RADIOLOGY FOR FINALS – THE ULTIMATE REVISION GUIDE

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This short focused revision guide features 20 of the most popular x-rays that are likely to feature in the final OSCE examination. Each x-ray is accompanied by the same x-ray with annotation in order to highlight the abnormality more clearly and a ‘take-away’ learning point.

Supported by:
CASE 1:

Can you spot the abnormality?

When first looking at this film, it may appear normal, however on detailed inspection, you can see a focal opacity at the left apex. This is a PANCOAST'S TUMOUR.

Pathology at the lung apex includes; Pancoast's tumour, pneumothorax, TB and fibrosis. These areas should be reviewed with extra care as abnormalities may be missed due to clavicles and ribs (superimposed shadows).

LEARNING POINT:

Review areas on the CXR are:

- Lung apices
- Behind the heart
- Below the diaphragm
- Breast shadows
- The hila
CASE 2:
Can you spot the abnormality?

Here you can see multiple distended bowel loops centrally, with valvulae conniventes present, but the lumen diameter is less than 5cm. These are all indicative of small bowel obstruction. Note that there is normally only a small amount of gas in the small bowel, and that the lumen diameter is normally between 2-3cm.

LEARNING POINT:
In small bowel obstruction the loops are:

1. Central
2. Valvulae conniventes across bowel
3. Usually < 5.5cm
CASE 3:

Can you spot the abnormality?

Below you may see the pleural effusion in the right hemi-thorax, indicated by the blunting of the right costo-phrenic angle. You may also note that this patient only has her right breast and that there are axillary clips on the left hand side, indicating axillary node clearance which would have been conducted at the time of the left mastectomy.

LEARNING POINT:

If you see a mastectomy on a radiograph, you must look for metastatic disease elsewhere:

1. Lung metastases
2. Bone metastases
3. Malignant pleural effusion
CASE 4:
Can you see any abnormality?

You may note from the x-ray that this patient has a right upper lobe mass and enlarged right hilar lymph nodes. This is suggestive of a cavitating lung cancer. The hilar border is irregular, large and dense. When differentiating the cause of the hilar enlargement, note that lymphadenopathy can give a smooth lobular appearance, whereas a spiculated, irregular or indistinct margins are more indicative malignancy. However, you must be sure to look at the rest of the x-ray in order to detect any lung lesions.

LEARNING POINT:
Cavitating lung lesions include:
1. Tumour
2. Infection (especially TB)
3. Cavitating infarcts
4. Infected Bullae
CASE 5:

Can you spot the abnormality?

With lobar pneumonia, you may see the loss of the “Silhouette sign”. This states that the heart shadow and diaphragm are only seen due to the surrounding air in the adjacent pulmonary acini. If lobar consolidation occurs, the adjacent acini obscure that portion of the silhouette. For example, a right middle lobe consolidation, the right heart border silhouette is lost \(^1\). This film shows a right upper lobe pneumonia with consolidation “stopping” at the horizontal fissure.

LEARNING POINT:

With a lobar pneumonia, a follow-up CXR is required!
CASE 6:

Can you see an abnormality?

You can see a displaced trachea and an anterior mediastinal mass on this radiograph. The trachea is displaced due to the mass effect pushing against it. This mediastinal mass is an enlarged thyroid gland.

LEARNING POINT:
Anterior mediastinal masses could be due to thymus tumours (in the paediatric population), teratomas, lymphoma or retrosternal thyroid masses.¹
CASE 7:
Can you spot the abnormality?

This radiograph shows signs of colitis. This includes thumb-printing which is due to mucosal oedema.

The radiograph also shows dilatation of the transverse colon lumen (>5.5cm).

LEARNING POINT:
Daily AXR’s are often performed in ulcerative colitis patients with an acute episode, to assess for toxic megacolon.
The x-ray shows left upper lobe collapse. You should be able to see the “veiled” like opacity with diaphragmatic elevation.

LEARNING POINT:

When looking at left upper lobe collapse, look for:

1. Decreased visibility of the aortic knuckle
2. A veil like opacity
3. Diaphragmatic elevation
4. Ipsilateral mediastinal depression
CASE 9:
Can you spot the abnormality?

The above x-ray shows right upper lobe collapse. You will see the elevated right diaphragm, the horizontal fissure pulled up and the opacity in the right upper lobe of the lung.

LEARNING POINT:
Lobar collapse in a young asthmatic patient is likely to be due to a mucus plug.
CASE 10:
Can you spot the abnormality?

This x-ray shows peri-hilar consolidation, also known as “Bats Wings”. It is a sign of pulmonary venous congestion due to cardiac failure.

LEARNING POINT:

5 Features of cardiac failure:

1. Cardiomegaly
2. Pleural effusions
3. Kerley B Lines
4. Peri-hilar consolidation
5. Upper lobe venous distension
CASE 11:

Can you spot the abnormality?

This radiograph is showing the appearance of a left lower lobe collapse. If you look carefully you will detect a triangular appearance behind the heart, which occurs because the left lower lobe collapses down behind the heart. This is known as the “SAIL SIGN”. The left hilum is also in a lower position than normal as it is “pulled down” due to the collapse.

LEARNING POINT:

Left lower lobe collapse in adults should be viewed with suspicion as it may be due to an endo-bronchial tumour causing distal collapse. Bronchoscopy is therefore indicated.
LEARNING POINT:

Gallstones which are a common cause of pancreatitis are uncommonly seen on abdominal x-rays.

CASE 12:

Can you spot the abnormality?

From this x-ray you may see speckled pancreatic calcification. Whenever looking at abdominal radiographs, be sure to inspect for calcification. Pathological calcification which can be seen on an abdominal x-ray include; chronic pancreatitis, nephrocalcinosis (calcification of the renal parenchyma) and an aortic aneurysm.
This patient has emphysema, which can be seen by the hyperinflation of the lungs indicated by: the flat hemi-diaphragms, the large central pulmonary arteries and the decreased peripheral markings. Bullae are also seen at the apices. Bullae compress the normal lung and distort the surrounding vasculature, which may make them more apparent on the radiograph.

**LEARNING POINT:**
Pulmonary arteries enlarge due to secondary pulmonary hypertension from the emphysema.
CASE 14:
Can you spot the abnormality?

The radiograph shows evidence of pulmonary fibrosis, widespread in both lungs. This is seen by the reticulo-nodular shadowing. This is simply a meshwork of lines (reticule) and tiny nodules. It is usually a chronic and progressive process and so looking at previous chest x-rays may prove helpful. The heart border and diaphragm may appear blurred if fibrosis is present giving a ‘shaggy heart’ appearance and the vascular markings are less distinct due to numerous small areas of lung collapse.

LEARNING POINT:
Sometimes the cause of the fibrosis may also be on the x-ray.

E.g. A bamboo spine in ankylosing spondylitis, or erosions at the outer end of the clavicle in rheumatoid disease.
CASE 15:
Can you spot the abnormality?

The radiograph shows signs of TB. TB has a predisposition for the upper zones of the lung. With TB, you may also see unilateral hilar enlargement due to lymphadenopathy. TB may be present in the miliary form (tiny dots like “millet seeds”). You must remember however, that miliary shadowing may also be due to sarcoidosis or malignant miliary metastasis.

LEARNING POINT:
TB may “heal”, leaving:

1. Fibrosis
2. Calcified granulomas
3. Pleural thickening and calcification
CASE 16:

Can you spot the abnormality?

The artificial (metallic) mitral valve can be seen on careful inspection on this radiograph. They may be seen better on a lateral view. A pacemaker is also clearly evident. There is also cardiomegaly and splaying of the subcarinal angle. Remember the left atrium lies posteriorly just beneath the carina, higher than the major chambers. When it enlarges, it pushes upon the carina. On a well penetrated film, one will see the air containing carina to be splayed, with widening of the sub-carinal angle. This will be due primarily to the elevation of the left main bronchus as it rides over the expanding left atrium$^4$.

LEARNING POINT:

Chest x-ray signs of left atrial enlargement:

1. Splaying of the subcarinal angle
2. Prominent left atrial appendage
3. Double right heart border
CASE 17:

Can you spot the abnormality?

Ureteric calculi can be difficult to see. You must follow the path of the ureter, which lies adjacent to the medial border of the psoas muscle, along the transverse processes. A calcified stone is apparent due to the increased ‘whiteness’ (opacification).

LEARNING POINT:

CT-KUB is a very sensitive investigation for detecting renal calculi.
An NG tube has been inserted into this patient. However, as seen on the radiograph, the NG tube is in the wrong position, having passed down into the right main bronchus as highlighted.

**LEARNING POINT:**

Do not use an NG tube if you cannot confidently identify the position.

**ASK FOR HELP.**
Can you spot the abnormality?

This is an erect x-ray on which, you can see this patient has pneumoperitoneum. This is evident from the free air under the diaphragm. This is more evident under the right hemi-diaphragm as the upper liver border is distinguished from the diaphragm. It is harder to see under the left hemi-diaphragm due to the gastric bubble.

**LEARNING POINT:**

Beware of the bowel loop beneath the diaphragm (Chilaiditi’s sign), which can mimic a perforation.
CASE 20:

Can you spot the abnormality?

The chest radiograph demonstrates a large left sided pneumothorax. As the pleural space fills with air, the underlying lung collapses. If the pneumothorax is very large it may cause mediastinal shift (a tension pneumothorax) impeding venous return. If this is not immediately decompressed this may result in a cardio respiratory arrest.

LEARNING POINT:

Chronic chest diseases such as COPD, asthma and cystic fibrosis all predispose to pneumothoraces.
REFERENCES:


* Front page photograph: http://www.caspercollege.edu/radiography/images/radtech_m_000.jpg

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