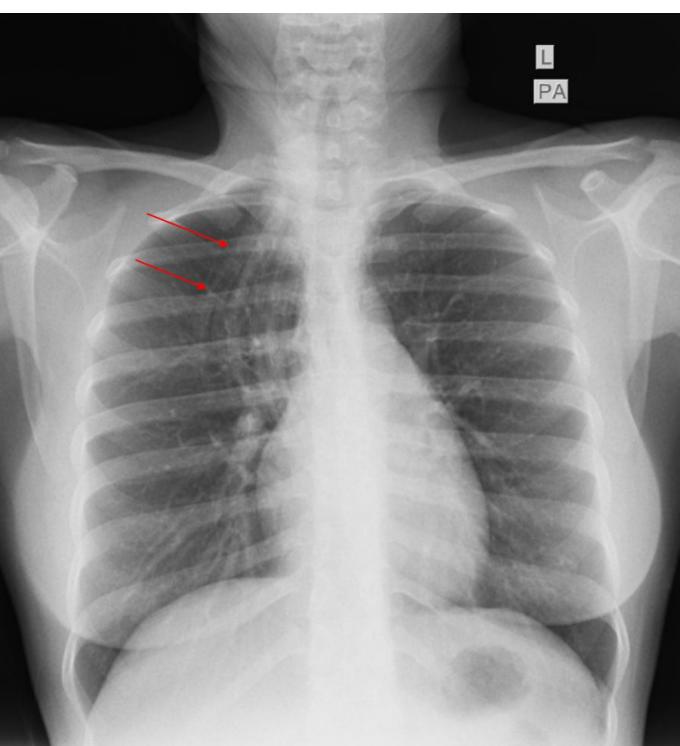
Post-primary TB has a predilection to the upper zones. Therefore, the most common site for fibrosis due to tuberculosis tend to be in the upper zones.

Apical fibrosis can be easily missed because there are so many overlapping structures in the apices.



Fig 2.3: Extensive pulmonary fibrosis with bilateral apical fibrosis, blunting both CP angles, right diaphragmatic tenting and elevated hilum – UNSUITABLE

Apical fibrosis means old TB but as tubercle bacilli are dormant, the infection could be re activated.



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Fig 2.4: Hair shadows mimicking right apical fibrosis - SUITABLE.





Fig 2.5: Linear shadow in right upper zone – is this right apical fibrosis? What should you do next?



Fig 2.6: An apical view was done and normal. Linear shadow seen on PA view is just neck shadow – SUITABLE. Hairs and neck shadows can easily mimic apical fibrosis. When you are not sure, do apical view.



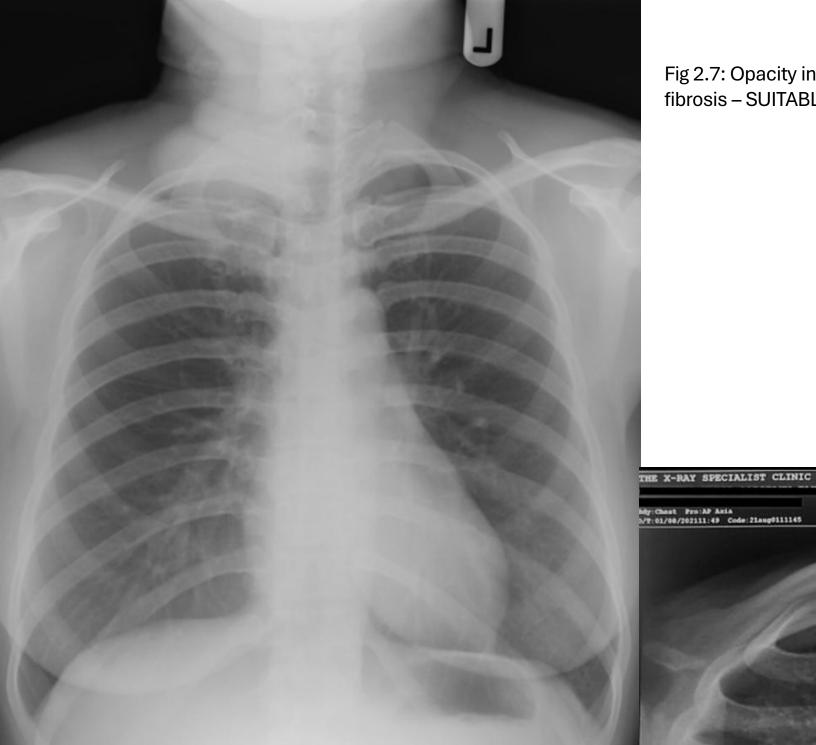


Fig 2.7: Opacity in right upper zone mimicking right apical fibrosis – SUITABLE or UNSUITABLE?

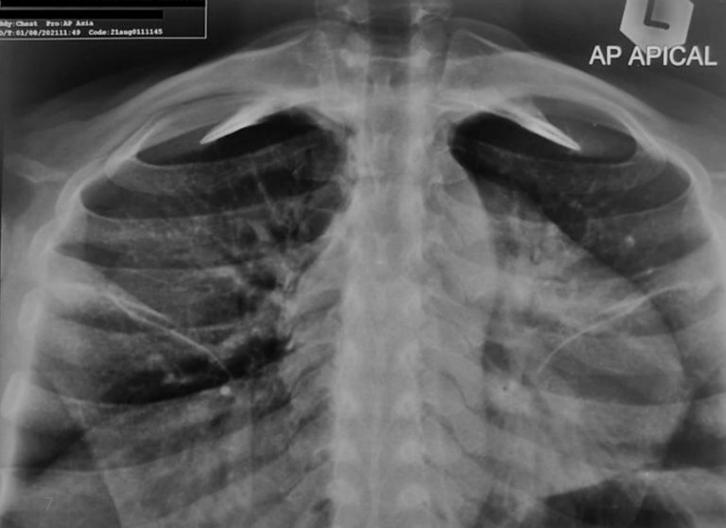
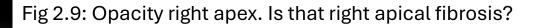


Fig 2.8: Apical view of the same person showing right apical fibrosis has disappeared. The opacity is just hair shadow! *Hair bun is a good mimicker. Please push it up or untie the bun.*



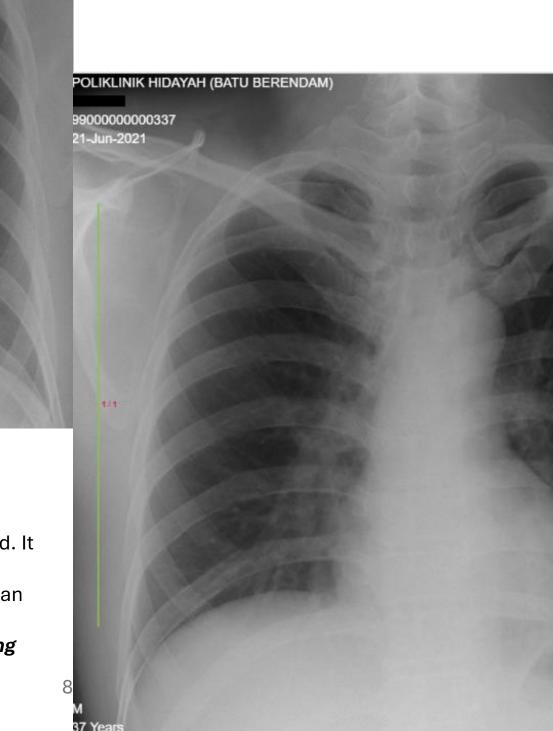


Fig 2.10: CXR was repeated. Opacity right apex has vanished. It was just hair shadows.

But wait a minute, he is a guy. It cannot be hair. Well, guys can also have long hairs!

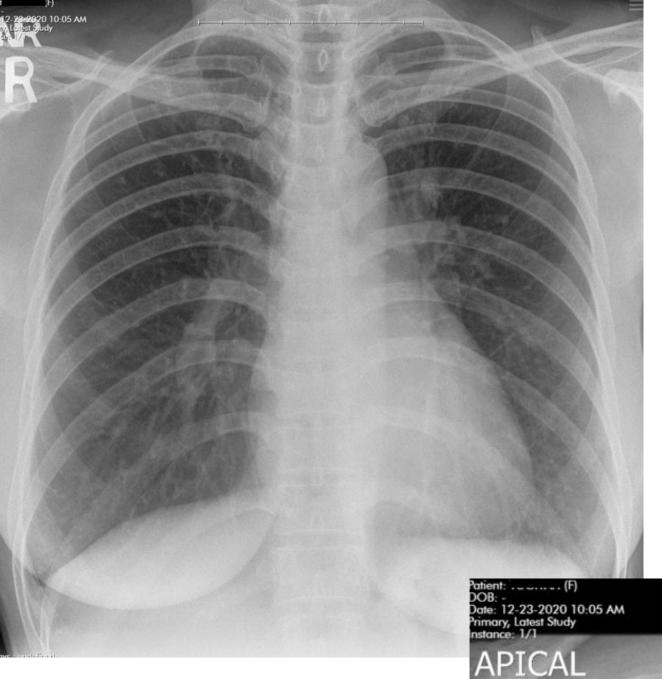
Both genders can have long hairs. Any long hairs over lung fields can mimic pathology.



POLIKLINIK HIDAYAH (BATU BERENDAM)

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09-Jun-2021



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Fig 2.11: Suspicious shadows in the right upper zone.

If I am not sure of apical fibrosis, what should I do?

- a. Do apical view. In a good apical view, the clavicles will be thrown out and the lung fields at the apices will be clearly seen.
- b. Blood vessels will be seen coming from hilum upwards but usually will not reach the periphery.
- c. Apical fibrosis will start from periphery and can go in any direction. They cross each other and the pattern is haphazard.



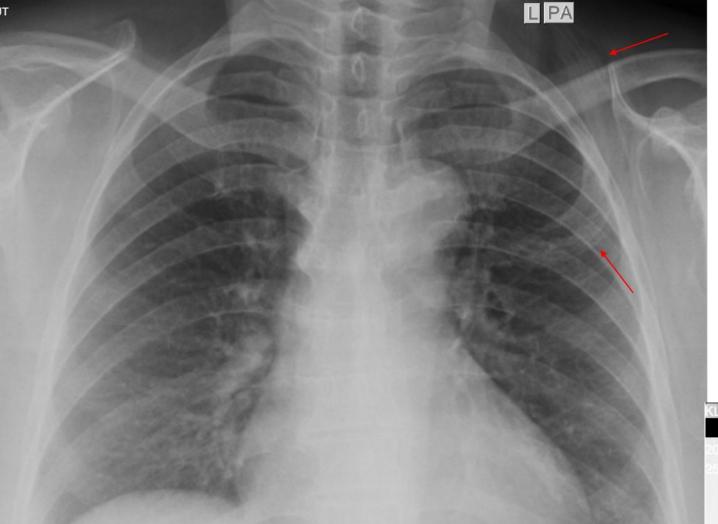


Fig 2.13: Hair shadows mimicking pulmonary fibrosis LMZ - SUITABLE.

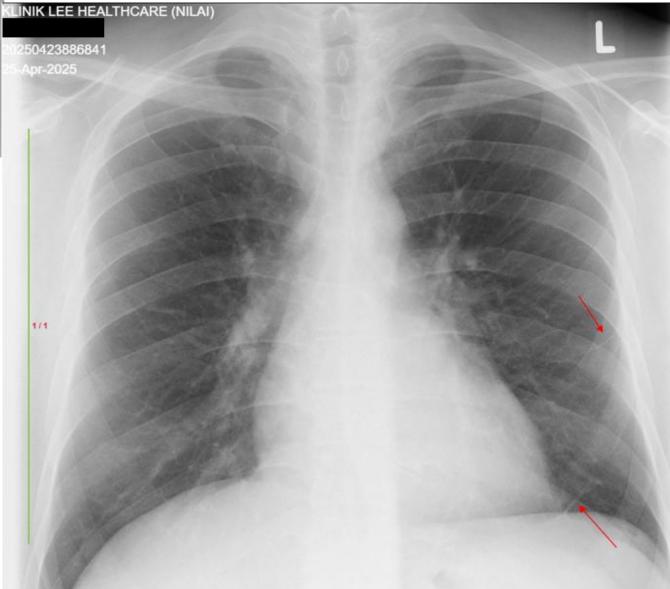


Fig 2.14: Linear shadows LMZ & LLZ – pulmonary fibrosis – UNSUITABLE

The criteria says if 1 or 2 linear shadows, it is still acceptable. In Fig 2.14, there are more than 2. therefore UNSUITABLE.



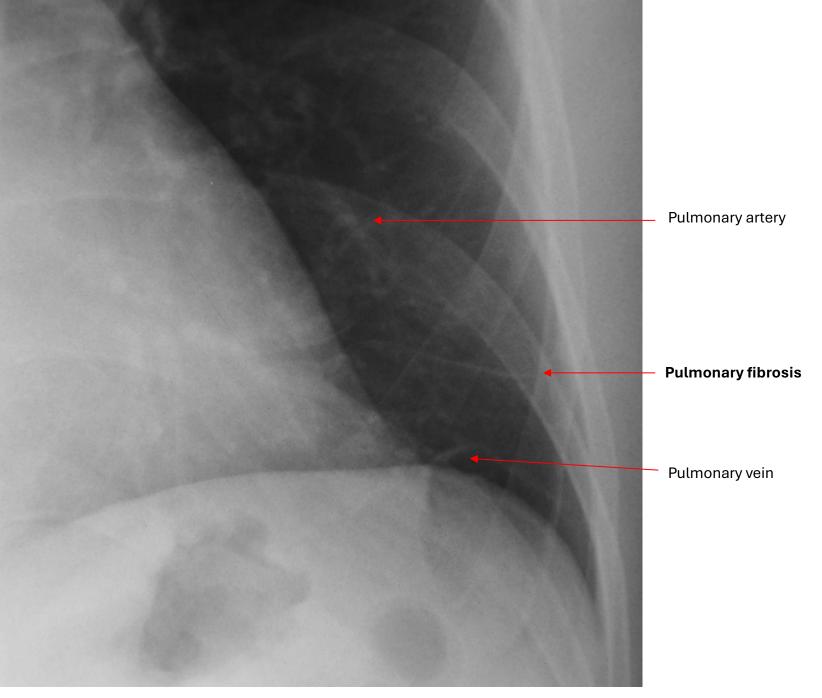


Fig 2.15: 3 linear shadows representing pulmonary artery, pulmonary fibrosis and pulmonary vein.

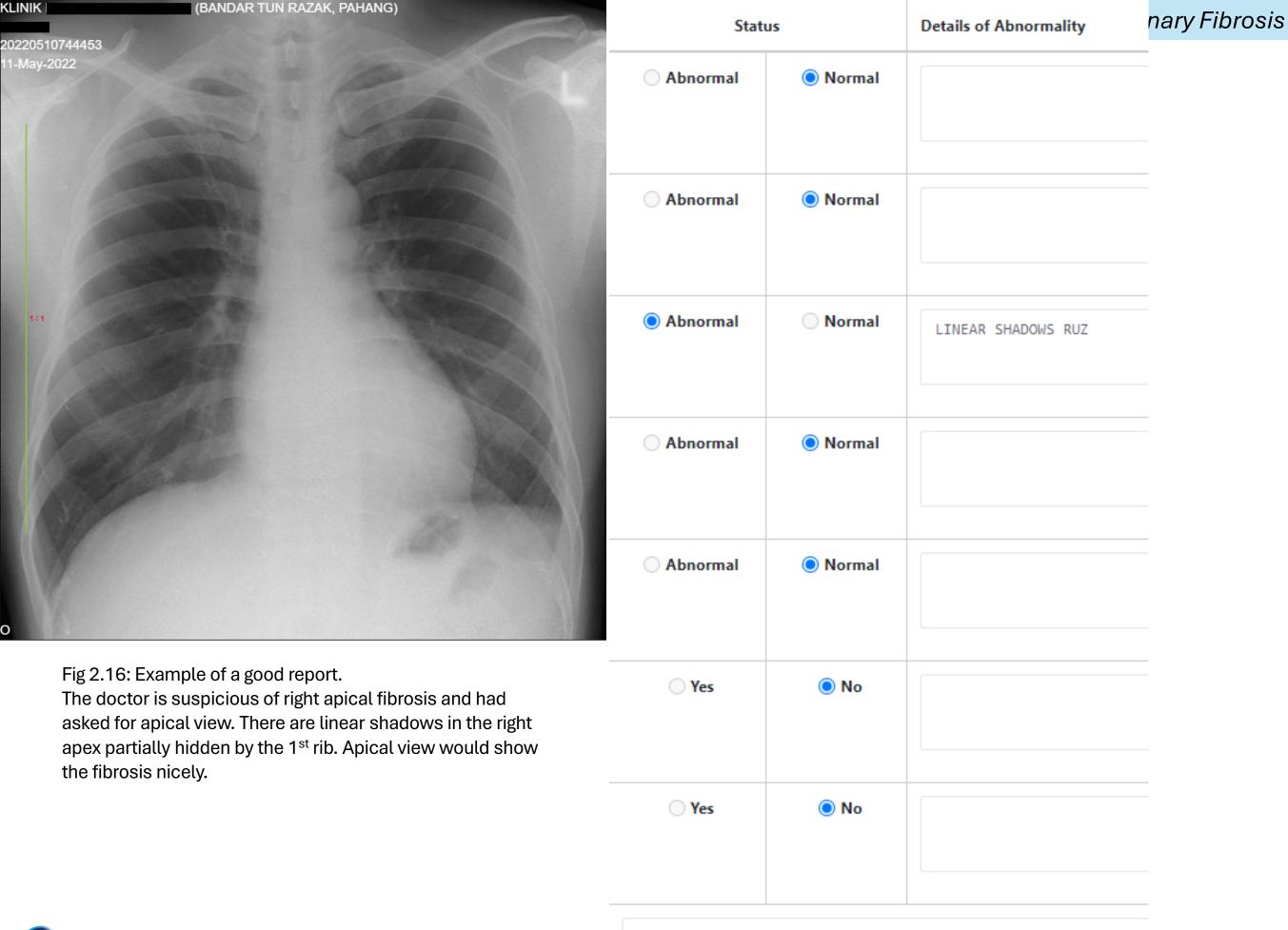
How to differentiate pulmonary fibrosis from blood vessels?

- a. Pulmonary fibrosis is seen as thin reticular or linear shadows.
- b. Fibrosis usually start from periphery and can be in any direction
- c. They are less than a mm in thickness
- d. They cross each other in non-uniform pattern
- e. If there is only 1 fibrotic shadow, thickness may vary long its course or if there are multiple fibrotic shadows, thickness between them may not be the same

In contrast, pulmonary arteries

- a. start from hilum and move to the periphery.
 Unless the lung field is plethoric, you don't see pulmonary arteries in the outer 1/3 of lung fields on normal chest x-ray.
- b. They are a few mm initially but tapers gradually
- c. As they course towards periphery, they give off branches in a pattern
- d. Pulmonary arteries run alongside bronchi. If you see end on bronchus, most likely there is also end on pulmonary artery next to it.

Pulmonary veins are not usually seen on normal chest x-rays as they are low pressure system. If you do, they start from periphery and course toward the left atrium.





RIGHT APICAL FIBROSIS SUGGEST APICAL VIEW

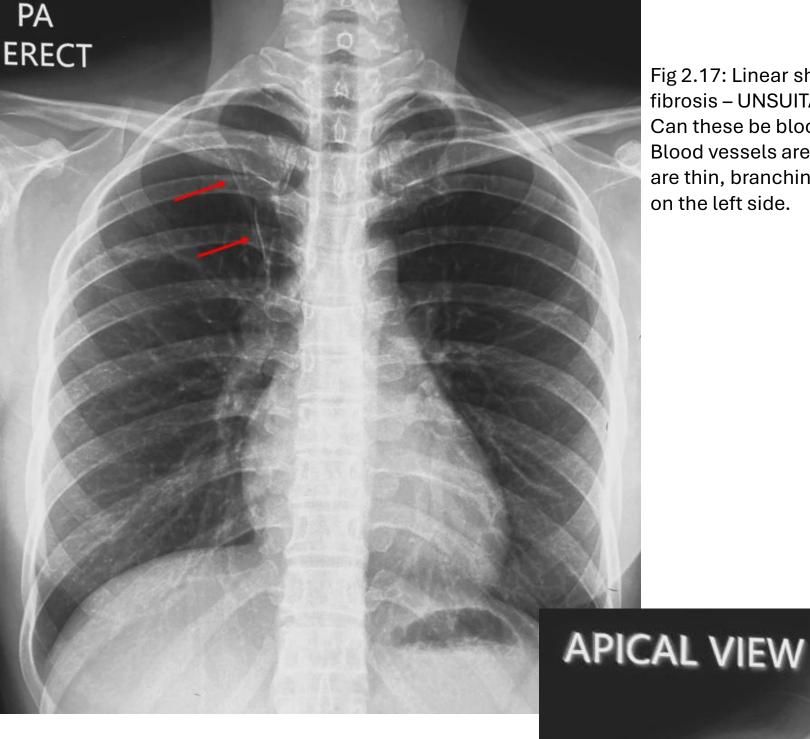


Fig 2.17: Linear shadows in right upper zone, consistent with right apical fibrosis – UNSUITABLE.

Can these be blood vessels?

Blood vessels are thicker in diameter and less dense. These linear shadows are thin, branching and dense. You also don't see the same linear shadows on the left side.

Fig 2.18: Apical view of same worker showing linear shadows in better clarity without being obscured by ribs and clavicle. This confirms right apical fibrosis -UNSUITABLE.



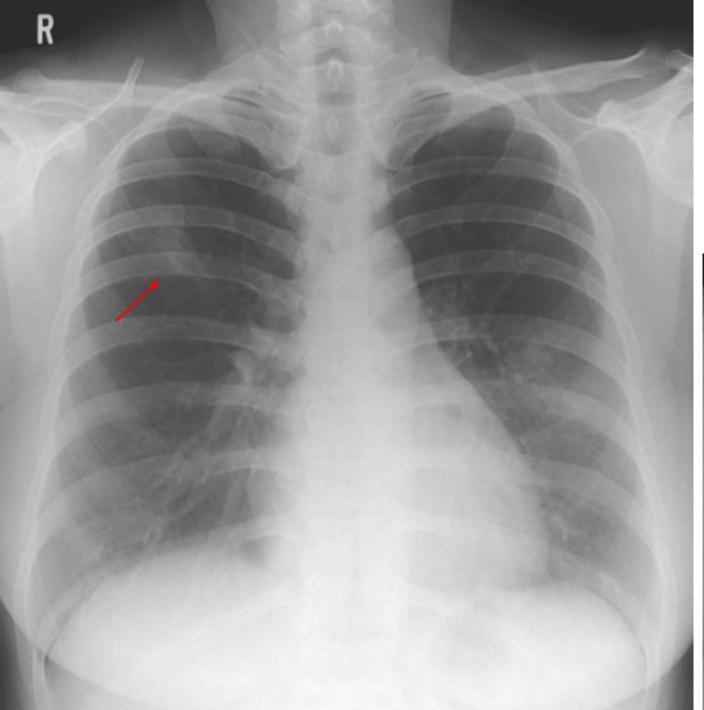


Fig 2.19: Audited as right apical fibrosis - UNSUITABLE.



Fig 2.20: Repeat CXR is normal!

How come? Both images are rotated but the 1st image is slightly more rotated than the 2nd image.

Rotation makes one side more opaque than the other. Ensure minimal or no rotation at all.



Fig 2.21: Reported as left apical fibrosis - UNSUITABLE.

Fig 2.22: But apical view is normal!

The apices are perhaps the most difficult part of CXR to decipher. This is because there are so many overlapping structures. This is compounded by rotation as in this case.

When in doubt, do extra view. For the apices, do apical view such as this one – a nicely done apical view.

Why do I say its nice? Because the clavicles are thrown out superiorly allowing us full view of the

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apices.

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Fig 2.23: Curvi-linear shadow right upper zone – Right apical fibrosis - UNSUITABLE.

DFOV:33.0 x 34.0

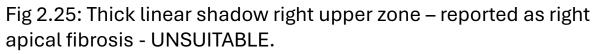
W:1024 L:512 (Au

3402 X 33 CHE

Fig 2.24: A repeat PA and extra view was done.

This is right posterior oblique view. Is this the correct view to see the apices?

No, it is not. It should be apical view for the apices. When I say do extra view, its not just any extra view. It has to be appropriate to the region of interest. Anyway, you can appreciate the fibrotic shadow over the scapula shadow (arrow).



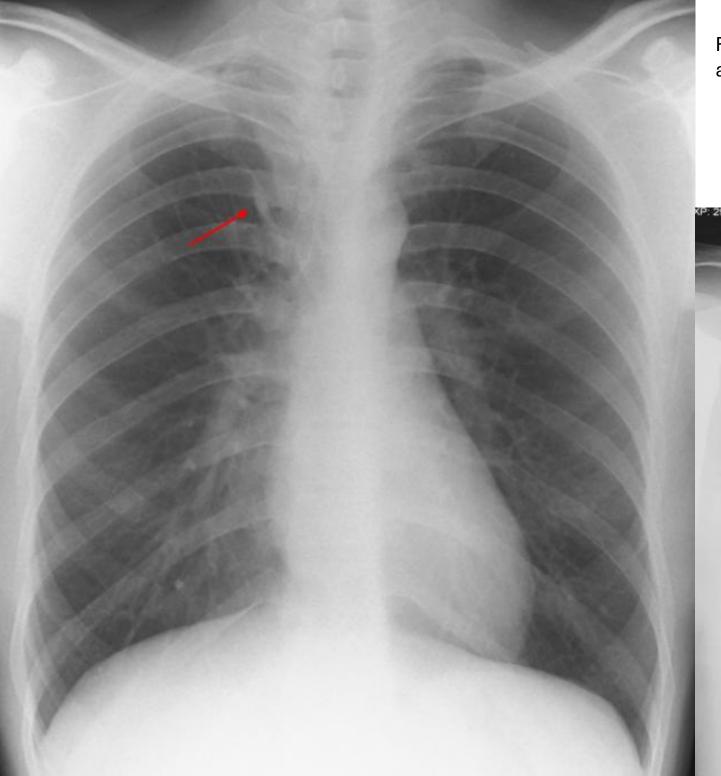


Fig 2.26: Repeat CXR shows the same linear shadow. This is azygous vein & fissure – SUITABLE.

Azygous vein is a normal variant.



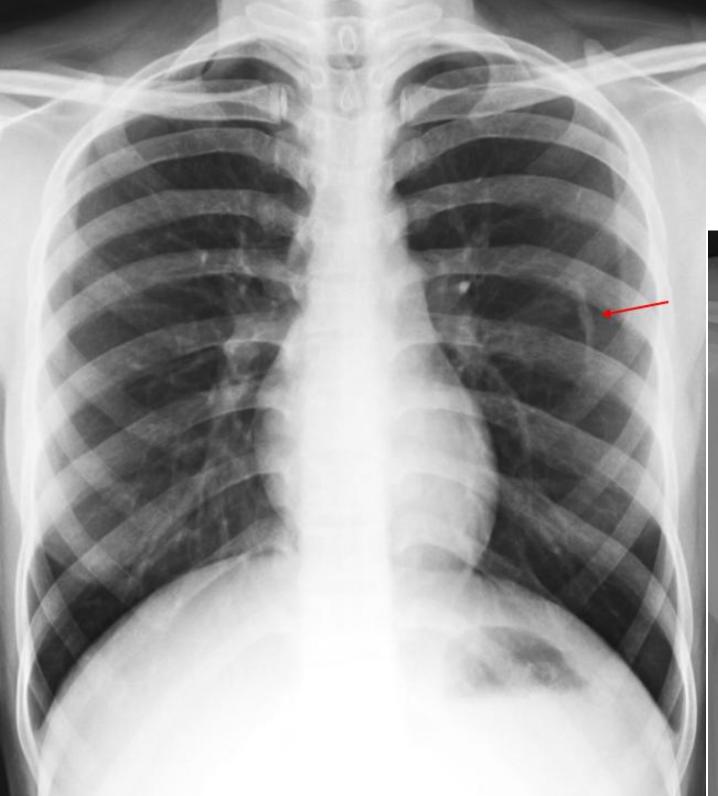


Fig 2.27: Thick linear shadow left mid zone – reported as pulmonary fibrosis - UNSUITABLE.



Fig 2.28: Repeat PA view of the same worker but at another clinic is normal. The 'fibrosis' has disappeared!

This is just an artifact probably from the gown.

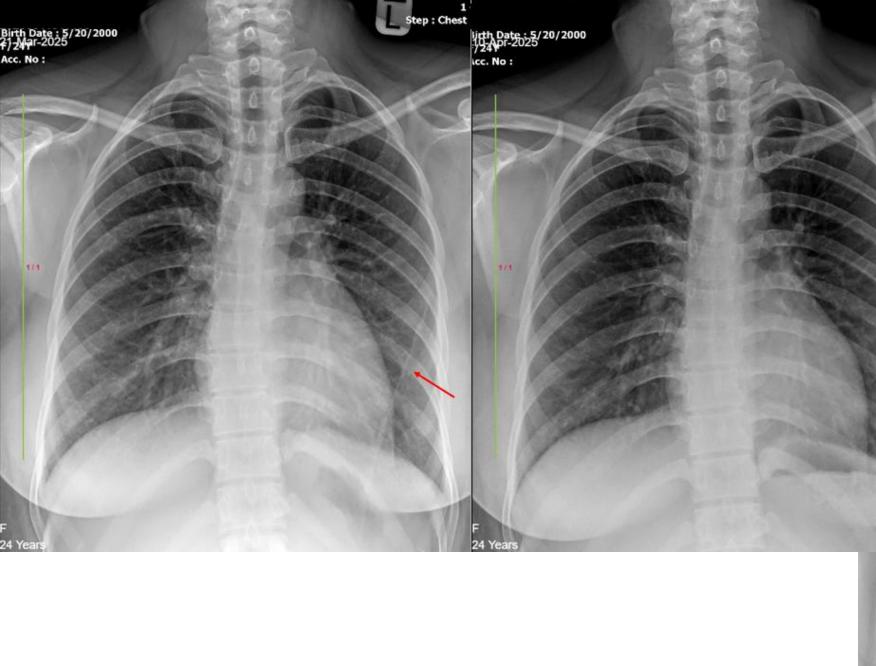
WA X RAY CENTRE SON BHO KIL DAYA X-RAY CENTRE SON BHD K.L. Pulmonary Fibrosis Fig 2.29: Right mid zone looks rather 'busy' - red arrow. What you should do next? Do a right posterior oblique view. Now you can see things better – green is right horizontal fissure (normal). But yellow is pulmonary fibrosis - UNSUITABLE. NR KLINIK PAKAR X-RAY 2429 / 2793 Fig 2.30: Is that right apical fibrosis? No, it is not. That is azygous vein (red arrow) and azygous fissure (yellow arrow) - SUITABLE. 19 ser 1 3072 x 3072 Medical Imaging 1/8/2025

Pulmonary Fibrosis

Fig 2.31: Is that pulmonary fibrosis (red arrow)?

No, it is not.

The x-ray was repeated and the linear shadow has 'disappeared'! This is most likely artifact from patient's gown - SUITABLE.



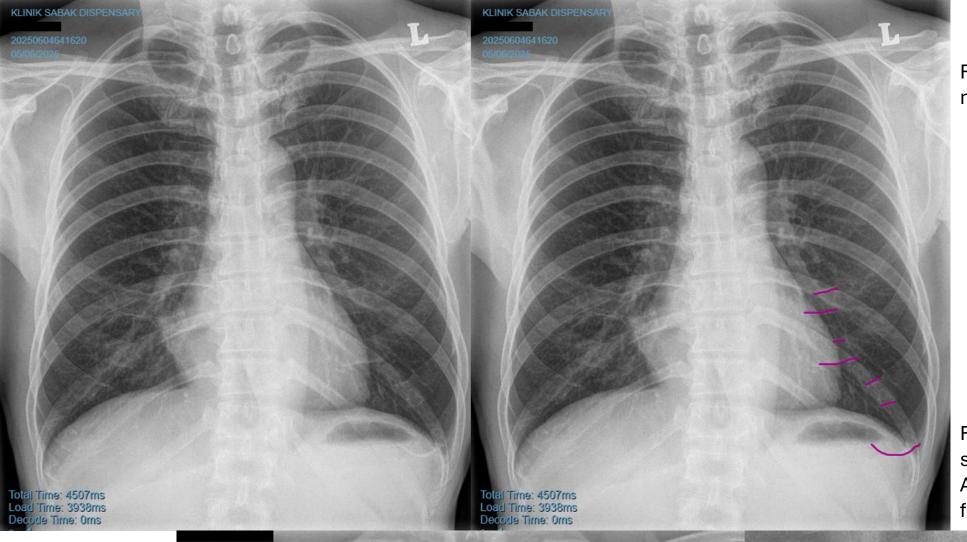
KLINIK FAMILI (MANTIN)

Fig 2.32: Is that pulmonary fibrosis (red arrow)? Or is that blood vessel? It does look like blood vessel but it is going in a different direction. Blood vessels should be from hilum going to the periphery. This is pulmonary fibrosis.

KLINIK FAMILI (MANTIN)

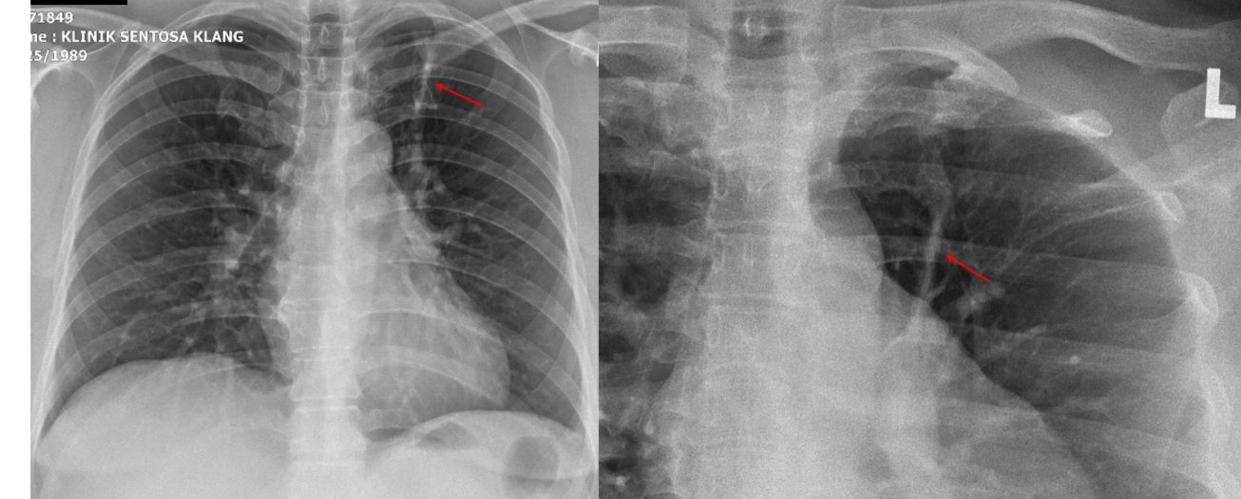
Pulmonary Fibrosis

Fig 2.33: Coastal cartilage ossification can mimic pulmonary fibrosis



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Fig 2.34: PA view showed a thick linear shadow in the left apex. Is that fibrosis? Apical view showed the shadow originated from the left hilum. Thus, it is a blood vessel.



Pulmonary Fibrosis Fig 2.35: PA view showed suspicious shadows in right apex. Is that apical fibrosis? Apical view showed apical fibrosis nicely – UNSUITABLE. BAYAN BARU) KLINIK 20250419860454 30-Apr-2025

Fig 2.36: Is that left apical fibrosis? Red arrow No, look closely. Its hair shadow – yellow arrow.



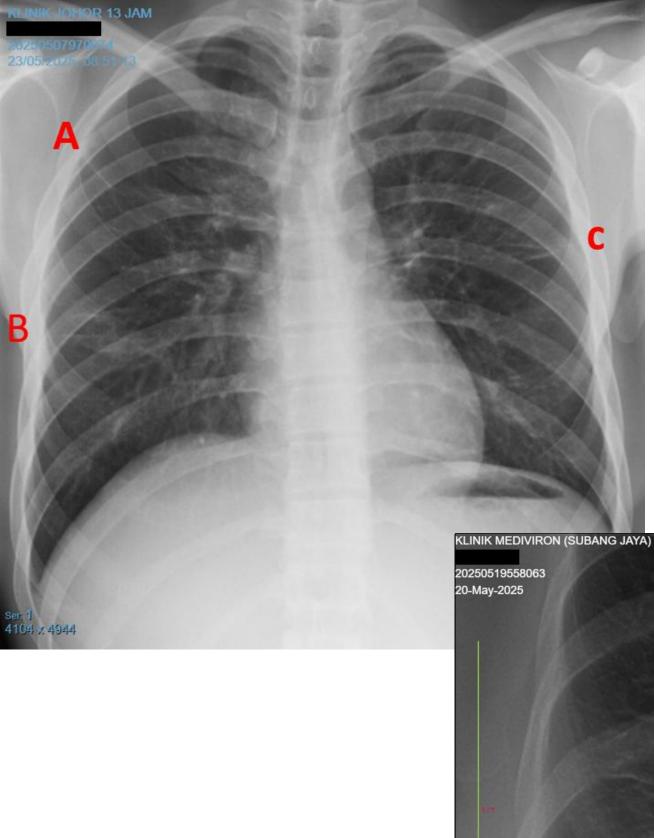


Fig 2.37: Pulmonary fibrosis – UNSUITABLE. Why I call them fibrosis and not blood vessels. A, B & C showed similar features:

- They start from periphery
- They are branching

Fig 2.38: Pulmonary fibrosis or plate atelectasis?

The linear shadow starts from periphery and oriented medially and downwards. This is a feature of pulmonary fibrosis.

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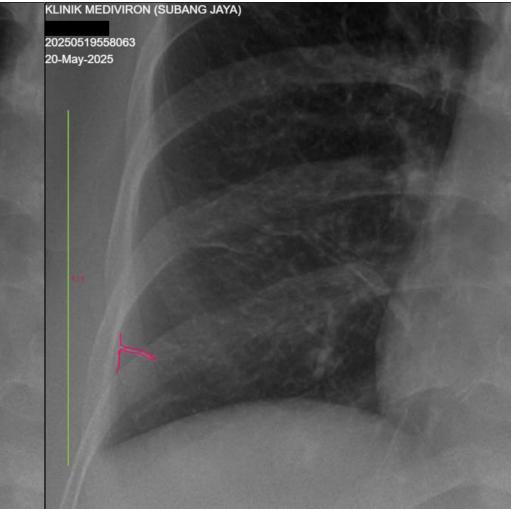




Fig 2.39: How to read the apices on PA view?

I have mentioned this before: apical fibrosis is the most common misread by doctors in my audit.

Why? Because apices are difficult to read due to many over-lapping structures.

What should you do?

- a. Mentally or physically blocked off the bottom 2/3 of the lung fields.
- b. Compare right and left apices and look for any asymmetry
- c. Check for any rotation that might cause the asymmetry
- d. Finally, decide if it is normal or abnormal

The above is right apical fibrosis. There are linear shadows which you don't see on the left side.

Why cant these be vessels? They are thin, irregular in thickness and not continuous. Some extend to periphery. You expect vessels to be uniform in thickness and has a branching pattern, starting from periphery and extends superiorly towards the apices (but not reaching the apices).



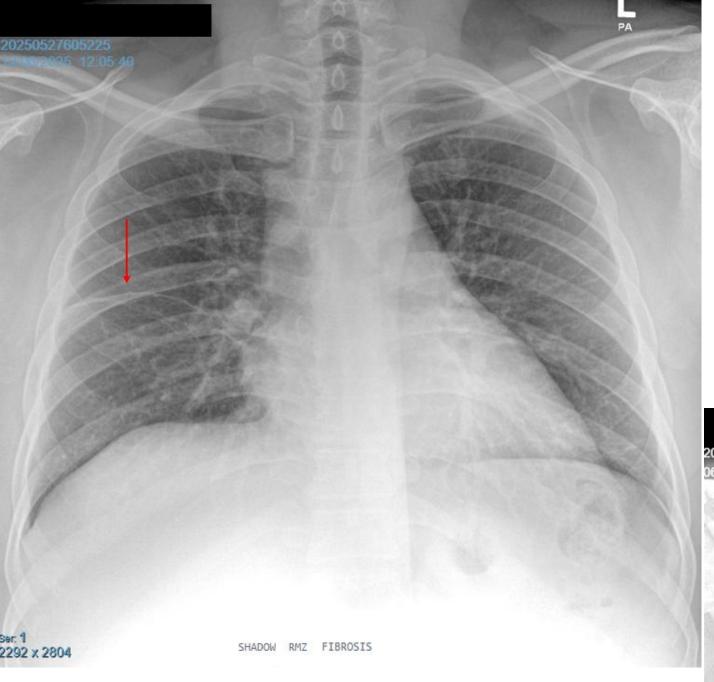


Fig 2.40: Reported as shadow RMZ – Fibrosis – UNSUITABLE This is normal horizontal fissure – SUITABLE

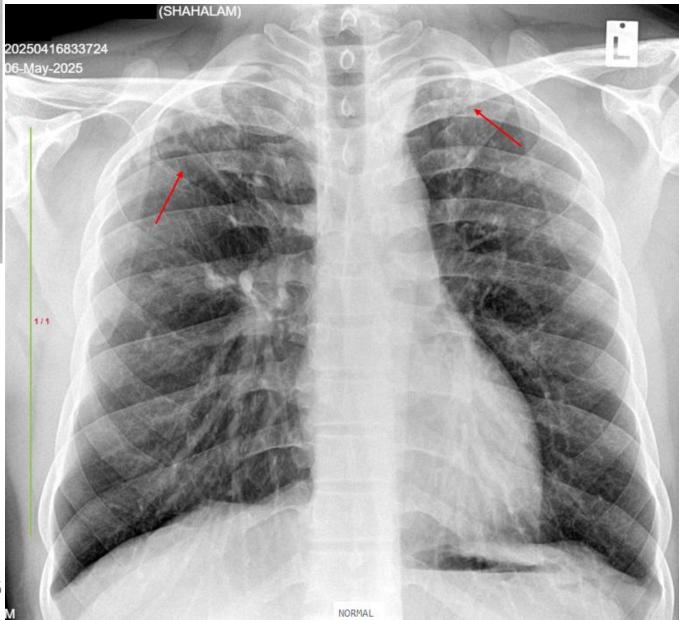


Fig 2.41: Reported as NORMAL – SUITABLE This is bilateral apical fibrosis – UNSUITABLE





Fig 2.42: PA view showing ?bilateral apical fibrosis – UNSUITABLE. Apical view is normal – SUITABLE Which one do you follow? Follow apical view

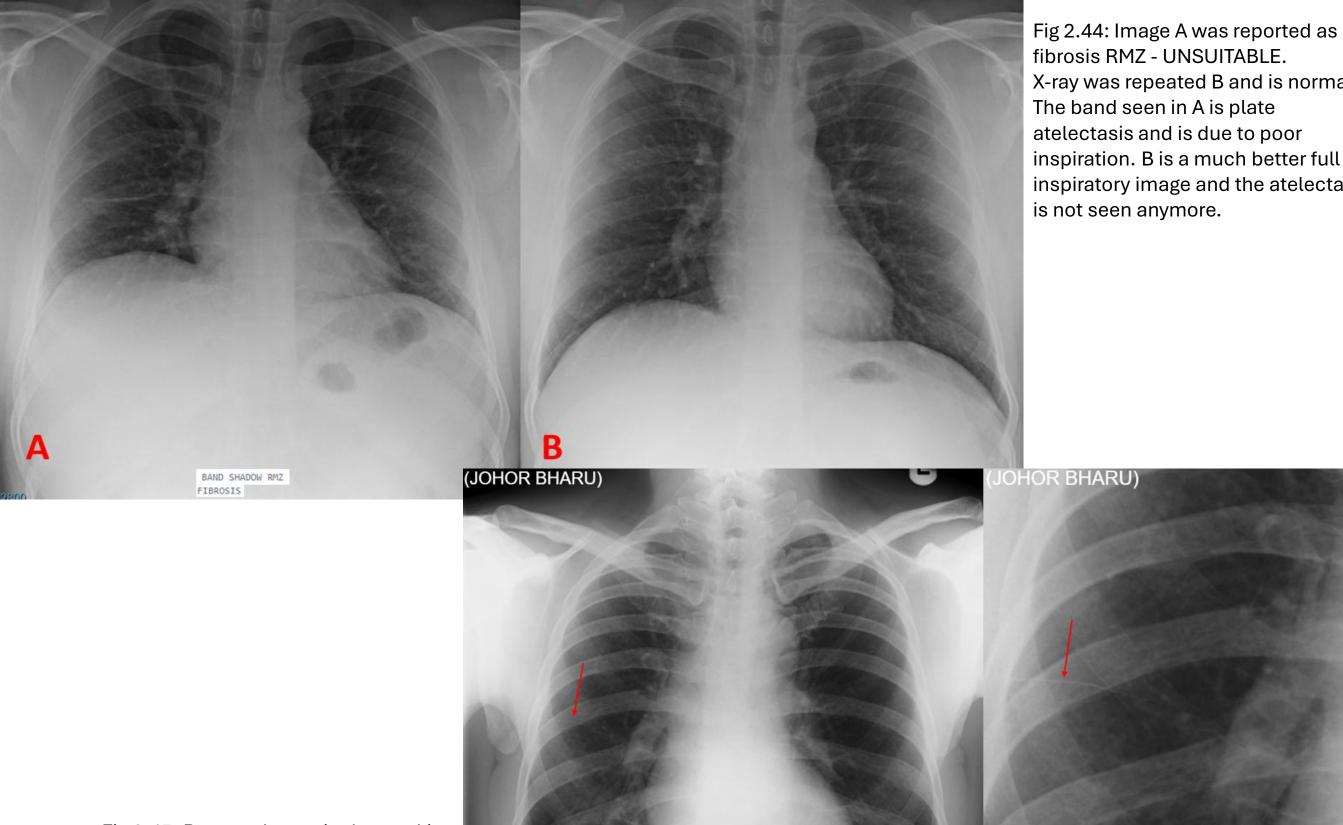
Fig 2.43: Reported as fibrosis RMZ - UNSUITABLE. PA and apical views showing normal right horizontal fissure – SUITABLE.



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Pulmonary Fibrosis

X-ray was repeated B and is normal. atelectasis and is due to poor inspiration. B is a much better full inspiratory image and the atelectasis



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Fig 2.45: Reported as reticular marking RMZ - UNSUITABLE. This is normal right horizontal fissure.

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A RETICULAR MARKING SEEN AT THE RIGHT MID ZONE THIS COULD BE DUE TO PAST LUNG INFECTION.

Fig 2.46: Thick reticular or linear band RUZ – right apical fibrosis - UNSUITABLE.

Be sure to zoom your image to see things better.



CUVILINEAR OPACITY AT THE LEFT HILUM TO UPPER

Fig 2.47: Reported as pulmonary fibrosis - UNSUITABLE. This is just pulmonary vessel – normal.

Klinik Koeh

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NOTES

About this e-book 'How I report my foreign workers CXR?':

They are 12 chapters in the series

- 1. Pulmonary granuloma
- 2. Pulmonary fibrosis
- 3. Pleural anomalies
- 4. Hilar lymphadenopathy
- 5. Diaphragm anomalies
- 6. Rib anomalies
- 7. Clavicle anomalies
- 8. Lung anomalies
- 9. Cardiac anomalies
- 10.Other anomalies
- 11.Tuberculosis
- 12. How to produce a good quality report

Each is published separately as it becomes available Each is subject to review from time to time

What do we do?

- Teleradiology: online x-ray reporting
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Radiology for GPs Series

Standard Reporting Criteria for Foreign Workers CXR e-book

No	Topic	Launch date	Link
1	Pulmonary granuloma	1 st July 2025	1 Pulmonary granuloma.pdf
2	Pulmonary fibrosis	1 st Aug 2025	
3	Pleural anomalies	1 st Sept 2025	
4	Hilar lymphadenopathy	1st Oct 2025	
5	Diaphragm anomalies	1 st Nov 2025	
6	Rib anomalies	1 st Dec 2025	
7	Clavicle anomalies	1 st Jan 2026	
8	Lung anomalies	1 st Feb 2026	
9	Cardiac anomalies	1 st March 2026	
10	Others	1 st Apr 2026	
11	Tuberculosis	1 st May 2026	
12	How to write a good report	1 st June 2025	How to produce good quality report.pdf



X-RAY COURSE FOR LICENSE RENEWAL (PHYSICAL)



16 AUGUST 2025



09:00 AM - 1.30 PM

4 CPD POINTS
FOR DOCTORS & RADIOGRAPHERS

NR MEDICAL IMAGING



Venue:

MBSA Convention Centre Seksyen 13, Jalan Tinju 13/50, Seksyen 13, 40100 Shah Alam, Selangor. Bilik Seminar 4, 5 & 6

9.00 am - 11.00 am

En. Syarul Iman Saufi (BKRP, MOH)

 Guidelines for Application of Radiology Facility Under the Atomic Energy Licensing Act 1984 (ACT 304)

11.00 am - 11.30 am

Group Photo/ Tea Break

11.30 am - 1.00 pm

Prof. Hamzaini Abdul Hamid (Prof. of Radiology & Consultant Radiologist, UKMMC)

- · Paediatric X-rays for GPs
- Understanding other Imaging Modalities Ultrasound, CT, PET-CT, and MRI for General Practitioners

1.00 pm - 1.30 pm

Dr. Abdul Rahman Mohamad (Consultant Radiologist, NR Medical Imaging)

- · Patient Care & Handling, including Medico-Legal Aspects.
- · Quiz (Slido.com)

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- **2.** To enable the GP's to make better clinical decision and instituting appropriate treatment.
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Number of Doctors: Minimum 1 doctor,

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Module B) Antenatal & Female Pelvis

Module C) Breast & Thyroid

Module D) MSK- Shoulder & knee

Module E) Echocardiography

Module F) Vascular- Carotid & popliteal vein

(The date is subject to change)
Choose your dates & modules:

Module A

AUG 6, 2025 (Wednesday) Module B AUG 7, 2025 (Thursday) Module D AUG 9, 2025 (Saturday)

Module C

AUG 14, 2025 (Thursday)

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- Common pathology

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Placenta localization

• Estimation of amniotic fluid

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- · Organ identification

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- Scanning technique and basic measurements
- Common pathology

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your learning experience.

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Hands-on session with Live model

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- Scanning technique and basic measurements
- Common pathology

Course fee RM 800

per module



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(Slots are limited)

AUG 9th, 2025

Saturday

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Number of Minimum 1 doctor, doctors: maximum 2 doctors

3-4 hours

Registration: Check the slot availability

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GENERAL PATIENTS (NON-FOMEMA)

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GENERAL PATIENTS (NON-FOMEMA)

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- 2. Dr Harith Sherifuddin Ismail (NSR 124596)
- 3. Dr Zakaria Habib (NSR 134025)
- *All our radiologists are members of Fomema Panel **Consultant Radiologists (PCR)**

WHAT IS YOUR **TURNAROUND TIME (TAT)?**

All cases will be reported within 24 hours, meaning all cases send today will be reported by the following day.

HOW DO YOU CHARGE?

We charge RM6.25 per case.

No minimum fee and no other hidden charges.

Our other services:

- 1. X-ray courses for new license holders (Kursus 40 jam)
- 2. CME for x-ray license renewal
- 3. Film audit report
- 4. QC for x-ray machine (with our affiliated partners)

For more information:

NR Medical 603 5036 0607

Dr Rahman 6012 203 1542

Pn Nor (Manager) 6019 299 5586

Pn Qila (Business Development) 6012 244 1547

Hotline 014 555 6060

- 5. Radiographic technique workshops
- 6. Ultrasound workshop & lectures

HOW DO YOU ASSIGN CASES TO US?

When you open MERTS, on the x-ray page, there is a button ASSIGN TO RADIOLOGIST.

Click this button and look for Dr Rahman.

Dr Rahman full name is Abdul Rahman Mohamad and Fomema R code is R9EA000009.

After that, make Dr Rahman your favourite so that you don't have to search for his name every time.

HOW DO WE OPEN AN ACCOUNT WITH NR?

Just fill in the information on the last page, take a photo and whatsapp to Pn Nor at 6019 299 5586.

HOW DO YOU BILL US?

Please check you bill every month at www.nrmedical.net using your username and password. We do not send paper invoices anymore.

Please pay promptly to avoid interruption.

Just fill in the information on the last page, take a photo and whatsapp to Pn Nor at 6019 299 5586.

URGENT CASE?

Within the period 9am – 9pm, you may whatsapp our Hotline number. Hotline will alert the radiologists and we will get a radiologist to report ASAP. However, this should be only for clinically urgent cases. This service is not available after 9pm. You are advise to refer to hospital for urgent medical care.

GENERAL PATIENTS X-RAY REPORTING

OUR RADIOLOGISTS:

- 1.Dr Abdul RahmanMohamad (NSR 124701)
- 2.Dr Harith Sherifuddin Ismail (NSR 124596)
- 3. Prof Dr Hamzaini A Hamid (NSR 135269)
- 4.4.Dr Lee Chee Kong (NSR 132343)
- 5.Dr Norba'aiah Md Noh (NSR 125263)
- 6.Dr Aslinda Mahat (127468)
- 7. Dr Jeremiah Sundaraj Peter (NSR 139363)
- 8.Dr Norlah Khalil (NSR 124608)

All our radiologists are senior consultants with years of experience in radiology.

WHAT IS YOUR **TURNAROUND TIME (TAT)?**

All cases will be reported within 12 hours, meaning all cases send today will be reported by the end of the day. In 90% of cases, TAT is within 2 hours.

HOW DO WE OPEN AN **ACCOUNT WITH NR?**

WHAT IF I HAVE AN

HOW DO WE SEND CASES FOR REPORTING?

First, we need to install our teleradiology system called NRRIS in your clinic. Installation is done via Teamviewer and it takes only minutes. We shall install NRRIS in your x-ray computer. You can choose to install in a separate computer but the 2 computers must be linked. There is no installation fee.

WHAT IS YOUR REPORTING TIME?

9am - 9pm 7 days a week including weekends and public holidays.

HOW DO YOU CHARGE?

For plain x-rays, we charge based on number of views. Each view is charged at RM11.22

For other imaging modalities - ultrasound, mammo, CT scan & MRI - please ask us for the full price list.

HOW DO YOU BILL US?

Please check you bill every month at www.nrmedical.net using your username and password.

We do not send paper invoices anymore.

Please pay promptly to avoid interruption.

IS THERE EXTRA CHARGE FOR URGENT CASES?

No extra charges.





INTRODUCING **TELECARDIOLOGY**



Stay Ahead with Your Health Screening & Patients' Management!

Introducing Our NEW Online ECG & **Echo Reporting Services**

WHY CHOOSE OUR SERVICE?



Market Leader

We are already a leader in TeleRadiology & NOW introducing TeleCardiology



Convenient

Get your ECG & Echo reports online within the next working day!



Accurate

Our senior NSR-registered cardiologists ensure high-quality analysis and interpretation.



Secure

Your patients' health information is encrypted and kept confidential.



Accessible

Simply upload your ECG or Echo and receive a thorough report online.

WHAT YOU NEED TO DO?



1) Health screening packages

Incorporate ECG with cardiologist report or Echo with cardiologist report in your health screening packages.



2) Patient's management

Make it your standard protocol to obtain cardiologist reports for all your routine ECGs & Echocardiography.



3) Open account & Installation

Contact us to open an account and installation of NRRIS in your desktop or laptop. Installation is done remotely and is free.

For more information:

NR Medical 603 5036 0607 Hotline 014 555 6060 Pn Nor (Manager) 6019 299 5586 Pn Qila (Business Development) 6012 244 1547 Dr Rahman 6012 203 1542

INTRODUCING TELECARDIOLOGY **ONLINE ECG & ECHO REPORTING**

ONLINE ECG REPORTING

HOW IT WORKS:



1) Doing your ECG

Do your 12 leads ECG as usual



2) JPG image

If your output is on an A4 ECG paper, use your printer scanner to scan the printout to get a jpg image. You can also use your phone and an appropriate app to get a clear high-resolution photo of your ECG. Keep it in a folder on your laptop/desktop.

Certain machine has a build-in SD card. Copy the tracing in jpg format.



3) Upload Your ECG

Upload your ECG image onto our secure platform.



4) Expert Review

Our team of experienced cardiologists will review vour ECG.



5) Receive Your Report

Access your detailed report with clear explanations and recommendations by the next working day!

ONLINE ECHO REPORTING

HOW IT WORKS:



1) Doing your Echo

Echo should be performed by a qualified and trained Cardiovascular Sonographer or Technician.



2) Dicom image

The output from your ultrasound machine should be a set of Dicom images. Extract these Dicom images on a thumb drive.



3) Draft report

Your sonographer or CVT will prepare a draft report for each patient



4) Upload Your Echo

Upload your Echo images (cine and still) from the thumb drive and draft report onto our secure platform.



5) Expert Review

Our team of experienced cardiologists will review your Echo.



6) Receive Your Report

Access your detailed report with clear explanations and recommendations by the next working day!

WHO CAN BENEFIT?

- Clinics or medical centres offering health screening packages
- · Doctors monitoring patients with cardiovascular conditions
- Doctors needing faster and accurate ECG or echo analysis for their patients
- · Compliance to insurance requirement
- Clarifying ambiguous report by ECG machine
- Doctors' own personal development in ECG & Echo knowledge
- Doctors who would like to reduce their medico-legal risk

WHO WE CANNOT HELP?

Doctors consulting patients with chest pain and require urgent report - better to refer to hospital immediately!

HOW MUCH DOES IT COST?

Installation is FREE ECG report fee is RM49.00 only Echo report fee is RM77.54 only

Upgrade your health screening packages and patients' management today -try our online ECG and Echo reporting services!



IMPORTANT REMINDER

The Malaysian Medical Council (MMC) has recently rejected appeal applications because of non - fulfillment of the CPD point requirement which is mandatory for renewal of Annual Practicing Certificate (APC).

Visit our website for related content and updates

- Quality Standards for formal Continuing Professional Development (CPD) Activities
- Continuing Professional Development (CPD) Guidelines
 - Frequently Asked Questions (FAQs) On Continuing Professional Development (CPD)

"SECURE YOUR FUTURE: EARN CPD POINTS NOW!

FOR FURTHER INQUIRIES, CONTACT US:



Unit APC: 019-802 2171 / 019-383 2171



unitapc@mmc.gov.my









