

**The Unofficial Guide to
Radiology: 100 Practice Chest X-Rays,
with Full Colour Annotations
and Full X-Ray Reports**

MOHAMMED RASHID AKHTAR, NA'EEM AHMED and NIHAD KHAN
Edited by MARK RODRIGUES and ZESHAN QURESHI

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The Unofficial Guide to Radiology: 100 Practice Chest X-Rays, with Full Colour Annotations and Full X-Ray Reports

FIRST EDITION

MOHAMMED RASHID AKHTAR MBBS BSc (Hons) FRCR
NA'EEM AHMED MBBS BSc
NIHAD KHAN MBBS BSc

Edited by

MARK RODRIGUES MBChB (Hons) BSc (Hons) FRCR
ZESHAN QURESHI BM BSc (Hons) MSc MRCPCH



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Edited by Mark Rodrigues and Zeshan Qureshi
Authored by Mohammed Rashid Akhtar, Na'eem Ahmed, Nihad Khan.

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INTRODUCTION

Almost every patient has some form of medical imaging performed during his or her investigations and management. The commonest type of imaging modality remains the X-ray. Chest X-rays are a frequently performed and particularly important test that all doctors should be able to interpret.

Despite its universal importance, X-ray interpretation is often an overlooked subject in the medical school curriculum, making it difficult and daunting for many medical students and junior doctors. *The Unofficial Guide to Radiology: 100 Practice Chest X-Rays, with Full Colour Annotations and Full X-Ray Reports* aims to help address this.

The key to interpreting X-rays is having a systematic method for assessment, and then getting lots of practice looking at and presenting X-rays. The best-selling core radiology text *The Unofficial Guide to Radiology* was specifically designed for medical students, radiographers, physician's associates, and junior doctors. It outlines a comprehensive system for assessing X-rays, in addition to clinical and radiology based MCQs to contextualise the radiographs to real clinical scenarios. Its approach led to recognition from the British Medical Association, the British Institute of Radiology and the Royal College of Radiologists. This follow-up textbook builds upon these foundations, providing readers with the opportunity to practise and consolidate their chest X-ray assessment and presenting skills.

There are lots of radiology textbooks available, but many have important limitations. Most have small, often poor quality images which are not ideal for displaying the radiological findings. The findings are usually only described in a figure below the image, and it may be difficult to know exactly what part of the image corresponds to which finding! Many textbooks deal with X-rays in isolation rather than in a useful clinical context.

We have designed this book to allow readers to practice interpreting X-rays in as useful and clinically relevant way as possible. There are:

- 100 large, high quality chest X-rays to assess.
- Cases presented in the context of a clinical scenario and covering a wide range of common and important findings (in line with the Royal College of Radiologists' Undergraduate Radiology Curriculum).
- Detailed on-image colour annotations to highlight key findings.
- Comprehensive systematic X-ray reports.
- Relevant further investigations and management are discussed for each case.

The cases are divided by difficulty into standard, intermediate and advanced based on the imaging findings and clinical implications. Each begins with a clinical scenario and a chest X-ray for you to interpret. You can then turn over the page, and find a fully annotated version of the same X-ray with a comprehensive report. Each systematically structured report is colour coded to match the corresponding labelled image.

Each report is based on the ABCDE approach to chest X-ray interpretation, as recommended in *The Unofficial Guide to Radiology*:

Technical features: Patient ID, projection, inspiration, rotation.

Airway: Tracheal position.

Breathing: Lung parenchyma, pleural spaces, pulmonary vasculature.

Circulation and mediastinum: Heart size/shape/borders, aorta, mediastinum, hila.

Diaphragm and delicats: Diaphragm position/shape, pneumoperitoneum, skeleton, soft tissues.

Extras: Anything else e.g. ECG clips, line, tubes, surgical staples.

Review areas: Lung apices/hila/behind heart/costophrenic angles/below the diaphragm.

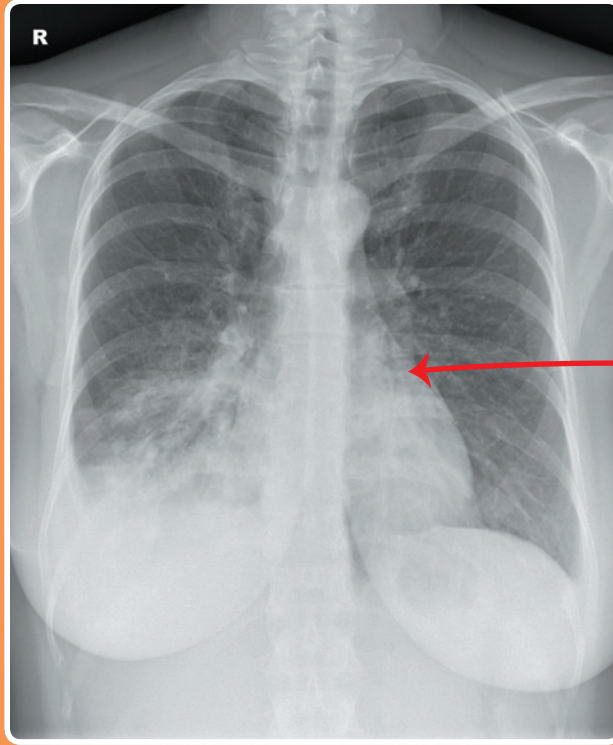
Summary: Putting together the salient findings of the X-ray with a differential diagnosis.

Investigations and management: The next steps in management after taking on board X-ray findings.

Realistic clinical history

CASE 11

A 40 year old female presents to ED with a 1 week history of cough and fever. There is no significant past medical history and she is a non-smoker. On examination, she has saturations of 85% in air, and is febrile with a temperature of 38.2°C. There is dullness to percussion and crackles in the right lower zone. A chest X-ray is performed to assess for possible pneumonia, collapse or effusion.



Large, high quality image to assess

REPORT – RIGHT MIDDLE AND LOWER LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY
 The trachea is central.

BREATHING
 There is heterogeneous airspace opacification of the right lower zone consistent with consolidation. The lungs are otherwise clear. The lungs are not hyperinflated.

There is blunting of the right costophrenic angle in keeping with a small right pleural effusion. The left-sided pleural spaces are clear.

CIRCULATION
 The heart is not enlarged.
 The right heart border is largely clear, although its inferior margin is indistinct. Clear left heart border.
 The aorta appears normal.
 The mediastinum is central, not widened, with clear borders.
 Normal size, shape, and position of the hila.

DIAPHRAGM + DELICATES
 The right hemidiaphragm is obscured by consolidation. Normal position and appearance of the left hemidiaphragm.
 No pneumoperitoneum.

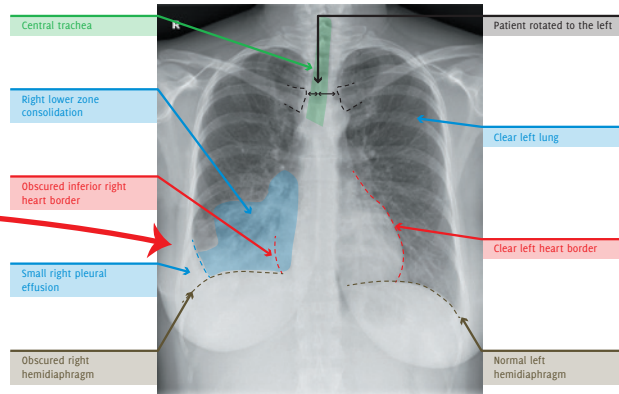
The imaged skeleton is intact with no fractures or destructive bony lesions visible.
 The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS
 No vascular lines, tubes, or surgical clips.
Lung Apices: Normal
Hila: Normal
Behind Heart: Normal
Costophrenic Angles: Blunted right costophrenic angle. Normal left costophrenic angle
Below the Diaphragm: Normal

Detailed report following a standard format

Chest x-ray review areas specifically highlighted

Clear annotations highlighting the major x-ray findings



SUMMARY, INVESTIGATIONS & MANAGEMENT
 This X-ray demonstrates right lower zone consolidation which obscures the right hemidiaphragm, consistent with right lower lobe pneumonia. There may also be pneumonia affecting the right middle lobe, as the right heart border appears partially obscured. A small right parapneumonic effusion is also present.
 Initial blood tests may include FBC, U/Es, CRP, and blood cultures. A sputum culture may also be obtained.

The patient should be treated with appropriate antibiotics for community-acquired pneumonia, with a follow-up chest X-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).
 Ultrasound could be used to further assess the volume of the pleural effusion, particularly if a diagnostic pleural aspiration is being considered.

Investigations & management plan put the x-ray in the context of the overall clinical management

With this textbook, we hope you will become more confident and competent interpreting chest X-rays, both in exam situations and in clinical practice.

We also hope that this is just the beginning; we want you to get involved! This textbook has been a collaboration with junior doctors and students just like you. You have the power to contribute something really valuable to medical education; we welcome your suggestions and would love for you to get in touch. A good starting point is our Facebook page, which is growing into a forum for medical education.

Please get in touch and be part of the medical education project.



Mark Rodrigues



Zeshan Qureshi



Mohammed
Rashid Akhtar



Na'eem Ahmed



Nihad Khan



Facebook: <http://www.facebook.com/TheUnofficialGuideToMedicine>



Email: unofficialguidetomedicine@gmail.com



Twitter: @UGTM



Instagram: @the_UGTM



LinkedIn: The Unofficial Guide to Medicine

FOREWORD



Professor David
M Hansell

It is often said that interpretation of the chest radiograph is a dying art, and so it may be. Nonetheless, there are good reasons to keep alive the skills that allow accurate radiographic diagnosis. As the authors point out in their introduction, the chest radiograph is one of the most frequently ordered diagnostic tests, and this is likely to remain the case for the foreseeable future. Although the chest radiograph is ubiquitous, audits repeatedly reveal that the quality and accuracy of radiographic diagnosis is highly variable. The consequence of faulty interpretation can be unnecessary further investigations or, worse, failure to recognise important disease. This book goes a long way in helping both the novice and the more accomplished readers to hone their skills at reading chest radiographs.

The wealth of high quality teaching material in this carefully curated collection of 100 chest radiographs is impressive, and the authors have rightly concentrated on common, but clinically important, conditions. Another strength of this book is the repetition of a suggested scheme

(given on the following page of each case) to ensure that the reader's evaluation of the chest radiograph is truly comprehensive - after some time this approach becomes second nature, and a good habit.

Any skill worth acquiring requires time and practice. Working through this series of chest radiographs will increase your confidence and skill at chest radiograph interpretation (n.b. confidence and skill are not synonymous) and there is considerable fun to be had along the way.

DAVID M HANSELL MD FRCP FRCR FRSM
*Professor of Thoracic Imaging, Imperial College, London
Consultant Radiologist, Royal Brompton Hospital, London*



Lana Nguyen

As a final year medical student approaching graduation, I only wish I had access to this book in my first few years on clinical placement. The high quality images, clearly labelled pathological signs and broad range of chest pathology covered, make this book an invaluable tool to anyone looking to develop a solid foundation in interpreting chest x-rays.

It is clear that this book has been written with students and junior doctors in mind. Each image is accompanied by a clinical vignette and examination findings which helps learners integrate the radiological findings with the clinical picture. Furthermore, the final "Summary, Investigations & Management" section provided in each case are precisely what supervisors and examiners want to hear when asking you to interpret an image either on the ward or in the OSCE.

This fantastic addition to the UTGM series easily meets its aim of helping students and junior doctors become more confident and competent at interpreting chest X-rays.

LANA NGUYEN
President, Western Sydney Medical Society 2015-6

ABBREVIATIONS

AC joint	Acromioclavicular joint
ACE	Angiotensin-converting enzyme
AP	Anterior-posterior
ARDS	Acute respiratory distress syndrome
ATLS	Advanced trauma life support
CABG	Coronary artery bypass graft
COPD	Chronic Obstructive Pulmonary Disease
CRP	C-reactive protein
CT	Computed tomography
CTPA	Computed tomography pulmonary angiography
CURB-65	Confusion Urea > 7 mmol/l Respiratory rate ≥ 30 SBP < 90 mmHg, or DBP ≤ 60 mmHg Age ≥ 65
ED	Emergency Department
ECG	Electrocardiogram
ESR	Erythrocyte sedimentation rate
ET tube	Endotracheal tube
FBC	Full blood count
HR	Heart rate
IV	Intravenous
LFTs	Liver function tests
LLL	Left lower lobe
NG tube	Nasogastric tube
PA	Posterior-anterior
PE	Pulmonary embolism
PICC	Peripherally inserted central catheter
PSA	Prostate specific antigen
RR	Respiratory rate
SVC	Superior vena cava
TFT	Thyroid function test
U/Es	Urea and electrolytes

CONTRIBUTORS

EDITORS

Mark Rodrigues
MBChB (Hons) BSc (Hons) FRCR

ECAT Clinical Lecturer, University of Edinburgh
Honorary Radiology Registrar, Royal
Infirmary of Edinburgh, UK



M. Rodrigues



Z. Qureshi

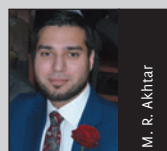
Zeshan Qureshi
BM BSc (Hons) MSc MRCPCH

Academic Clinical Fellow, Great Ormond Street,
UK and Institute of Global Health, UCL, UK

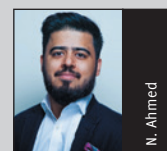
AUTHORS

Mohammed Rashid Akhtar
MBBS BSc (Hons) FRCR

Radiology Registrar, The Royal London
Hospital and Broomfield Hospital, UK



M. R. Akhtar



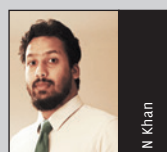
N. Ahmed

Na'eem Ahmed
MBBS BSc

Radiology Registrar, St George's University
Hospital NHS Foundation Trust, UK

Nihad Khan
MBBS BSc

Radiology Registrar, Nottingham
University Hospital NHS Trust, UK



N Khan

SENIOR REVIEWER

Patrick Byrne
MRCPG MRCSed FRCP Edin

Consultant Physician & GP, Bedford
Hospital, Fort William, UK



P. Byrne

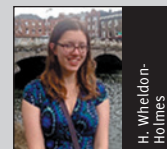
REVIEWERS

Cong Ying Hey

Medical Student, University of Nottingham



C. Y. Hey



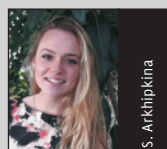
H. Wheldon-
Holmes

Hannah Wheldon-Holmes
BA (Hons)

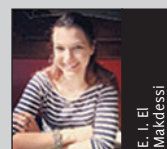
Medical Student, Swansea University

Sofia Arkhipkina

Medical Student, University of Leeds



S. Arkhipkina



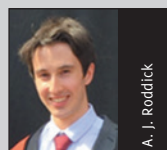
E. I. El
Makdessi

Emma Isabella El Makdessi
BA MSc

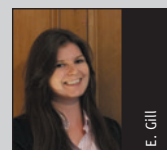
Medical Student, University of Edinburgh

Alistair J. Roddick
BSc (Hons)

Medical Student, King's College London



A. J. Roddick



E. Gill

Emma Gill
BSc (Hons)

Medical Student, University of Edinburgh

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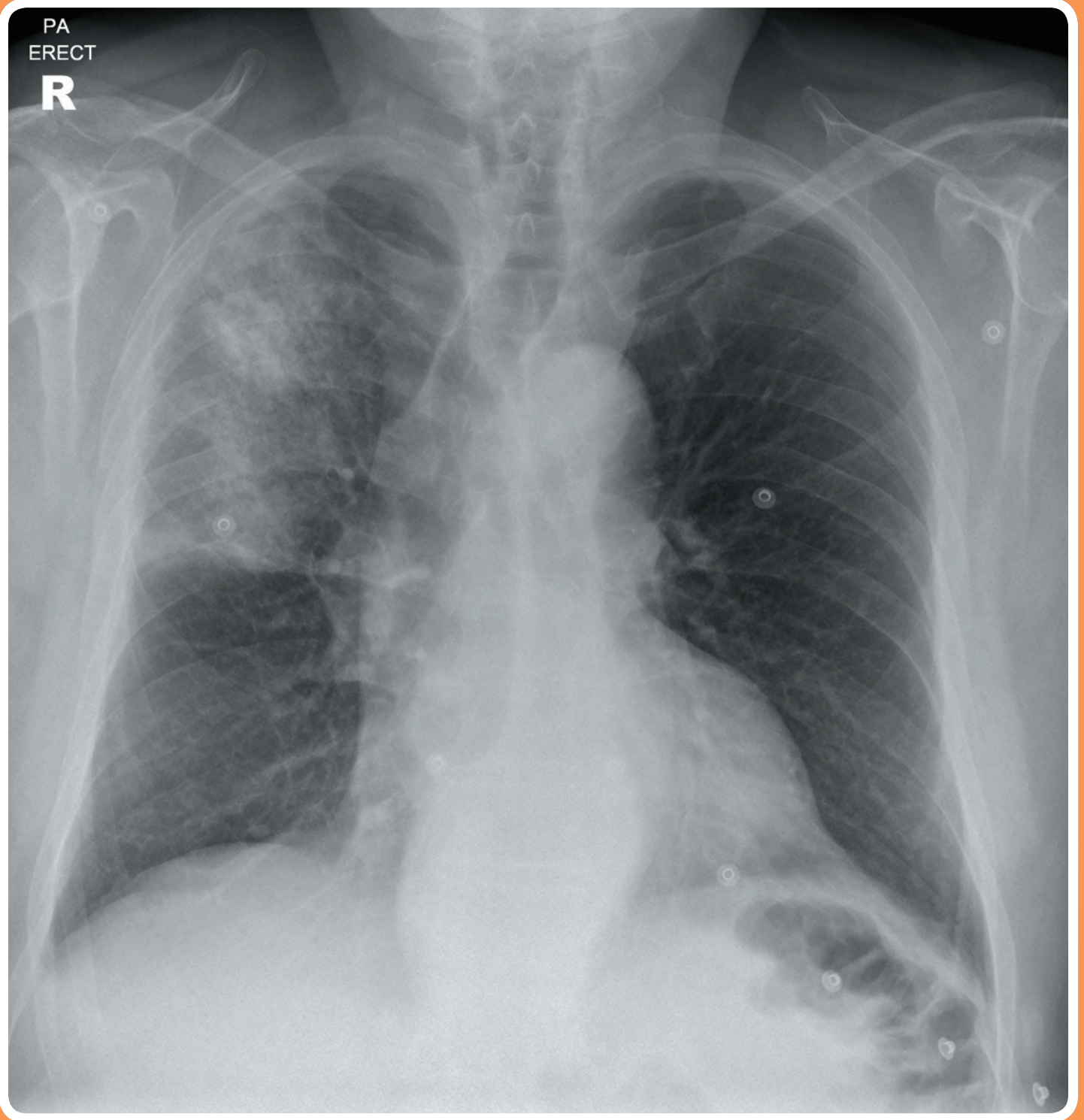
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STANDARD CASES



CASE 1

A 70 year old male who lives in a residential home presents to ED with increasing confusion. He has a productive cough and a fever. He has a past medical history of hypertension, angina and mild cognitive impairment. He has a 25 pack year smoking history. On examination, he has saturations of 89% in air, and is febrile with a temperature of 38.8°C. There is dullness to percussion and coarse crackles in the right upper zone. A chest X-ray is requested to assess for possible pneumonia or collapse.



REPORT – RIGHT UPPER LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The upper trachea is central. The lower trachea is displaced to the right by the aortic arch.

BREATHING

There is heterogeneous air space opacification in the right upper zone. This has a relatively well defined inferior margin, which is likely to represent the horizontal fissure. There is a focal area of increased opacification in the right upper zone, which may represent focal consolidation or an underlying mass. The

remainder of the lungs are clear. The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

There is unfolding of the thoracic aorta, which displaces the lower trachea to the right.

The mediastinum is central, not widened, with clear borders. There is a well-defined density projected over the lower mediastinum, which is in keeping with a hiatus hernia.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG electrodes in situ.

No vascular lines, tubes or surgical clips.

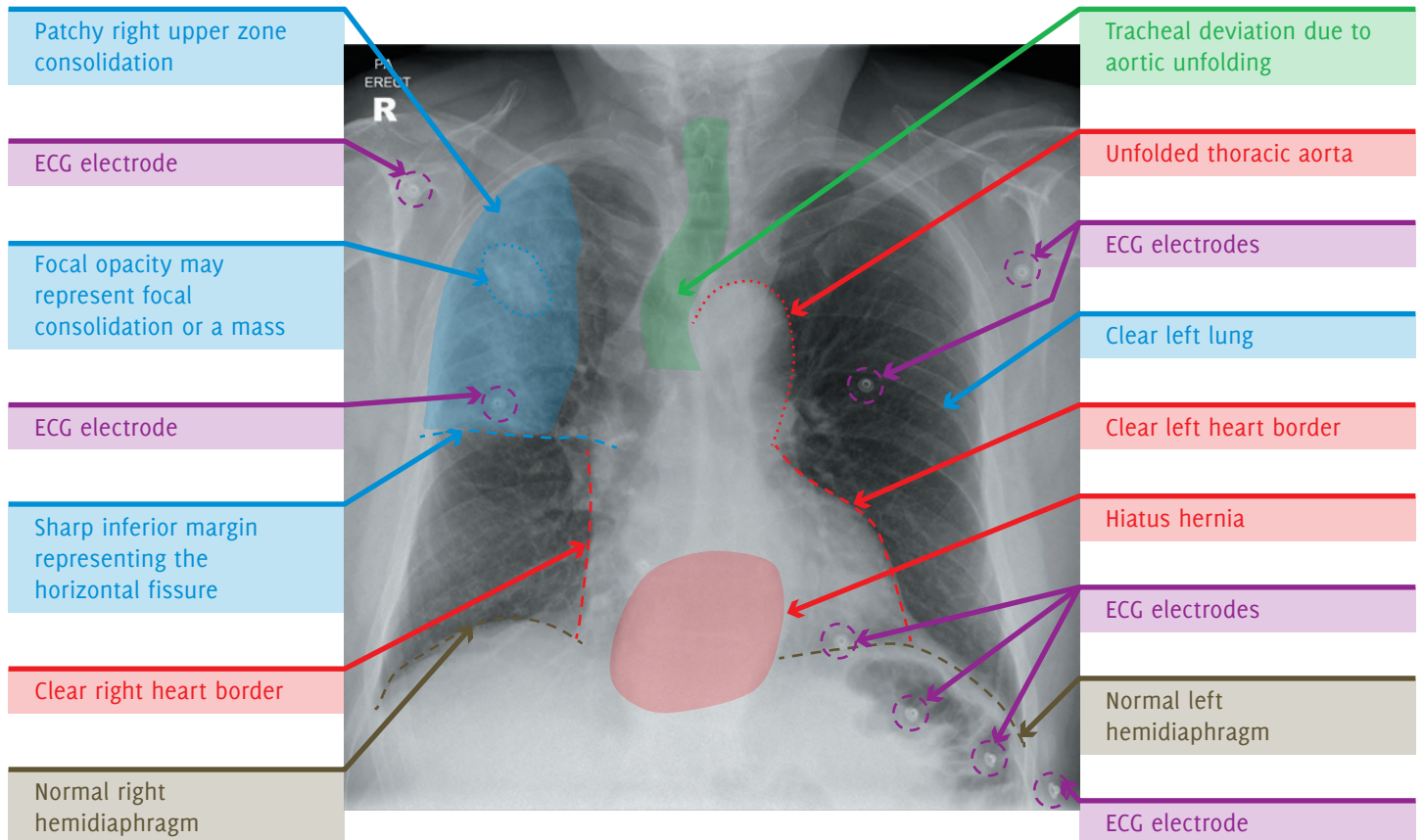
Lung Apices: Heterogeneous right apical consolidation. Normal left apex

Hila: Normal

Behind Heart: There is a retrocardiac density, which represents a hiatus hernia

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates heterogeneous right upper zone consolidation in keeping with pneumonia. The consolidation has a relatively abrupt inferior margin in keeping with the horizontal fissure, indicating this is right upper lobe pneumonia. A focal opacity in this region may represent focal consolidation or a mass. Incidentally, there is also a hiatus hernia.

Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken.

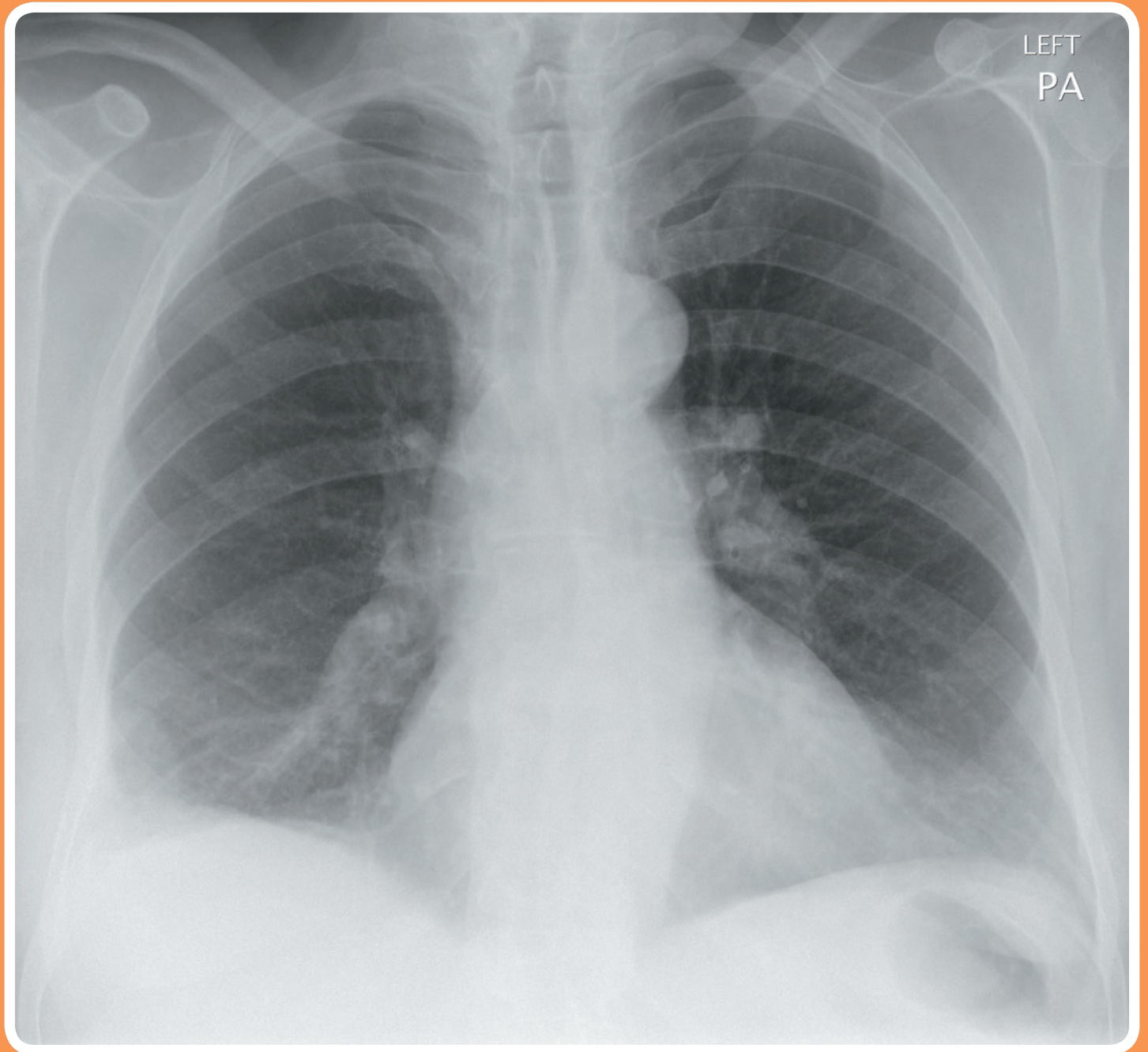
The patient should be treated with appropriate antibiotics for community-acquired pneumonia, and a follow-up chest X-ray performed in 4-6 weeks to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

If the focal opacity in the right upper zone does not resolve then a CT of the chest and abdomen with IV contrast would be appropriate to assess for a lung tumour. It would also be useful to review previous imaging and case notes to see if there was an abnormality at this site before.



CASE 2

A 71 year old female presents to ED with chest pain and breathlessness. She had a left total hip replacement 2 weeks ago. She is a non-smoker. On examination, she has saturations of 91% in air and is afebrile. Lung fields are resonant throughout, with good air entry bilaterally. A chest X-ray is requested to assess for possible pneumonia, collapse, effusion or pulmonary embolism.



REPORT – PLEURAL EFFUSION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is blunting of the right costophrenic angle in keeping with a small pleural effusion. A small area of heterogeneous opacification is visible in the adjacent lung.

The lungs are otherwise clear. They are not hyperinflated.

The left-sided pleural space is clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

The lateral aspect of the right hemidiaphragm is obscured. Normal

position and appearance of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

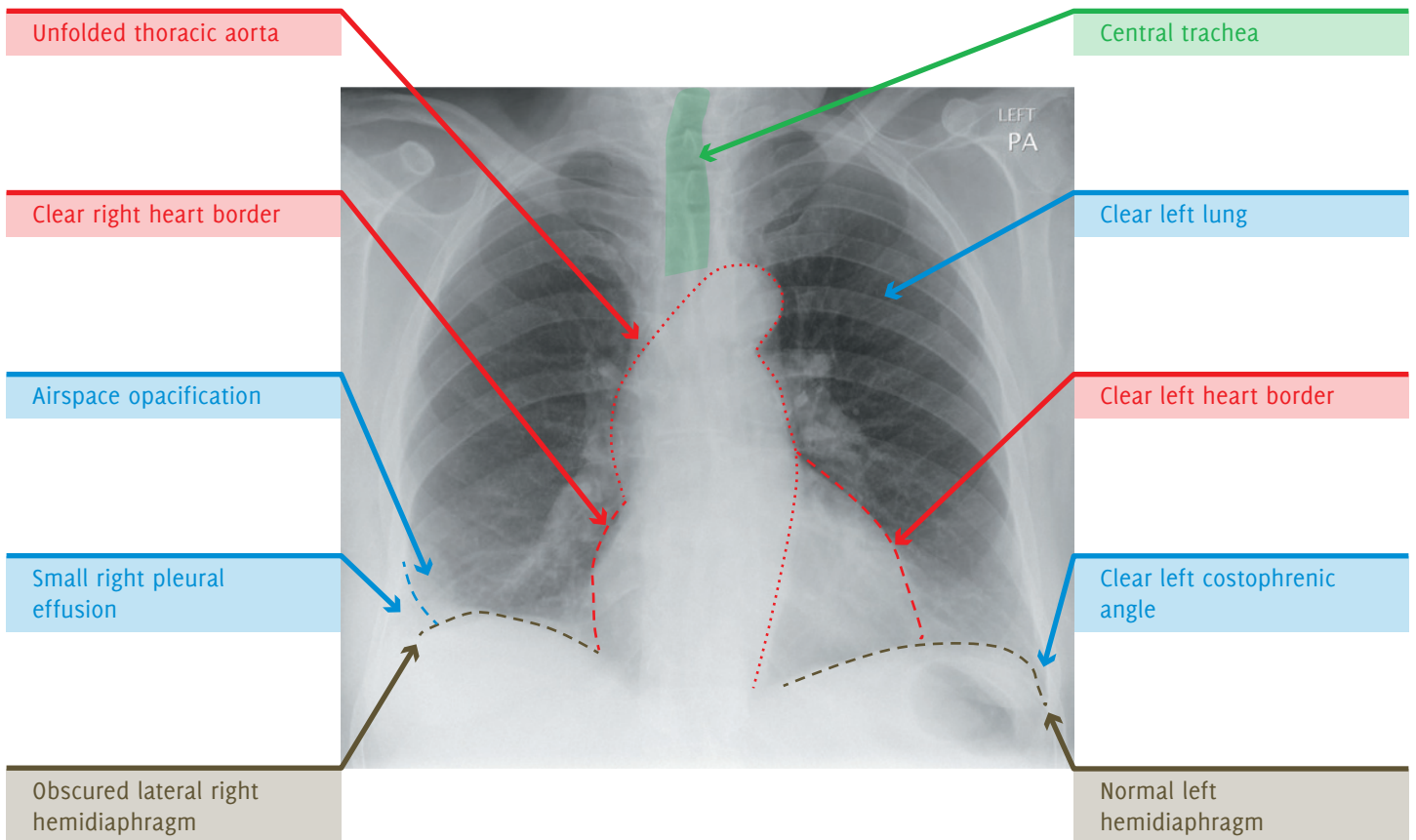
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Blunting of right costophrenic angle. Normal left costophrenic angle.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a small right pleural effusion with minor associated consolidation. This may reflect pneumonia with a parapneumonic effusion. The other main differential, especially given recent surgery, is a pulmonary embolism with infarction (consolidation) and an effusion.

Supplementary oxygen should be given.

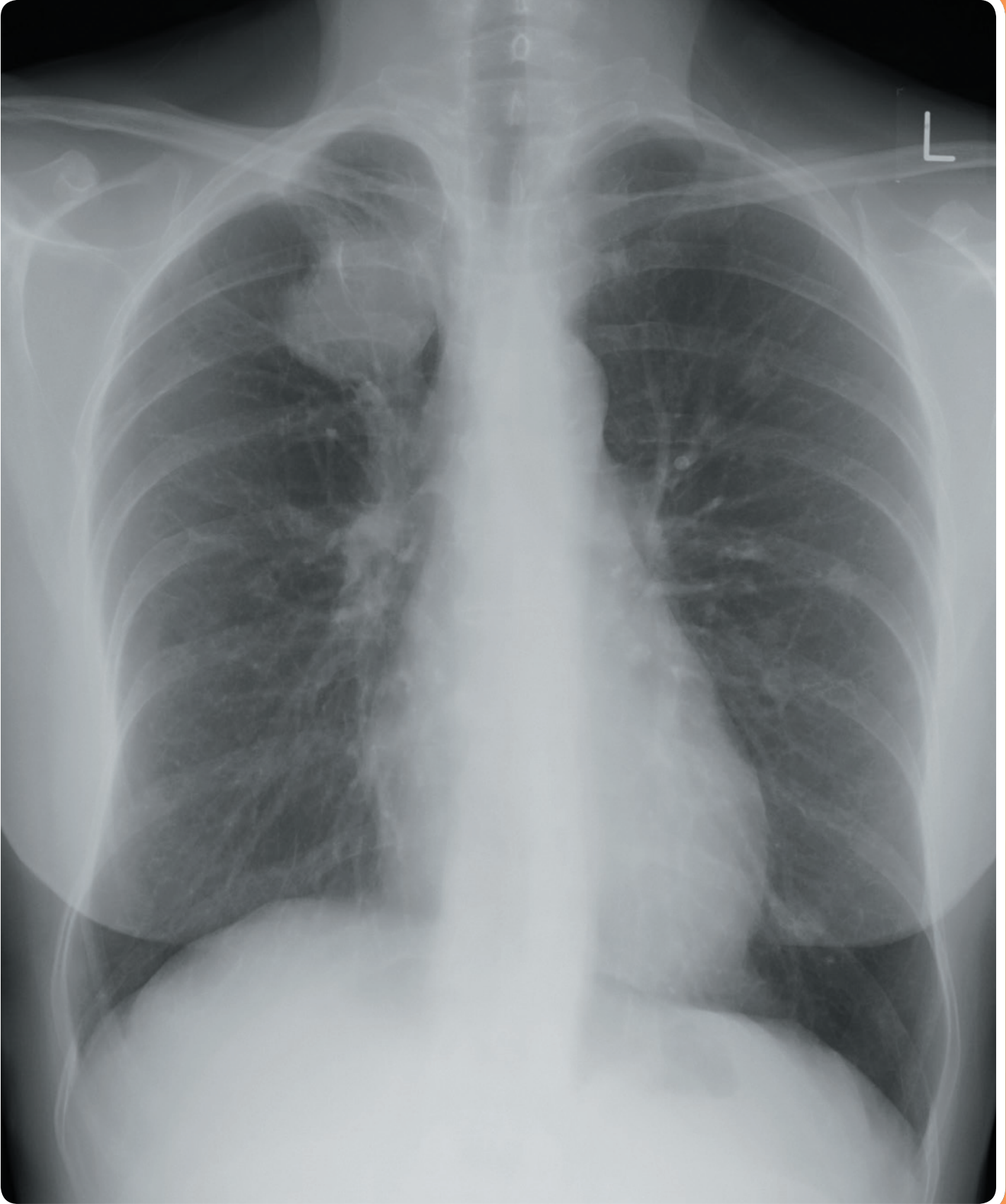
Initial blood tests may include an arterial blood gas, FBC, U/Es, LFTs, blood cultures, coagulation, and a CRP. Sputum cultures would also be helpful. D-dimer is unlikely to be helpful given the recent surgery. A CT Pulmonary Angiogram should be considered.

Treatment with either antibiotics or low molecular weight heparin will be guided by the results of above investigations.



CASE 3

A 60 year old female presents to her GP with fatigue, weight loss and wheeze. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 99% in air and is afebrile. There is wheeze in the right upper zone. A chest X-ray is requested to assess for malignancy or COPD.



REPORT – LUNG AND HILAR MASSES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is a right upper zone mass projected over the anterior aspects of the right 1st and 2nd ribs. There are multiple small pulmonary nodules visible within the left hemithorax.

The lungs are not hyperinflated.

There is pleural thickening at the right lung apex.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, and not widened. The right upper zone mass appears contiguous with the superior mediastinum.

The right hilum is abnormally dense. It also appears higher than the left. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

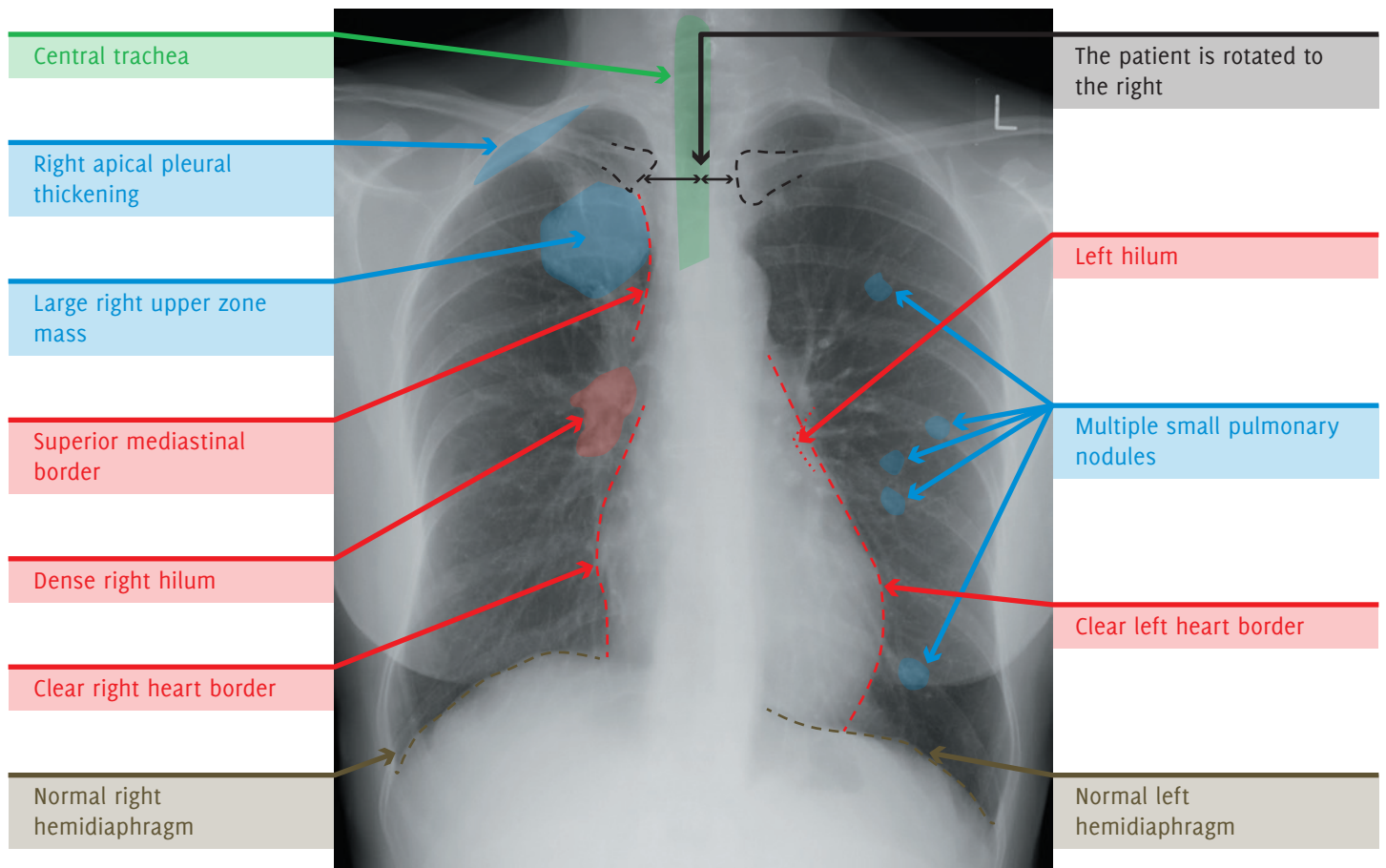
Lung Apices: Right apical pleural thickening

Hila: Dense right hilum, normal left hilum

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large, rounded right upper lobe lung lesion associated with multiple smaller nodules. This is highly suspicious of a right upper lobe primary lung cancer with lung metastases. The dense right hilum is suspicious for hilar nodal disease. The significance of the right apical pleural thickening is not clear.

Initial blood tests may include FBC, U/Es, CRP, LFTs, & bone profile.

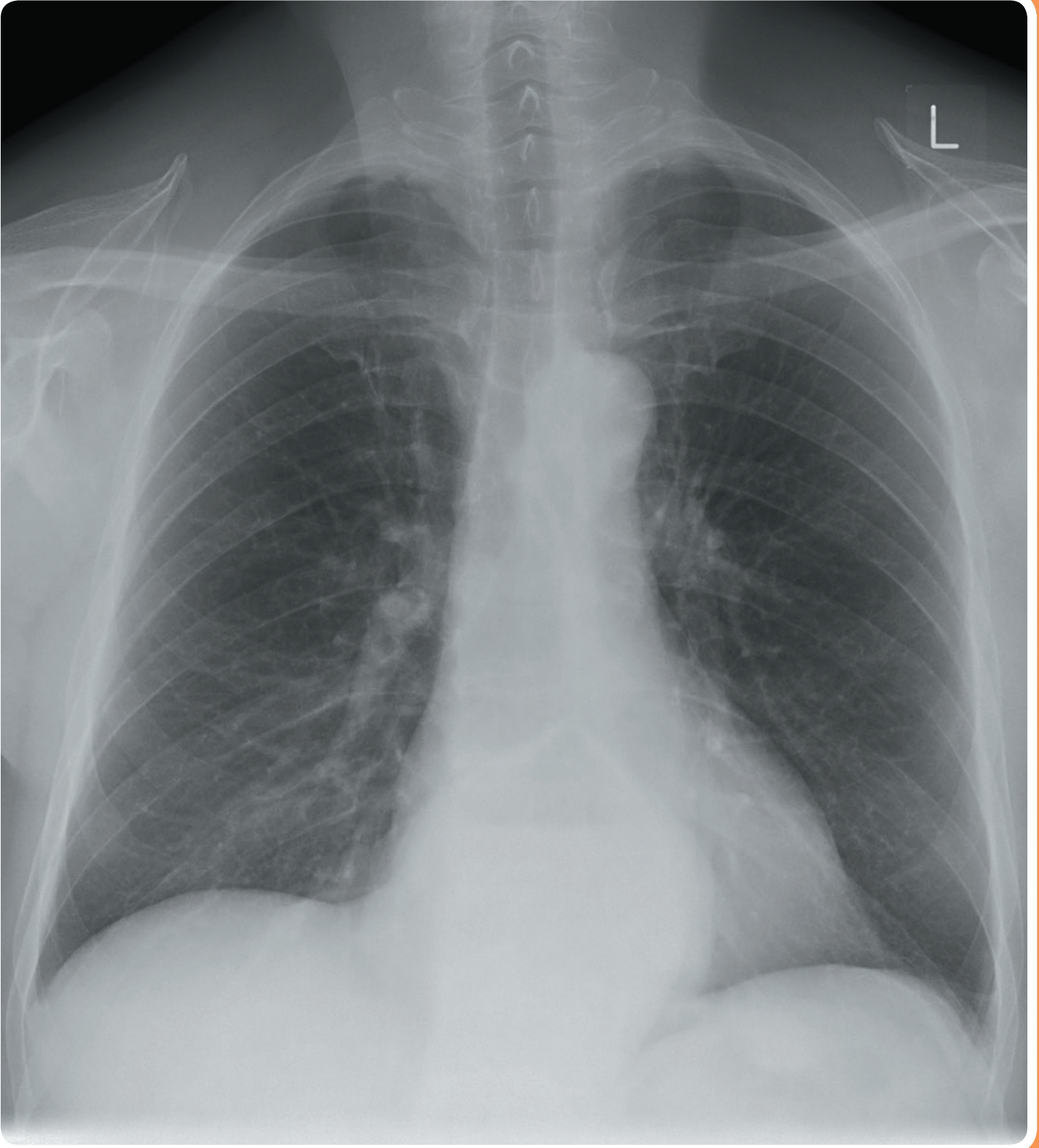
A staging CT chest, and abdomen with IV contrast should be performed.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 4

A 55 year old male presents to ED with a 2 week history of a productive cough and shortness of breath. There is a history of gastro-oesophageal reflux. He is a non-smoker. On examination, he has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia, effusion or collapse.



REPORT – HIATUS HERNIA

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear.

They are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

There is a mass projected centrally over the lower mediastinum/heart. An air-fluid level is visible.

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

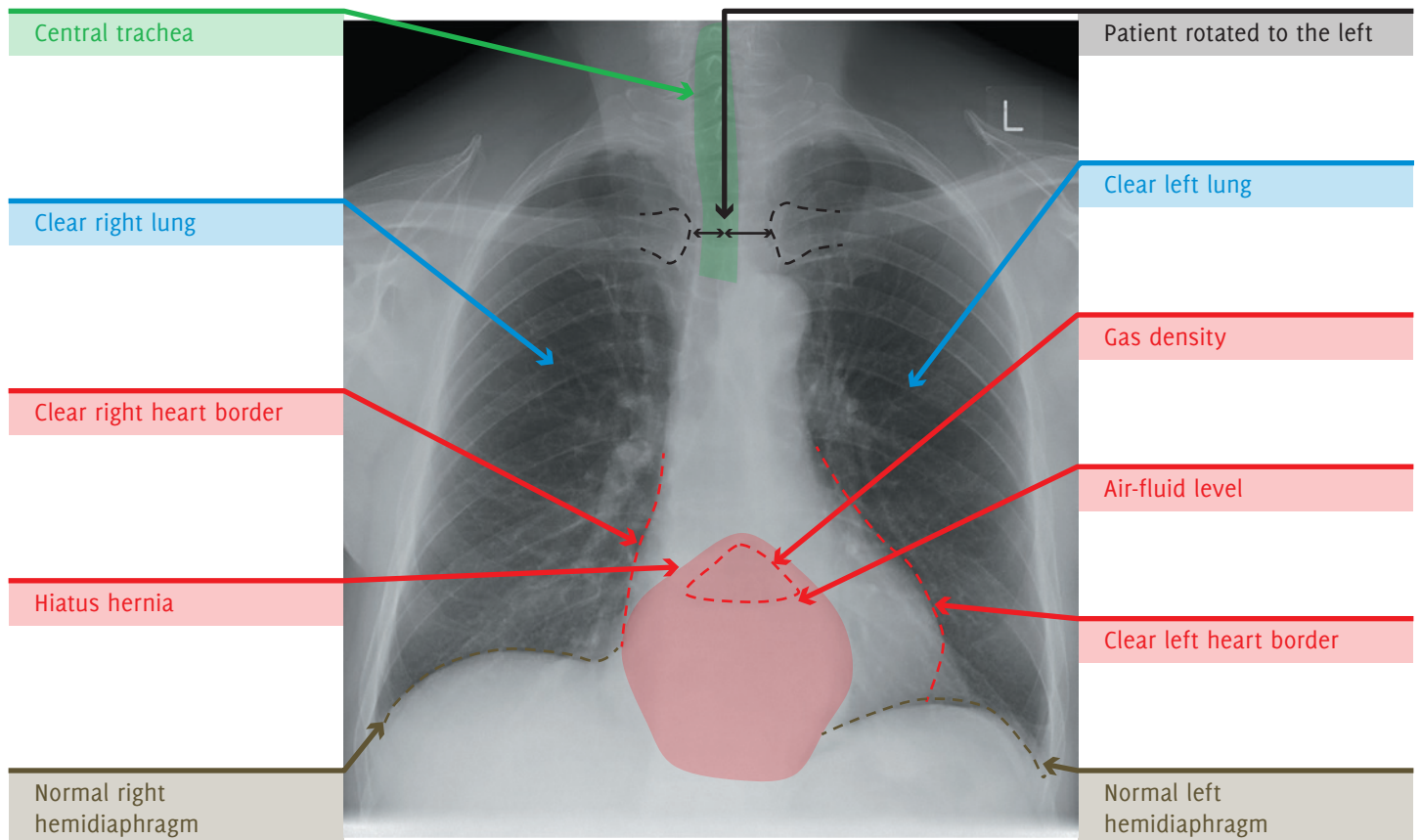
Lung Apices: Normal

Hila: Normal

Behind Heart: Retrocardiac opacity with an air-fluid level

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a retrocardiac opacity with an air-fluid level consistent with a moderately sized hiatus hernia. The lungs are clear.

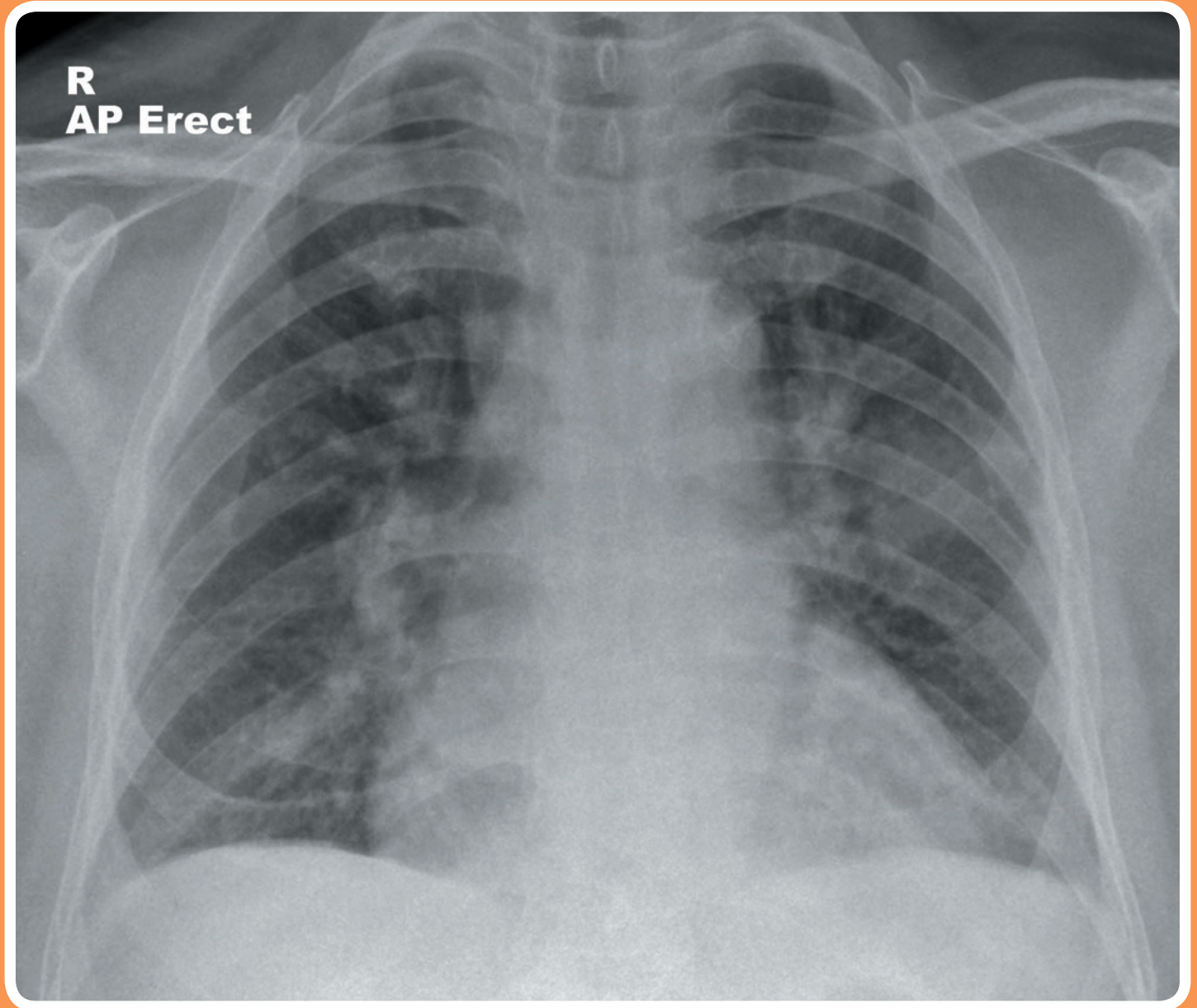
Initial blood tests may include FBC, U/Es, and CRP to look for possible infection.

Treatment may be required if the gastro-oesophageal reflux disease is symptomatic, otherwise no treatment for the hiatus hernia is necessary.



CASE 5

A 54 year old man presents to ED with acute shortness of breath. He has a background of ischaemic heart disease and has a 20 pack year smoking history. On examination, he is afebrile, with saturations of 90% in air. HR is 100 bpm with a RR of 22. There is dullness and inspiratory crackles in both lower zones. The JVP is raised 4cm. A chest X-ray is performed to look for pulmonary oedema.



REPORT – PULMONARY OEDEMA

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is mildly rotated to the right

AIRWAY

The trachea is central.

BREATHING

There is interstitial opacification throughout both lungs. Prominent pulmonary vessels within the upper lobes are in keeping with upper lobe venous diversion.

The lungs are not hyperinflated.

The pleural spaces are clear.

CIRCULATION

The heart appears enlarged although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

There is unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

The hila are enlarged, which is likely vascular in origin, but they are in a normal position, with no increased density.

DIAPHRAGM + DELICATES

There is blunting of the costophrenic angles in keeping with small pleural

effusions. The hemidiaphragms are otherwise normal.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

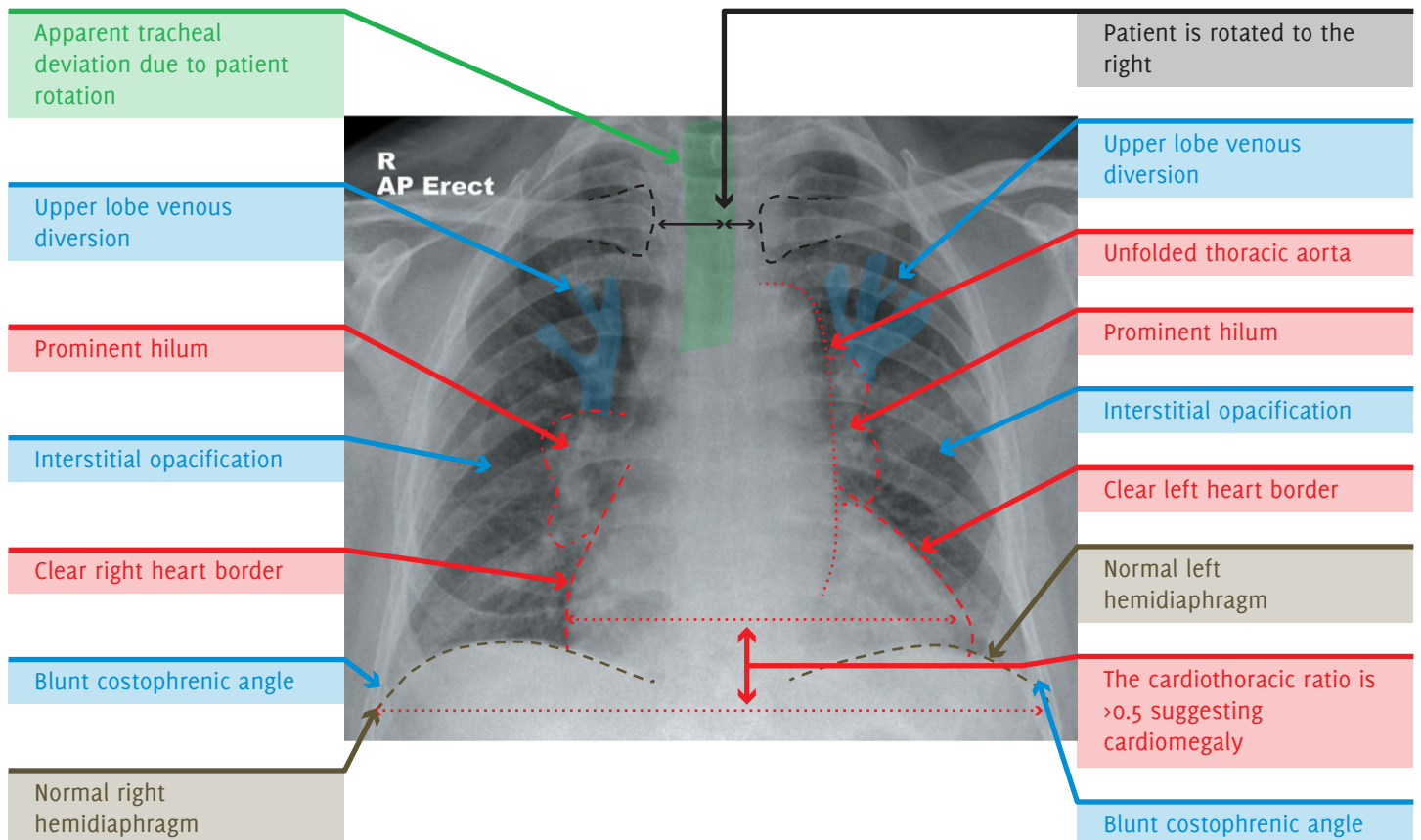
Lung Apices: Upper lobe venous blood diversion

Hila: Enlarged

Behind Heart: Normal

Costophrenic Angles: Blunting consistent with small effusions

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates features of heart failure (cardiomegaly, interstitial opacification, upper lobe venous diversion and small pleural effusions).

U/Es should be performed to assess renal function, as well as FBC to look for any associated anaemia. An ECG would be helpful to look for any new electrical changes. An ECHO would allow assessment of the left ventricular function. The patient should be managed for acute pulmonary oedema/heart failure. A repeat chest X-ray can be used to help monitor response to treatment.



CASE 6

A 50 year old female presents to the ED with shortness of breath. She also reports weight loss of 10 kilograms in the last month. She has an 80 pack year smoking history. On examination, she is cachexic, has saturations of 100% in air, and is afebrile. The lungs are resonant throughout, with good air entry bilaterally. There is tar staining of the fingernails. A chest X-ray is requested to assess for possible malignancy.



REPORT – RIGHT LOWER LOBE COLLAPSE

Patient ID: Anonymous
Projection: PA
Penetration: Under penetrated – vertebral bodies not visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is deviated to the right.

BREATHING

There is a homogeneous triangular shaped opacity in the medial aspect of the right lower zone that involves the right retrocardiac area, in keeping with the sail sign. The right hemithorax appears smaller than the left indicating volume loss. The left lung appears hyperexpanded with some coarsening of the bronchovascular markings.

The lungs are otherwise clear.
 The pleural spaces are clear, apart from mild bilateral apical pleural thickening.
 Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.
 The heart borders are clear.
 The aorta appears normal.
 The mediastinum is displaced to the right.
 The right hilum is difficult to identify and probably depressed. Normal size, shape, and position of the left hilum.

DIAPHRAGM + DELICATES

The right hemidiaphragm is indistinct, indicating right lower lobe pathology.

Normal position and appearance of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG clips in situ.

No vascular lines, tubes, or surgical clips.

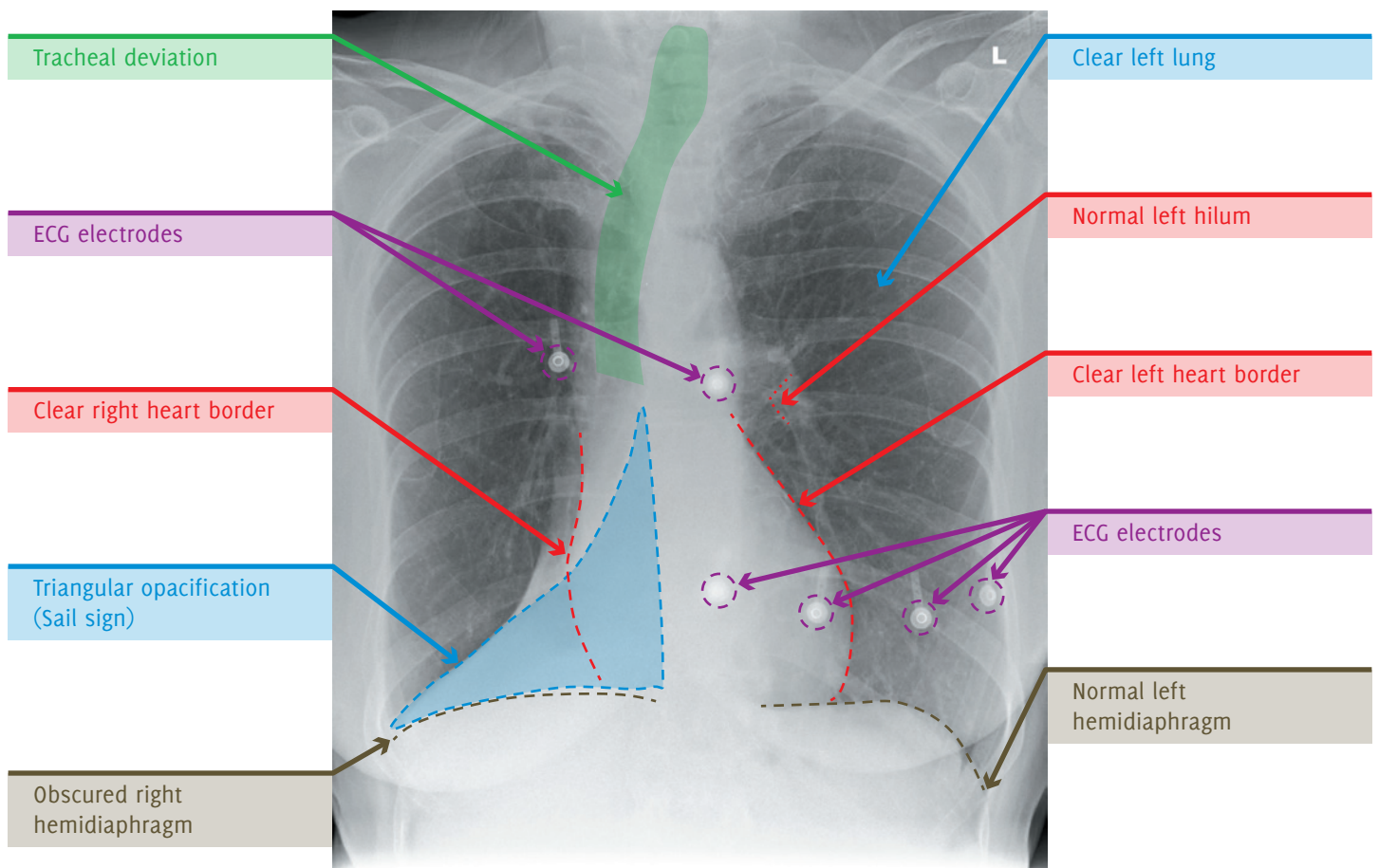
Lung Apices: Mild apical pleural thickening

Hila: Right hilum is difficult to identify and probably depressed. Normal left hilum

Behind Heart: Increased right retrocardiac opacification

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray shows a right lower lobe collapse (increased triangular opacity medially in the right lower zone which obscured the right hemidiaphragm – sail sign). There is resultant right-sided volume loss with probable depression of the right hilum. No definite mass can be seen but given the history, malignancy is the most concerning differential. Other differentials for collapse include mucus plugging and an inhaled foreign body.

Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, ESR and TFTs. A CT chest with IV contrast should be

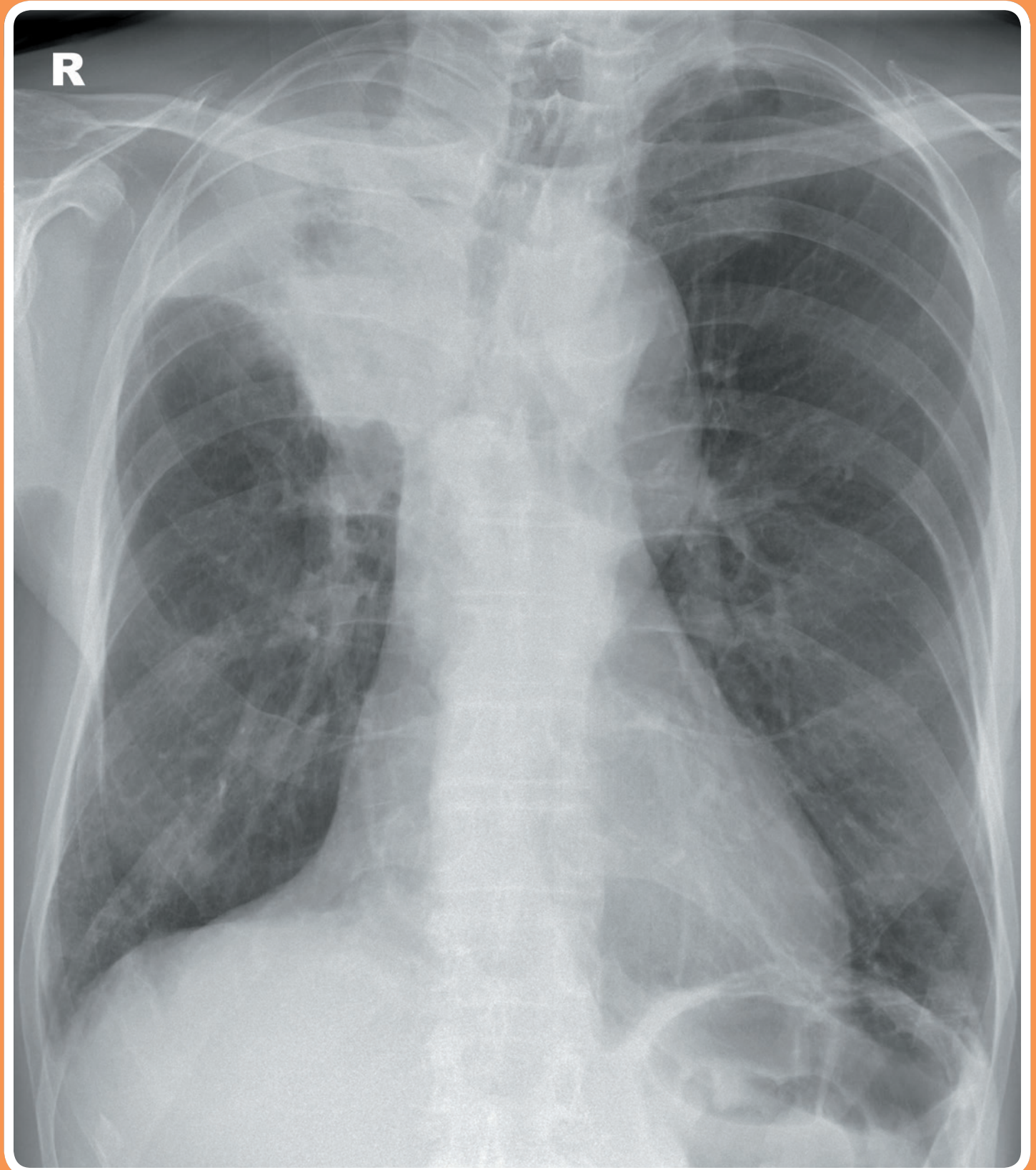
performed to assess for an underlying tumour. A CT of the abdomen will usually also be acquired at the same time to enable lung cancer staging.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT and the patient's wishes.



CASE 7

A 43 year old female presents to ED with worsening shortness of breath and inspiratory chest pain. She has had a cough for the last few weeks as well as general flu-like symptoms. She has a 30 pack year smoking history. On examination, saturations are 91% in air and she is afebrile. There is reduced air entry in the right upper zone, with associated dullness to percussion. A chest X-ray is requested to assess for possible malignancy, collapse or consolidation.



REPORT – RIGHT UPPER LOBE COLLAPSE

Patient ID: Anonymous

Projection: PA

Penetration: Adequate – vertebral bodies just visible behind heart

Inspiration: Adequate – 6 anterior ribs visible

Rotation: Not rotated

AIRWAY

The trachea is deviated to the right and appears attenuated distally.

BREATHING

There is an area of increased density in the right upper zone. It has a concave inferior margin, consistent with elevation of the horizontal fissure. The inferomedial margin has a convex contour, suggestive of a central mass. A small, rounded opacity is present at the left costophrenic angle.

The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central.

The right hilum is elevated and bulky. The right main bronchus appears compressed. The right side of the upper mediastinum is indistinct. Normal size, shape, and position of the left hilum.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips.

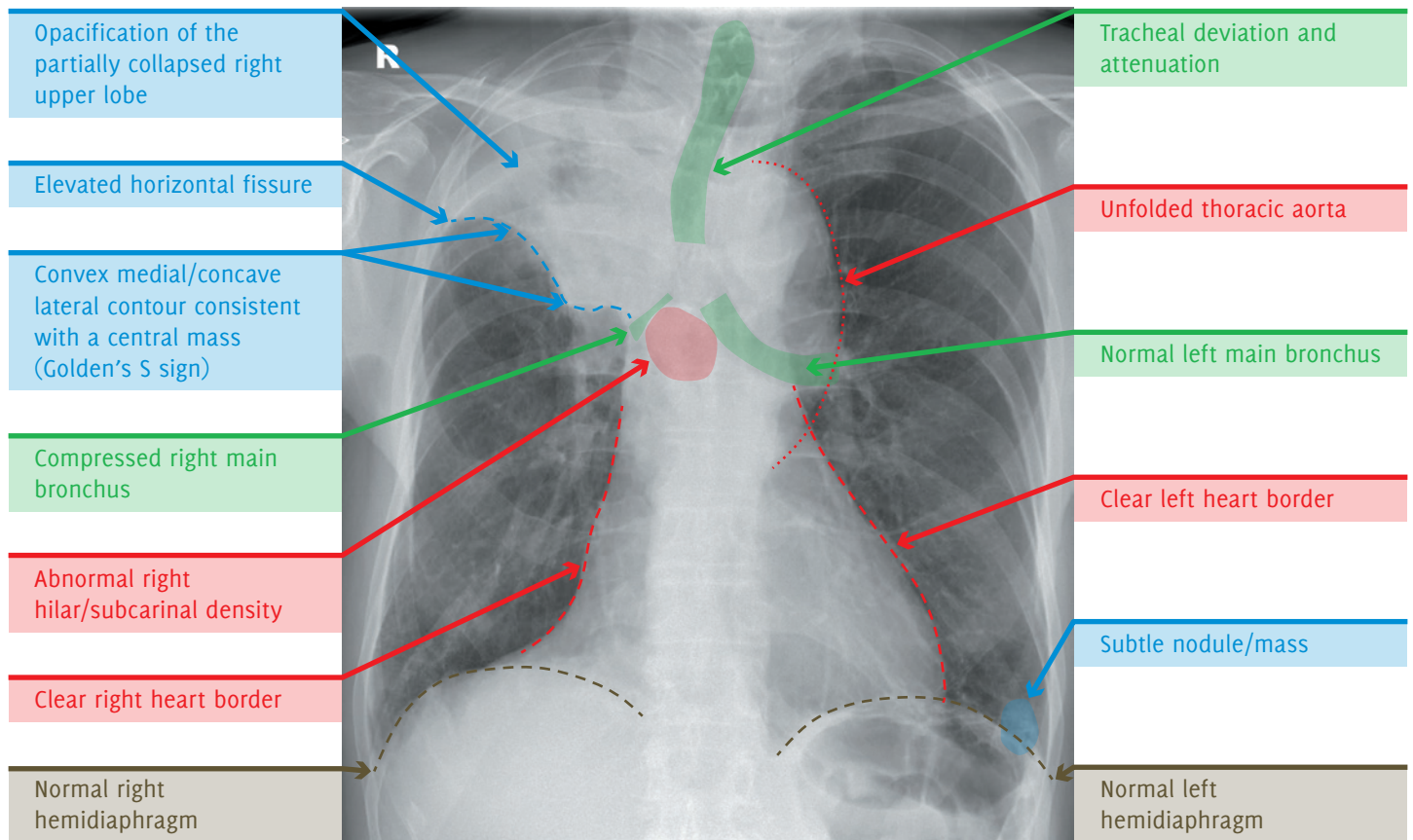
Lung Apices: Opacification of the right apex. Normal left apex

Hila: Elevated, bulky right hilum. Normal left hilum

Behind Heart: Normal

Costophrenic Angles: Rounded opacity at the left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a right upper lobe collapse (increased opacity in the right upper zone, concave inferior margin representing the displaced horizontal fissure). There is resultant volume loss demonstrated by tracheal deviation and elevation of the right hilum. The inferior margin of the collapse has a convex contour medially, in keeping with a proximal tumour (Golden's S sign).

The distal trachea and right main bronchus appear attenuated by a mass. The small rounded opacity at the left costophrenic angle may represent a pulmonary nodule/metastasis.

The most likely differential for a hilar lung mass is a primary lung malignancy. Pulmonary metastases are less likely.

Supplementary oxygen should be given.

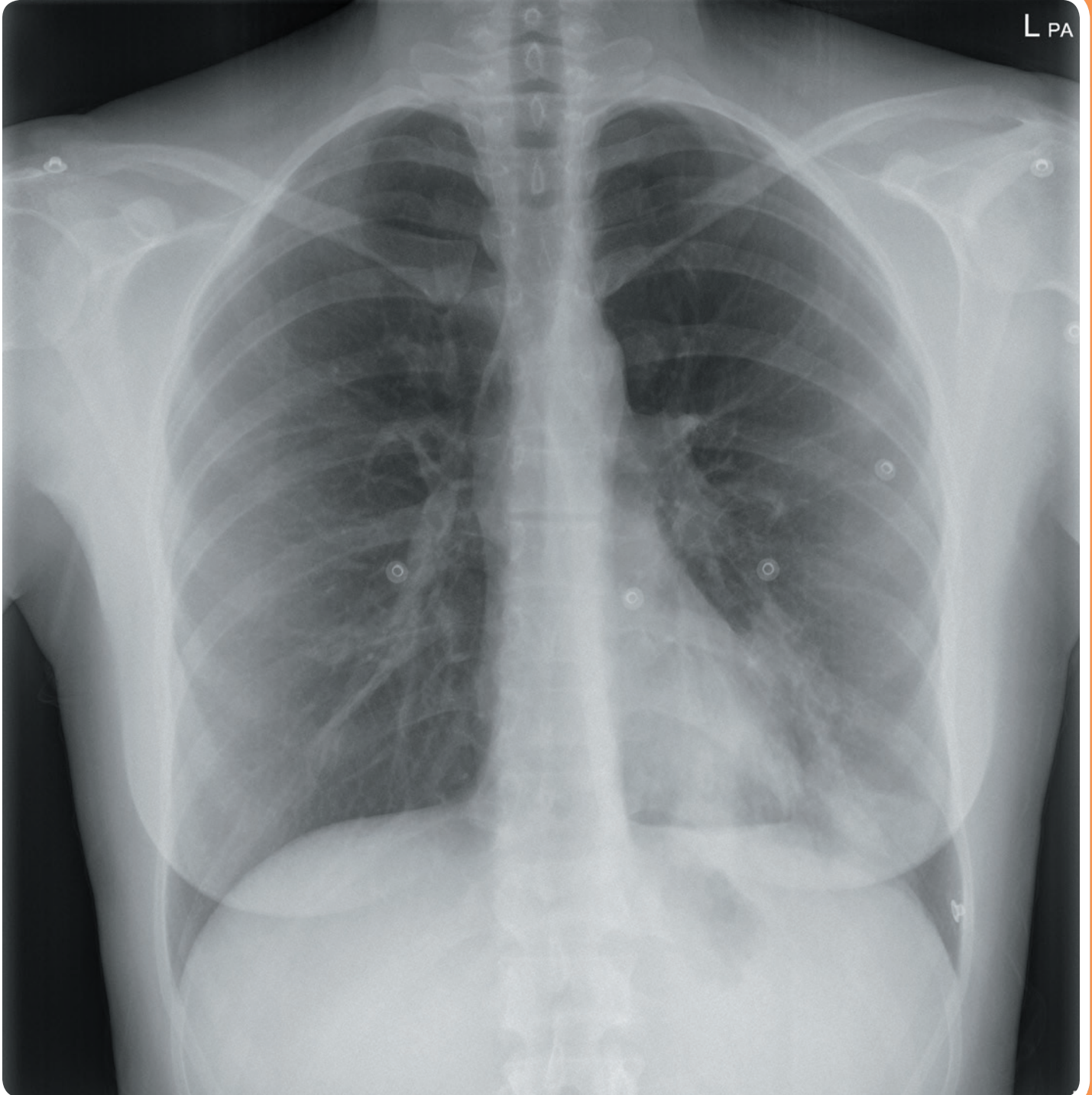
Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, and ESR. A CT chest with IV contrast should be performed to assess for underlying tumour. A CT of the abdomen will usually also be acquired at the same time to enable lung cancer staging.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT and the patient's wishes.



CASE 8

A 33 year old female presents to ED with a productive cough and feeling generally unwell. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 96% in air and is afebrile. There is dullness to percussion and reduced air entry at the left lung base. A chest X-ray is requested to assess for possible pneumonia, effusion, or collapse.



REPORT – LEFT LOWER ZONE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is heterogeneous airspace opacification in the left lower zone, in keeping with consolidation. The rest of the lungs are clear. The lungs are not hyperinflated.

The pleural spaces are clear.
 Normal pulmonary vascularity.
CIRCULATION
 The heart is not enlarged.
 The heart borders are clear.
 The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of the hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the right hemidiaphragm. The left hemidiaphragm is partially obscured by overlying consolidation.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG electrodes in situ.

No vascular lines, tubes or surgical clips.

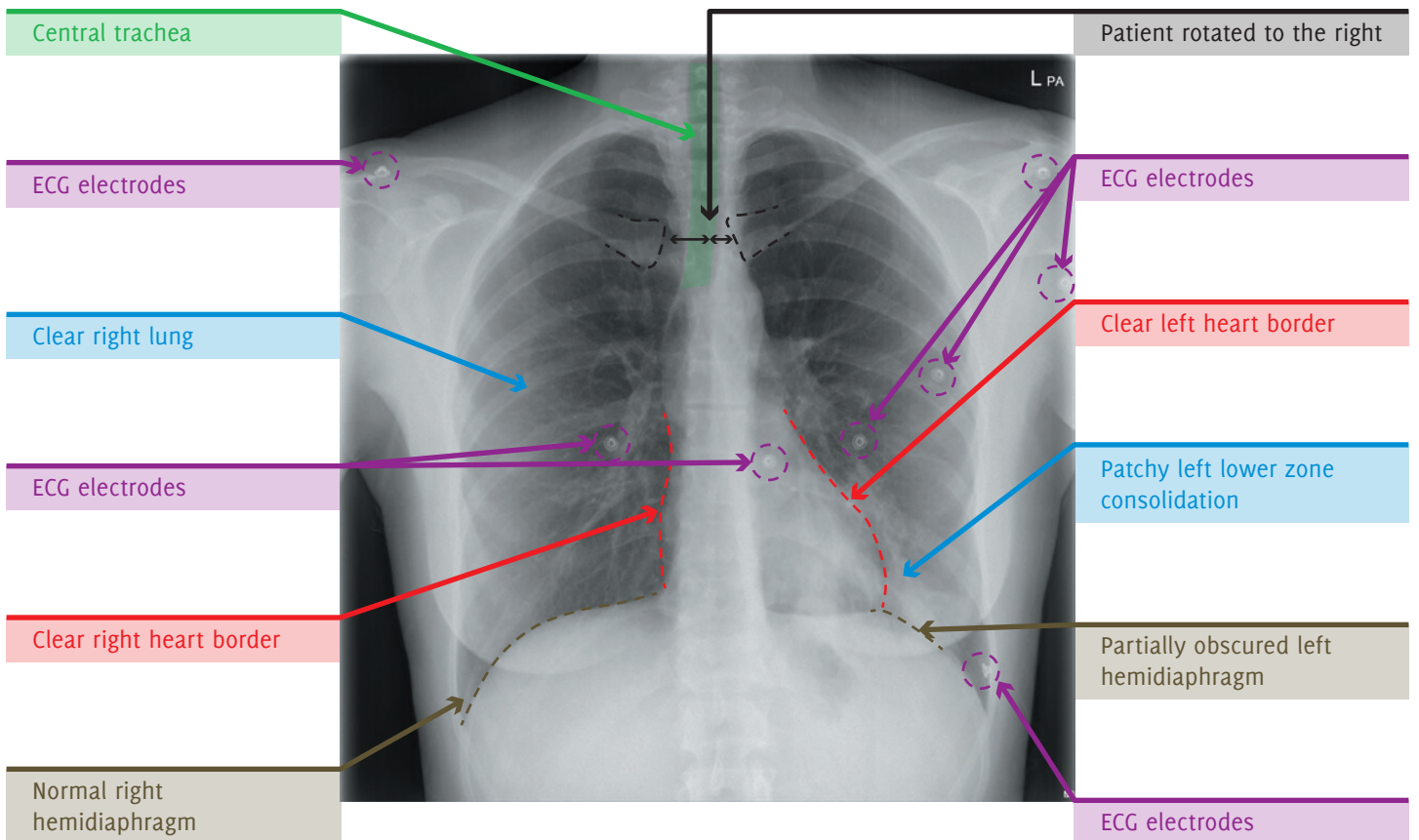
Lung Apices: Normal

Hila: Normal

Behind Heart: Heterogeneous left retrocardiac consolidation

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates left lower zone consolidation, which partially obscures the left hemidiaphragm. The left heart border is preserved. The findings are consistent with left lower lobe pneumonia.

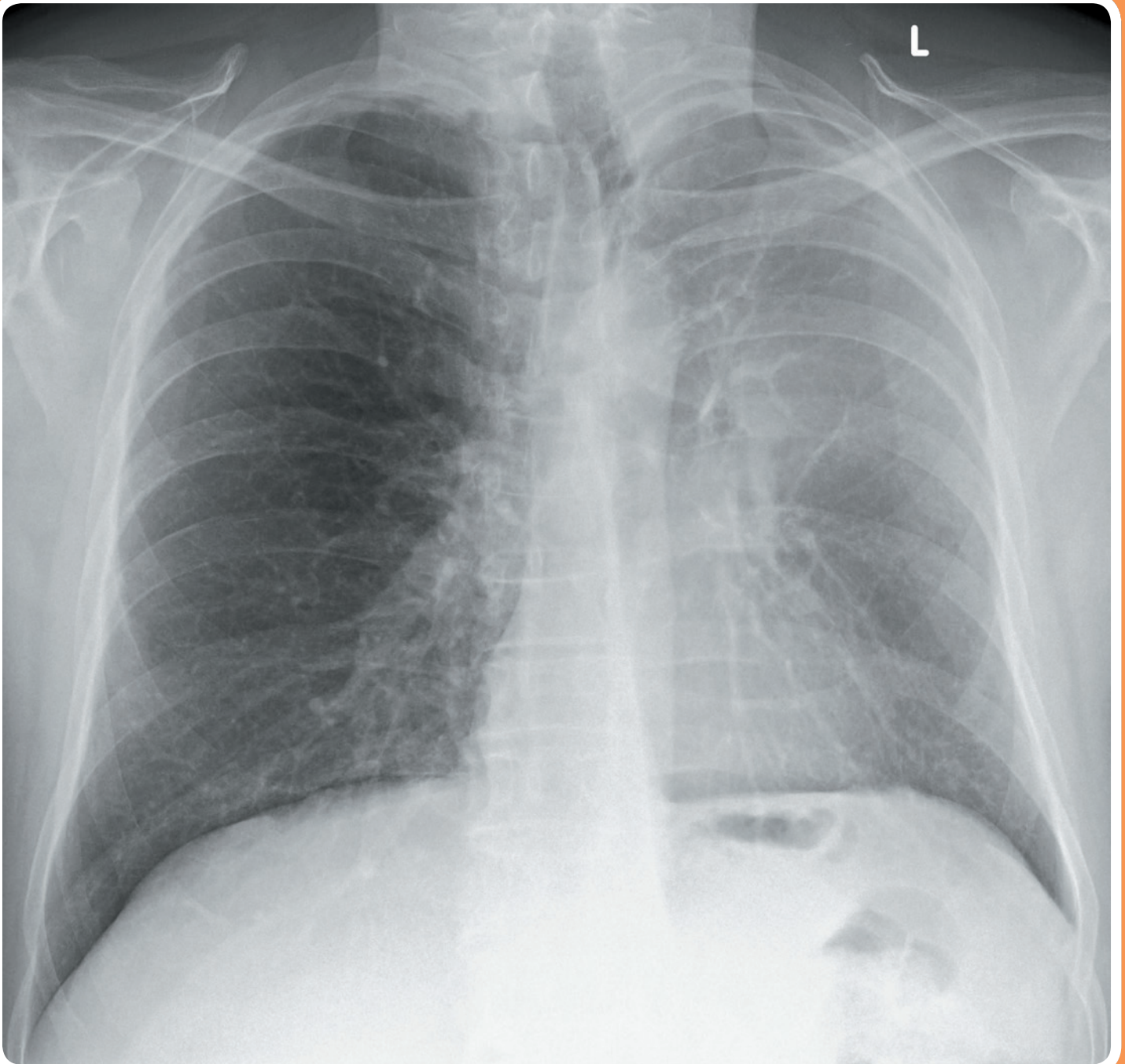
Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, and blood cultures. Sputum culture can also be checked.

Appropriate antibiotics should be given to treat a community-acquired pneumonia, which may be oral or intravenous depending on the severity of pneumonia (CURB-65). A follow-up chest X-ray in 4-6 weeks should be taken to ensure resolution.



CASE 9

A 31 year old male is brought to the ED with acute onset breathlessness and wheeze. He is a known asthmatic, on regular inhaled corticosteroid therapy and a β_2 agonist when required. He is a non-smoker. On examination, he is afebrile, with saturations of 82% in air. There is widespread wheeze. There is decreased air-entry on the left side and the lungs are resonant throughout. An urgent chest X-ray is requested to assess for a possible pneumothorax.



REPORT – LEFT UPPER LOBE COLLAPSE

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is deviated to the left, even when allowing for the patient rotation.

BREATHING

There is diffuse, veil-like opacification of the left hemithorax.

The right lung is clear apart from mild right apical scarring.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The left heart border is indistinct. The right heart border is displaced to the left, being projected over the spine. It appears clear.

The aorta appears normal.

The mediastinum is displaced to the left.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

Lung Apices: Left apical opacification.

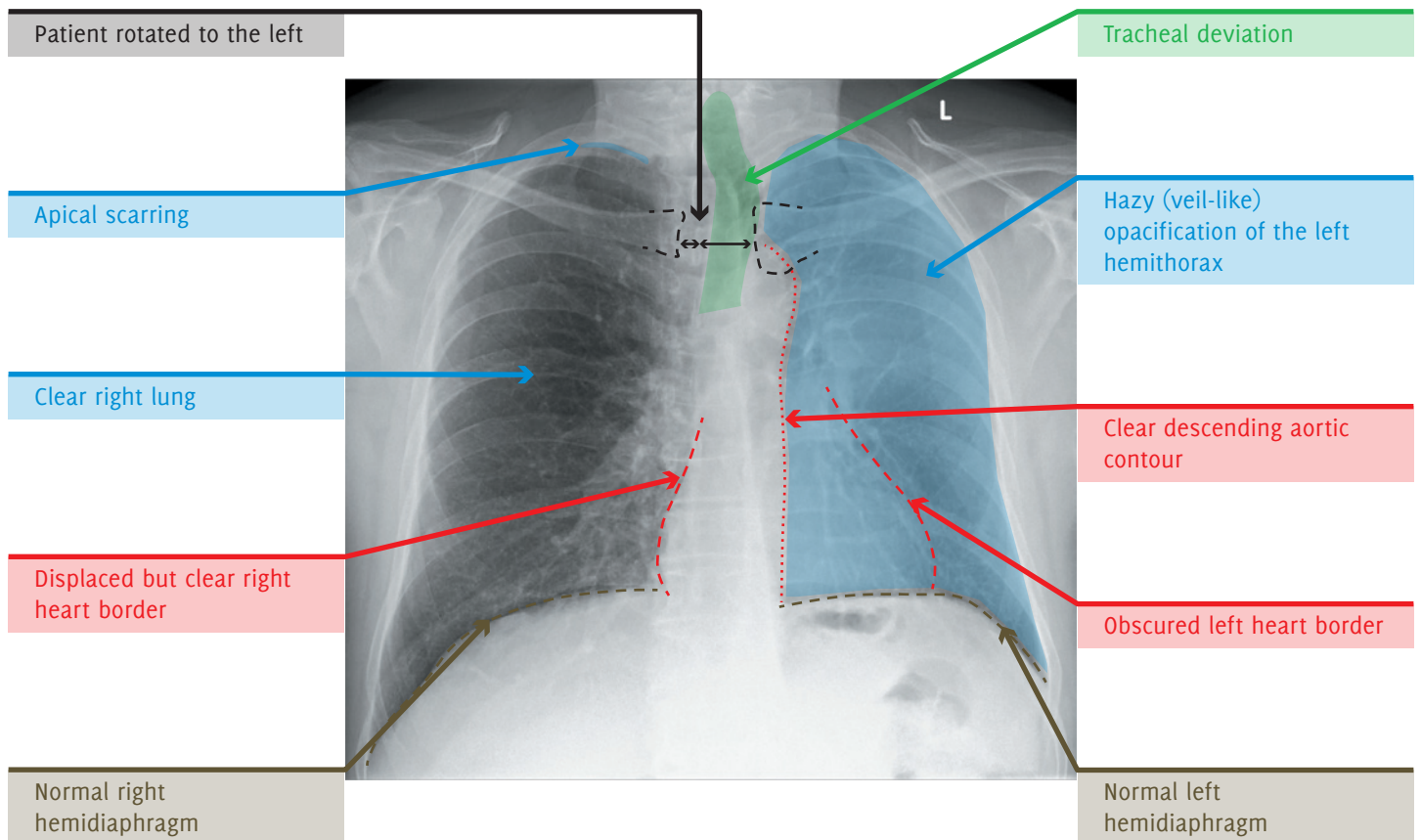
Right apical scarring

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray shows a left upper lobe collapse ('veil like' opacification of the left hemithorax) with resultant volume loss demonstrated by mediastinal shift to the left.

Given the patient's age and the asthma history, the most likely diagnosis is collapse secondary to mucus plugging. An inhaled foreign body is another possibility. Malignancy is unlikely in this context.

The acute asthma exacerbation should be managed using an ABCDE approach, with oxygen, nebulised bronchodilators and corticosteroids initially. Bloods may not be necessary if there is a rapid improvement with initial treatment. Chest

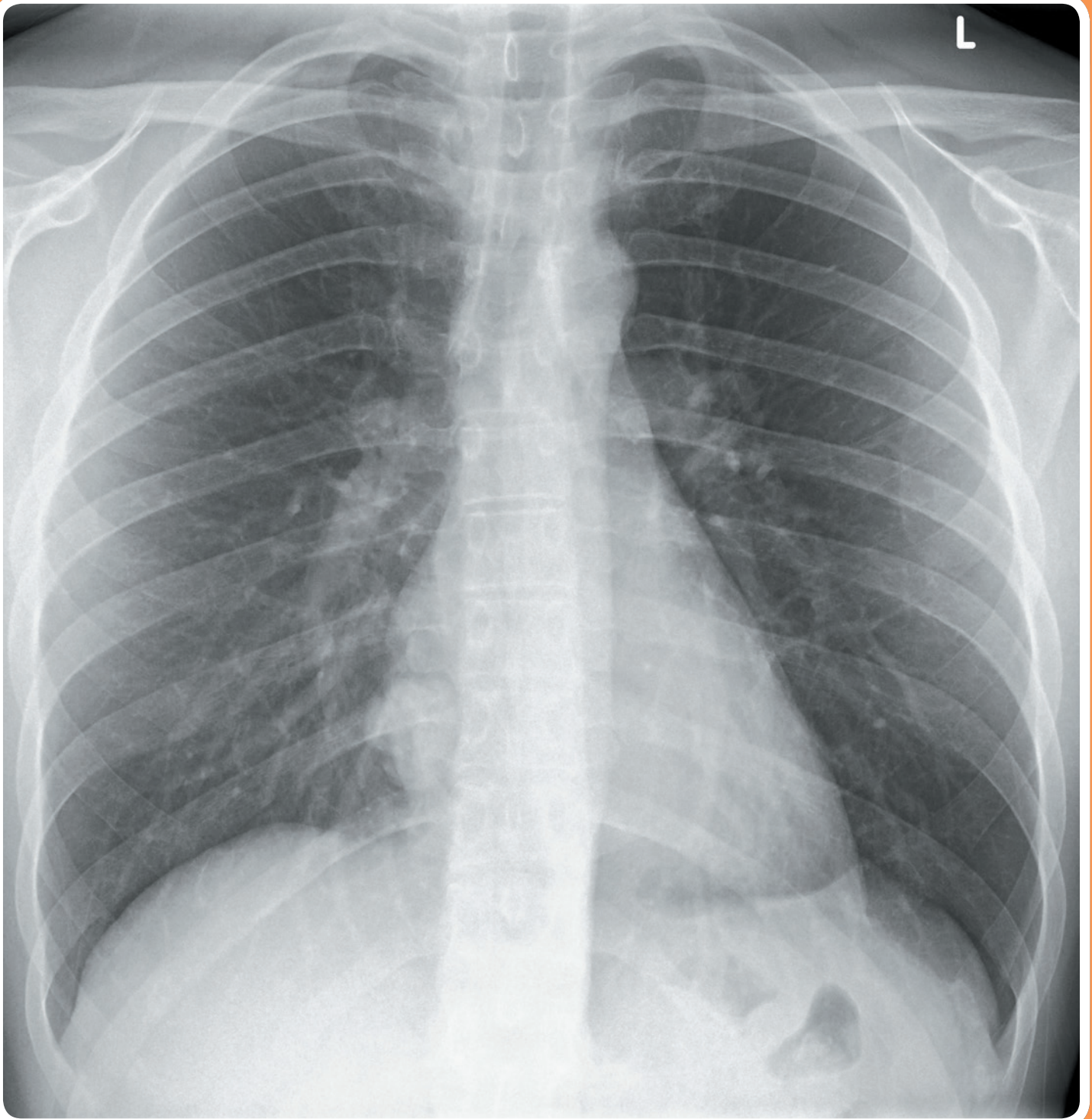
physiotherapy may help relieve mucus plugging and a follow up chest X-ray should be performed to ensure resolution of the collapse.

Respiratory referral should be considered.



CASE 10

A 40 year old male presents to ED with shortness of breath and a 6 week history of cough. He has a history of testicular cancer, which was treated with surgery. He is a non-smoker. On examination, he has saturations of 100% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry. A chest X-ray is requested to assess for possible malignancy.



REPORT – RETROCARDIAC MASS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is a small, lobulated mass medially in the right lower zone. It is partially projected over the right heart border. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear. A mass is projected over the right heart border, although the border remains visible.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

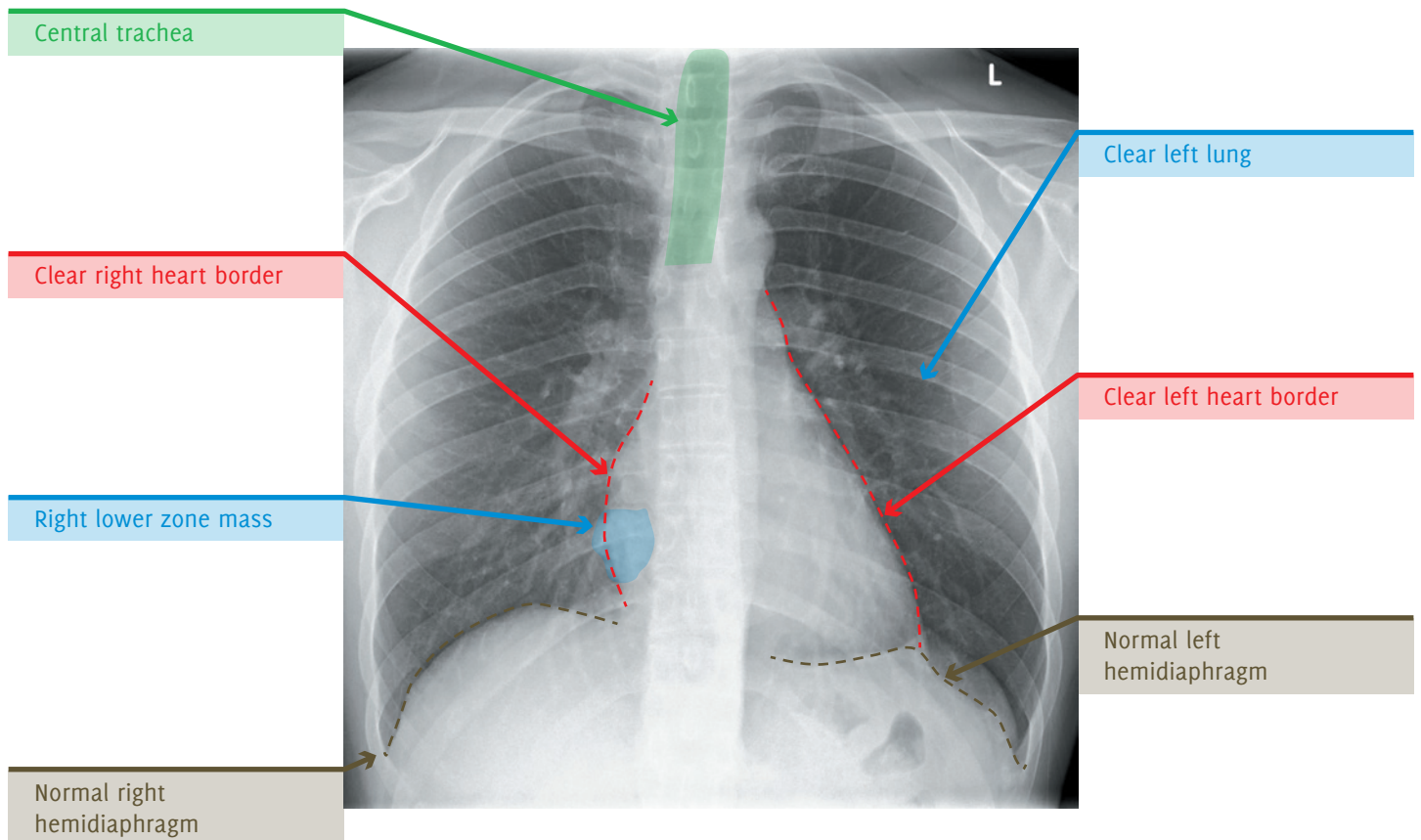
Lung Apices: Normal

Hila: Normal

Behind Heart: Mass projected over the right heart border

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a small rounded mass medially in the right lower zone. The mass is projected over the right cardiac border, which remains visible, indicating the mass is not in the middle lobe or anterior mediastinum. Given the history of previous malignancy, this is suspicious for a metastasis.

Initial blood tests may include FBC, U/Es, LFTs, & bone profile.

A staging CT chest, abdomen and pelvis with IV contrast should be performed to identify any underlying malignancy.

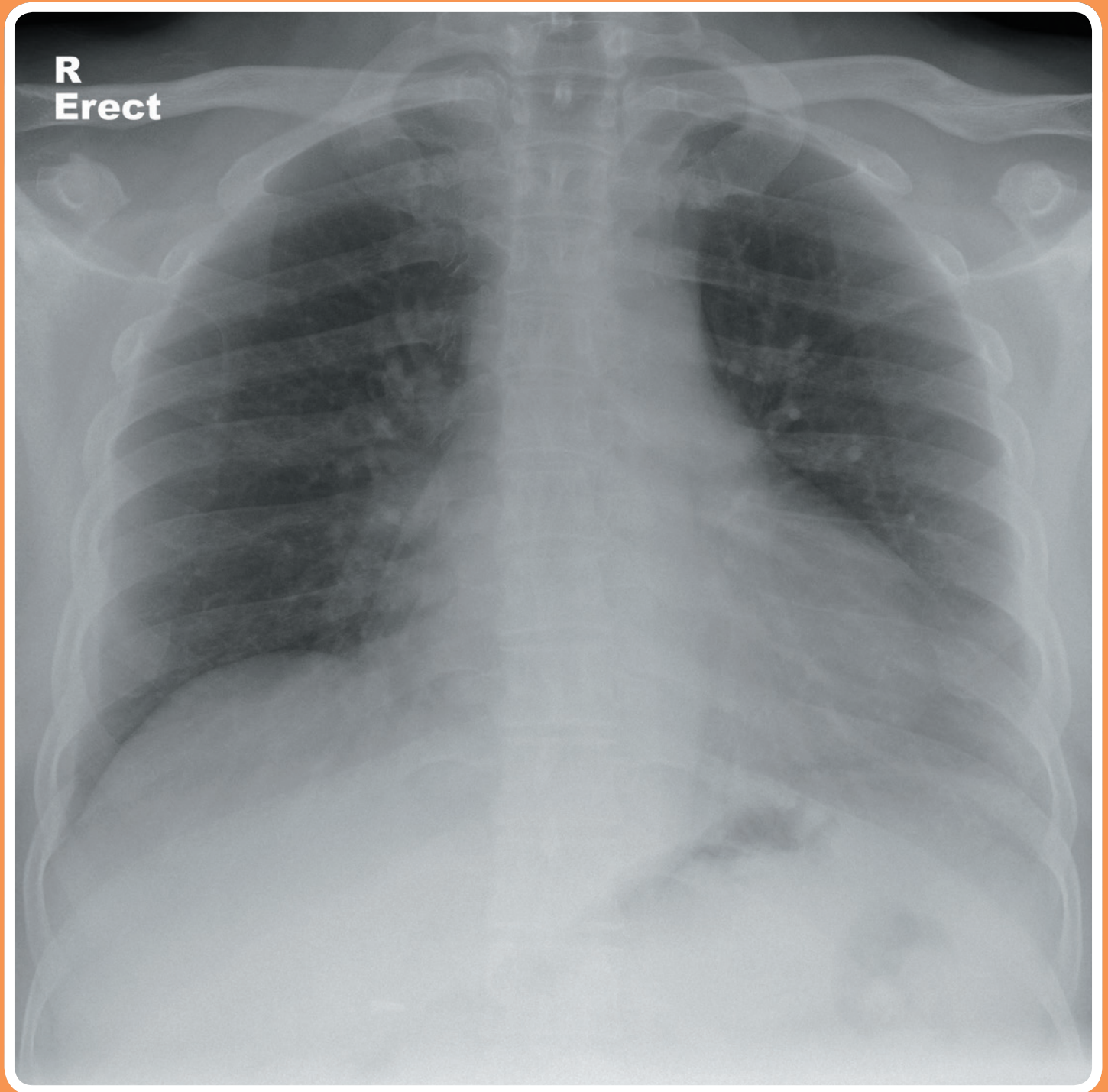
The patient should be referred to oncology services for further management, which may include biopsy and MDT discussion.

Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 11

A 40 year old male presents to ED with shortness of breath. He has been off work for a week with a productive cough and feeling feverish. On examination, he has saturations of 98% in air and is febrile at 39°C. There is decreased air entry, dullness to percussion, and crackles in the left lower zone. A chest X-ray is requested to assess for possible pneumonia, effusion, or collapse.



REPORT – LEFT LOWER LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: AP
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is heterogeneous opacification peripherally in the left lower zone consistent with consolidation. The rest of the lungs are clear. The lungs are not hyperinflated.

The left costophrenic angle is difficult to define, which may be due to pneumonia

or a small effusion. The right-sided pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The cardiac borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

The left hemidiaphragm is obscured. Normal position and appearance of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

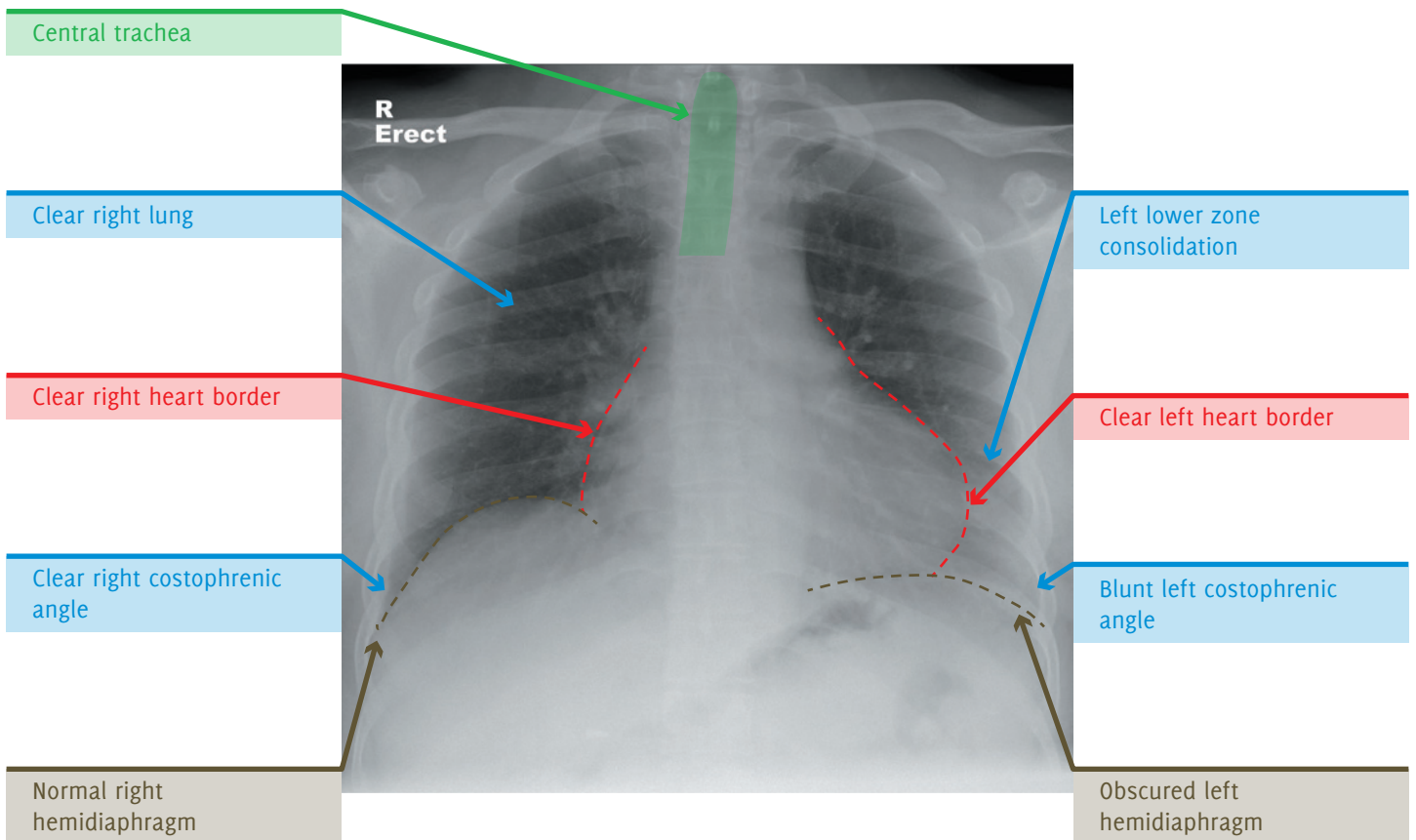
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Left costophrenic angle blunting

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates consolidation in the left lower zone. The consolidation obscures the left hemidiaphragm but not the left heart border consistent with left lower lobe pneumonia. There may be a small left pleural effusion.

Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken.

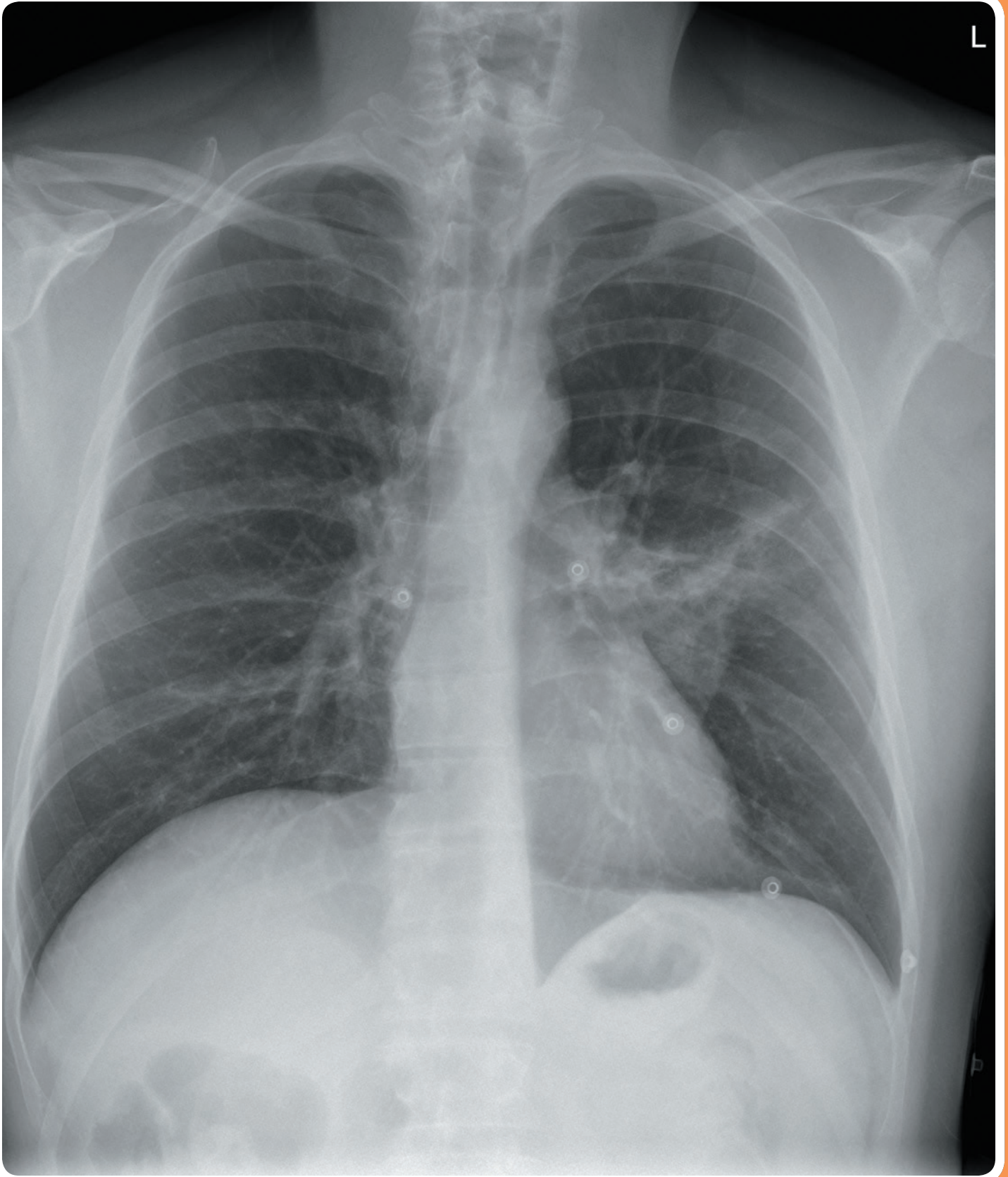
The patient should be treated with appropriate antibiotics for community-acquired pneumonia and a follow-up chest X-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

Ultrasound could be used to further assess the volume of the pleural effusion, particularly if a diagnostic pleural aspiration is being considered.



CASE 12

A 35 year old male presents to ED with coryzal symptoms, fever, and a productive cough with green sputum. There is no significant past medical history. He has a 15 pack year smoking history. On examination, he has saturations of 94% in air and is febrile with a temperature of 38.9°C. There is dullness to percussion and crackles in the left midzone. A chest X-ray is requested to assess for possible pneumonia.



REPORT – LINGULA CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is heterogeneous airspace opacification in the medial aspect of the left mid zone consistent with consolidation. This obscures the superior aspect of the left heart border. The lungs are otherwise clear. The lungs are not hyperinflated.

The pleural spaces are clear.
 Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.
 The superior aspect of the left heart border is obscured by consolidation. The right heart border is difficult to identify due to patient rotation.
 The aorta appears normal.
 The mediastinum is central, not widened, with clear borders.

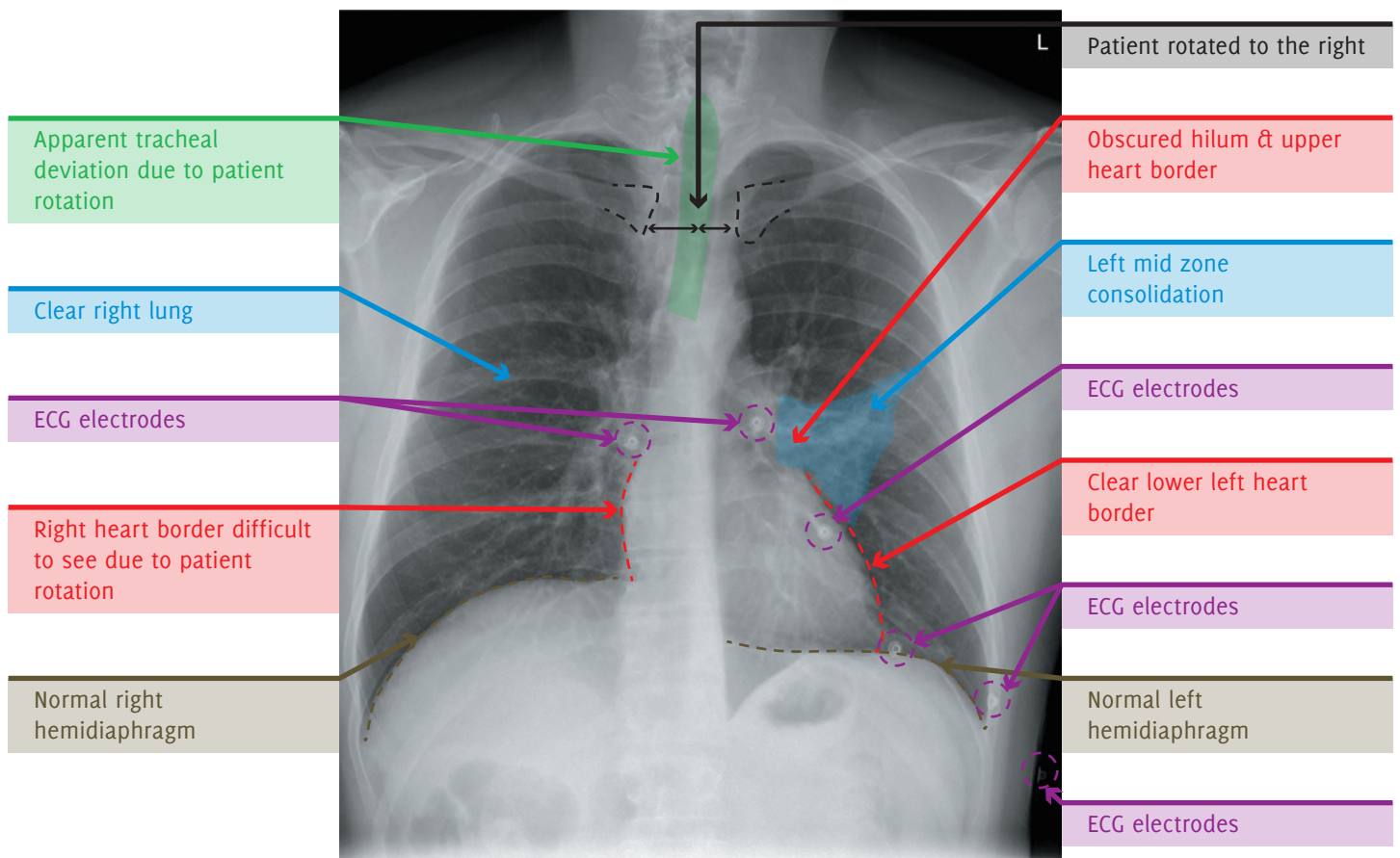
The left hilum is obscured by consolidation. Normal size, shape and position of the right hilum.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.
 No pneumoperitoneum.
 The imaged skeleton is intact with no fracture or destructive bony lesion visible.
 The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There are ECG electrodes in situ.
 No vascular lines, tubes or surgical clips.
Lung Apices: Normal
Hila: The left hilum is obscured by consolidation. Normal right hilum
Behind Heart: Normal
Costophrenic Angles: Normal
Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates left mid zone consolidation which partially obscures the left heart border. The findings are in keeping with pneumonia affecting the lingual segment of the left upper lobe.

Initial blood tests may include FBC, U/Es, CRP, and blood cultures. A sputum culture may also be obtained.

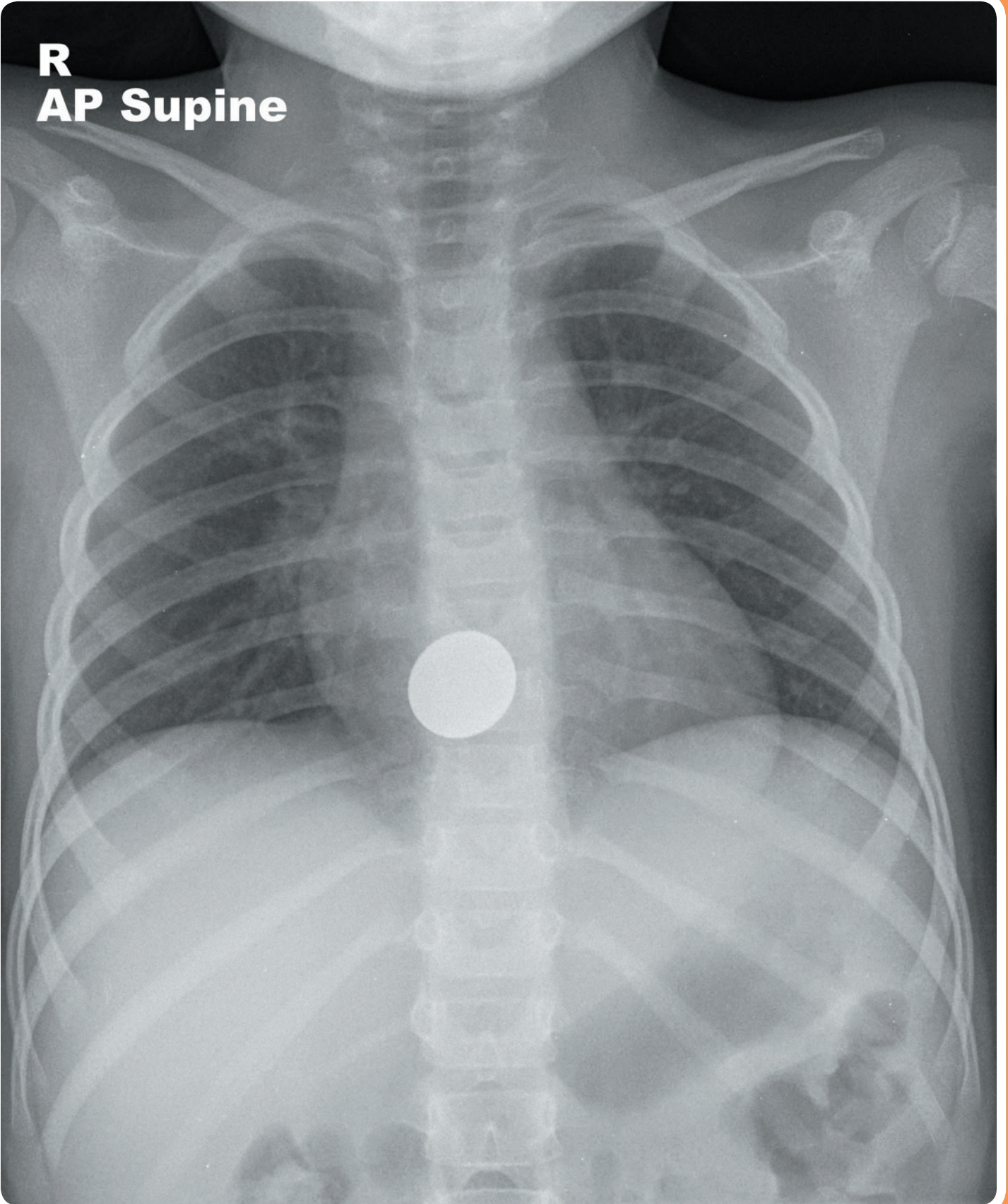
The patient should be treated with appropriate antibiotics for community-acquired pneumonia and a follow-up chest X-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).



CASE 13

A 2 year old female presents with her parents to ED after swallowing a coin. There is no significant past medical history. On examination, she has saturations of 100% in air, and is afebrile. Lung fields are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess the position of the foreign body.

R
AP Supine



REPORT – SWALLOWED FOREIGN BODY

Patient ID: Anonymous
Projection: AP Supine
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Limited – 5 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with normal thymic contours.

There is a circular radio-opaque foreign body projected over the lower mediastinum.

There is no evidence of pneumomediastinum.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum visible although the supine projection makes this difficult to assess.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips.

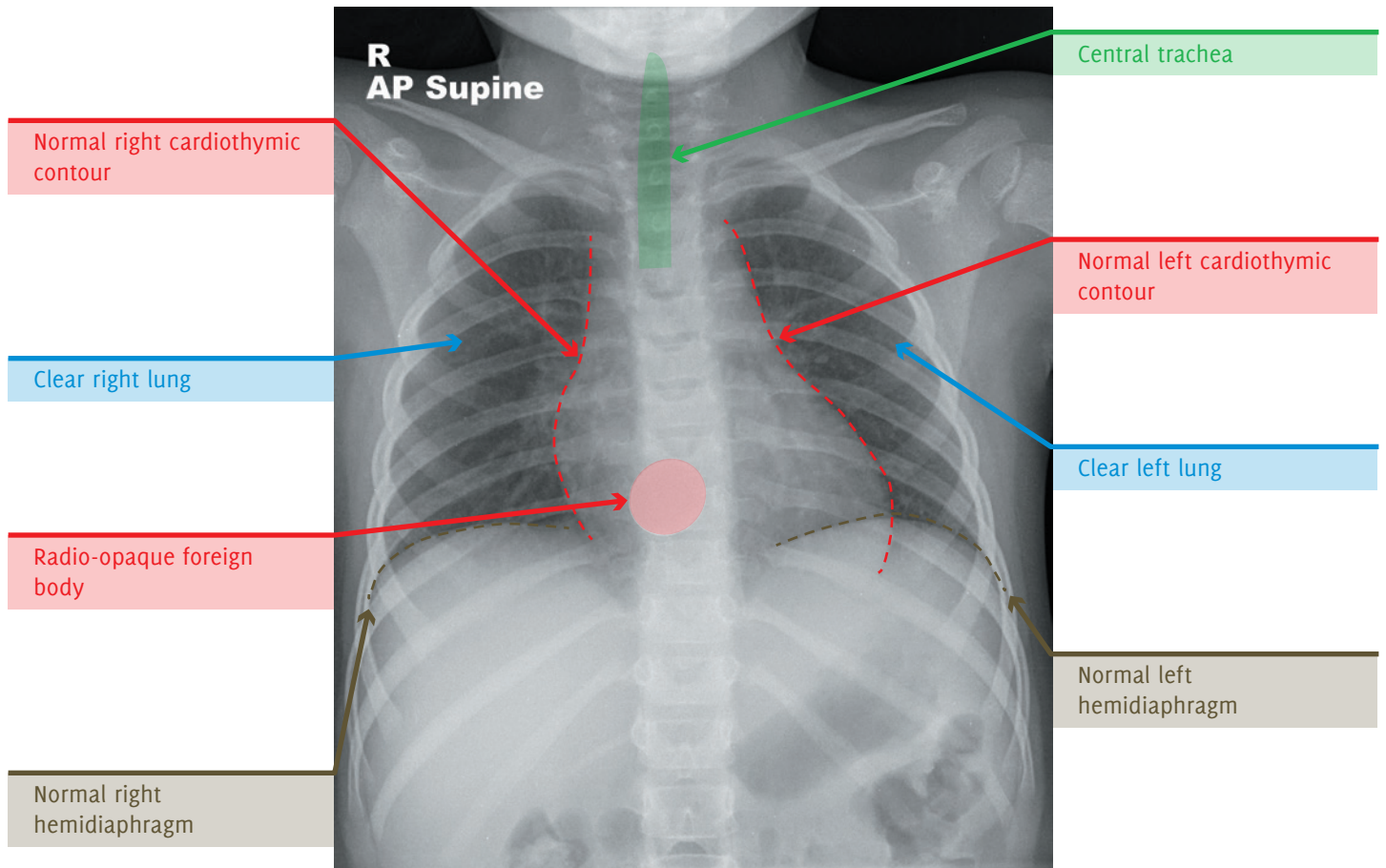
Lung Apices: Normal

Hila: Normal

Behind Heart: Radio-opaque foreign body projected centrally over the lower mediastinum

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a radio-opaque foreign body projected centrally over the lower mediastinum. Assuming it is not outwith the patient (i.e. on their skin or clothing), it is in keeping with a swallowed foreign body in the lower oesophagus.

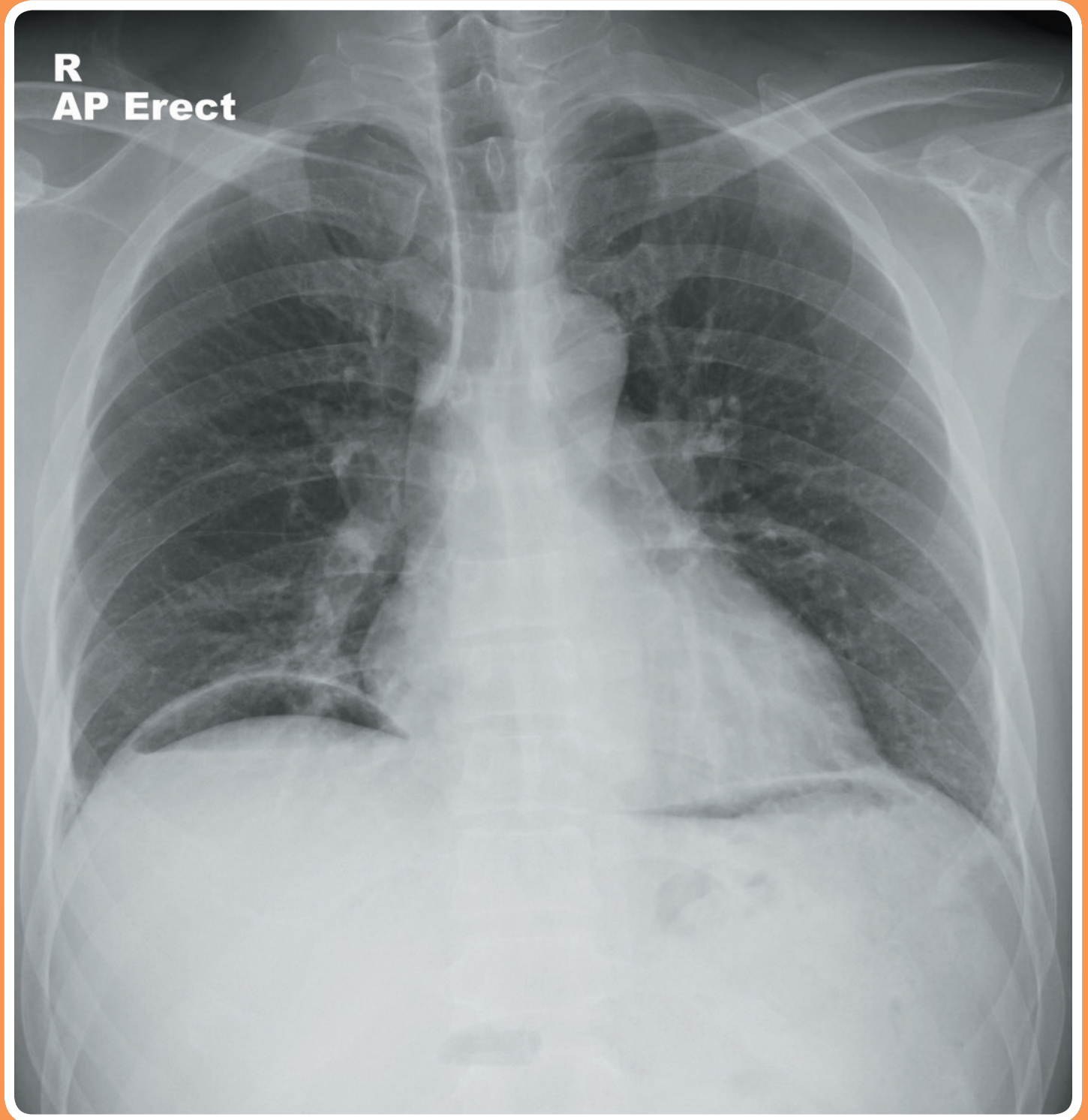
Ingested coins in the lower oesophagus do not necessarily need to be removed – their progress through the GI tract can be assessed with serial X-rays. However, endoscopic removal

should be considered if the coin appears stuck or is not progressing.



CASE 14

A 25 year old male presents to ED with worsening abdominal pain. He has a background of ulcerative colitis, and has been having diarrhoea and rectal bleeding over the last week. He is a non-smoker. On examination, he has saturations of 86% in air, RR 23, HR 128 bpm, and is febrile with a temperature of 38°C. Lungs are resonant throughout with good bilateral air entry. The abdomen is extremely tender, with absent bowel sounds and percussion tenderness. An erect chest X-ray is requested to assess for possible perforation.



REPORT – PNEUMOPERITONEUM

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear. They are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of both hemidiaphragms.

There are crescentic lucencies beneath both the left and right hemidiaphragms, in keeping with a pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

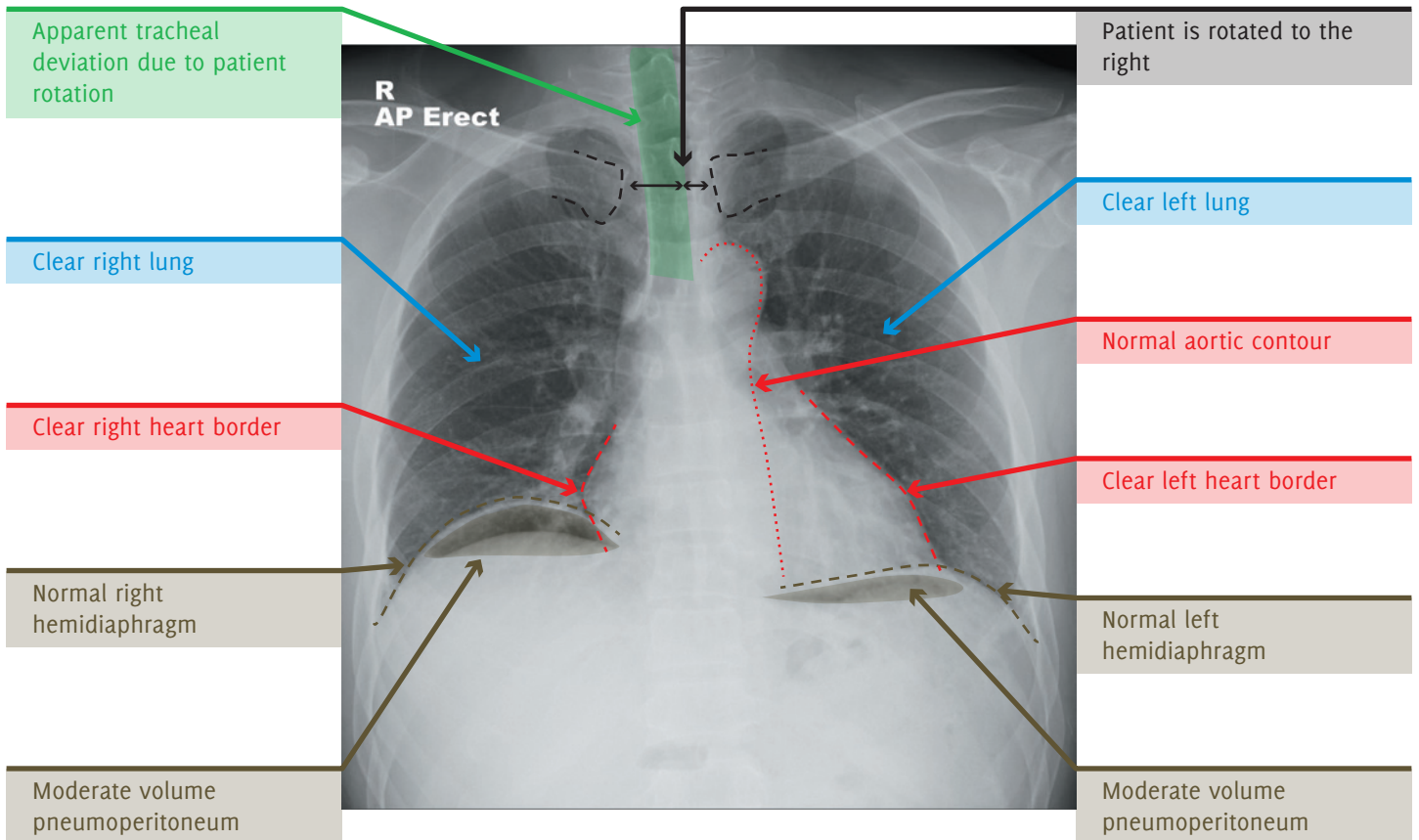
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Pneumoperitoneum



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates pneumoperitoneum. Given the clinical information, it may be related to perforation of a toxic megacolon.

The patient should be urgently resuscitated using an ABCDE approach. Oxygen should be administered, wide-bore cannulae should be inserted, and a fluid bolus should be given, as well as appropriate antibiotics for abdominal sepsis. Initial blood tests may include FBC, U/Es, LFTs, CRP, coagulation, group/save, and blood cultures.

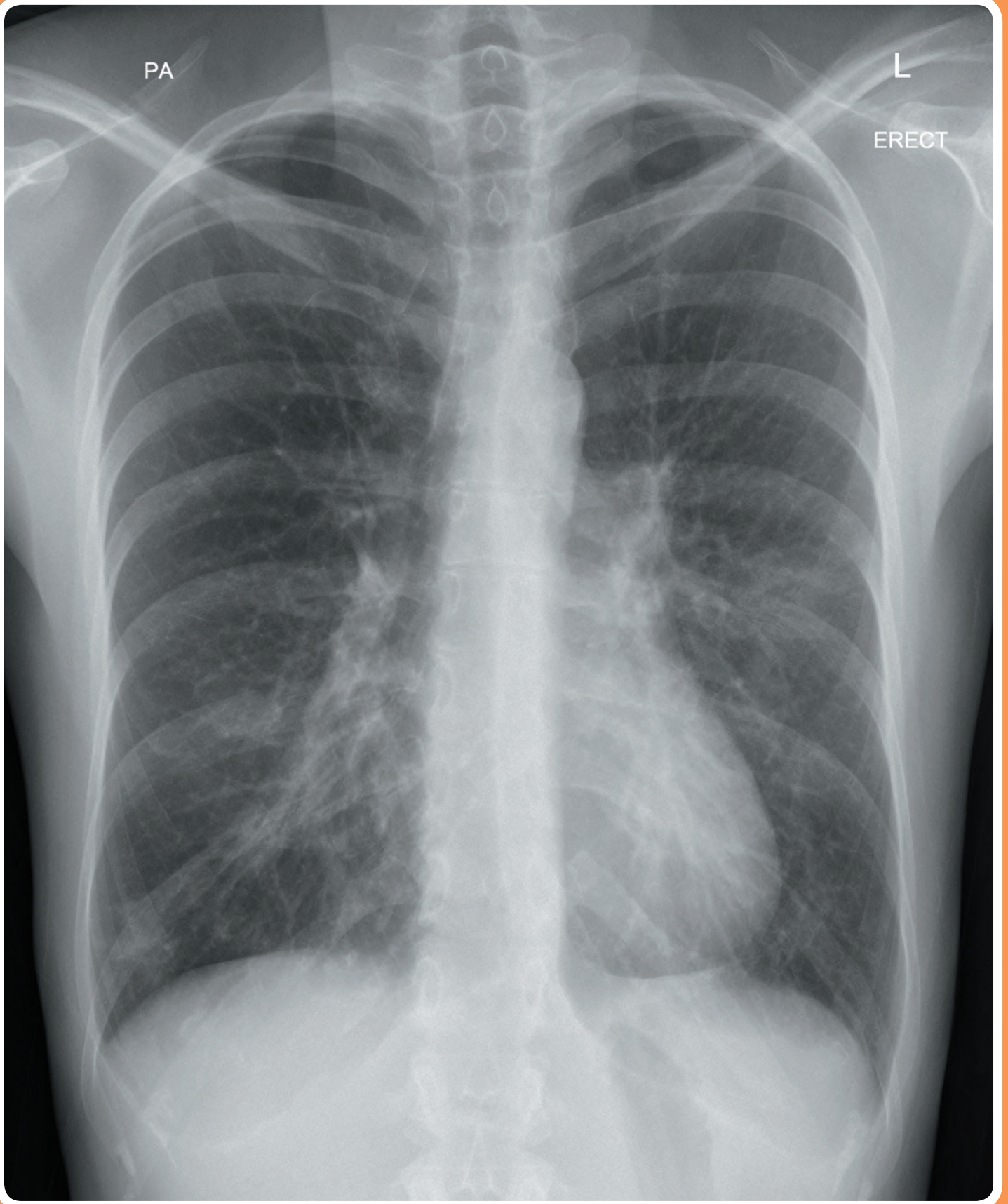
Urgent surgical review is required. Depending on the clinical picture, the patient may be taken straight to theatre, have an

urgent CT abdomen/pelvis with IV contrast (to identify the site and cause of the perforation), or require further stabilisation before any action.



CASE 15

A 30 year old female presents to ED two weeks post-partum feeling unwell, with a productive cough. On examination, she has saturations of 90% in air and is afebrile. There is dullness to percussion, crackles, and reduced air entry at both lung bases. A chest X-ray is requested to assess for possible pneumonia, effusion, or collapse.



REPORT – BILATERAL CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central.

BREATHING

There is heterogeneous airspace opacification of the right lower zone and left mid zone consistent with consolidation. The rest of the lungs are clear. The lungs are not hyperinflated.

The pleural spaces are clear.
Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.
The left heart border is clear. The right heart border is obscured by consolidation.
The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

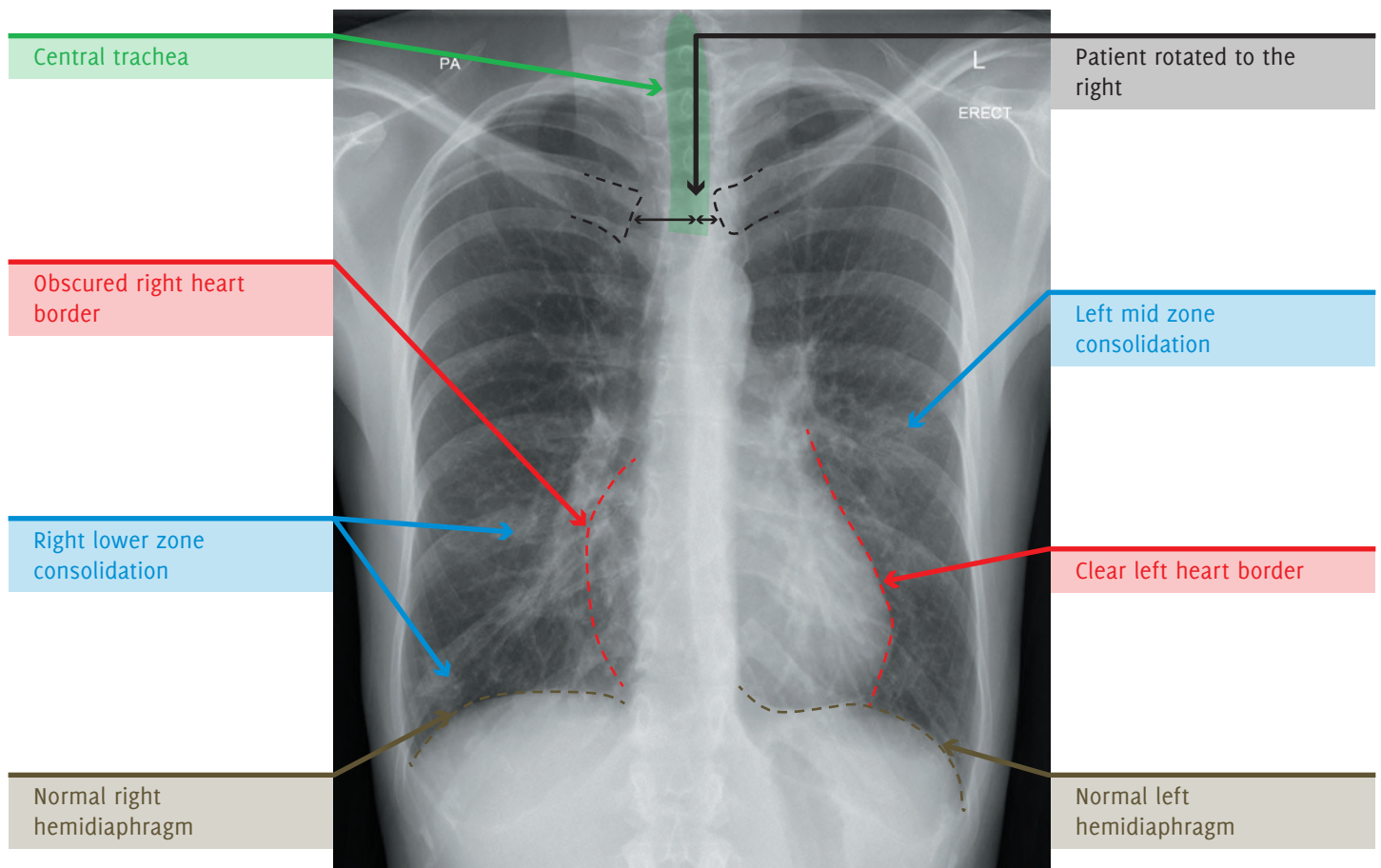
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates consolidation involving the right lower and left mid zones, in keeping with pneumonia. The right heart border is obscured, indicating middle lobe pneumonia. The left heart border and hemidiaphragm are preserved, making it difficult to determine which lobe the left sided pneumonia is affecting.

Supplementary oxygen should be given. Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken.

The patient should be treated with appropriate antibiotics for community-acquired pneumonia and have a follow-up

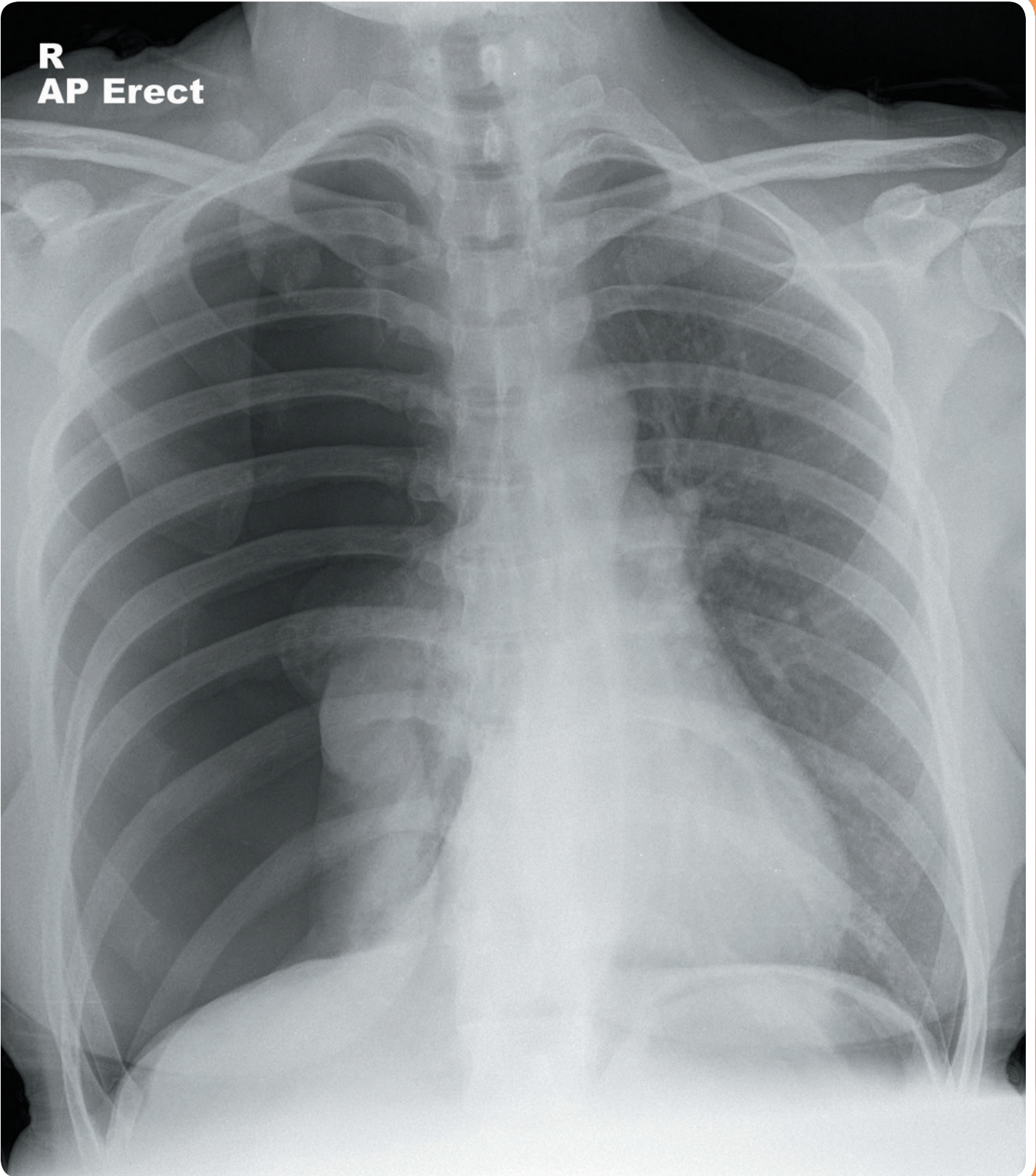
chest X-ray performed in 4-6 weeks to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65). The choice of antibiotics may need to be modified if the patient is breastfeeding.



CASE 16

A 30 year old female presents to ED with sudden onset right-sided pleuritic chest pain and breathlessness. She has no significant past medical history. She is a non-smoker. On examination, she has saturations of 91% in air and is afebrile. HR is 92 bpm, and BP is 120/80 mmHg. There is increased resonance in the right hemithorax and reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.

R
AP Erect



REPORT – SPONTANEOUS PNEUMOTHORAX

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate- vertebral bodies just visible behind heart
Inspiration: Adequate - 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

A lung edge is visible in the right hemithorax, beyond which no lung markings are seen, consistent with a large pneumothorax. There is almost complete collapse of the underlying right lung.

The left lung is clear. It is not hyper-expanded.

The left pleural spaces are clear, and there is normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The right heart border is difficult to identify (probably due to patient rotation and the adjacent collapsed right lung). The left heart border is clear.

The mediastinum is central allowing for patient rotation. It is not widened, with clear borders.

The right hilum is difficult to identify due to the adjacent collapsed lung. Normal size, shape, and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable. Of note, there is no surgical emphysema.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

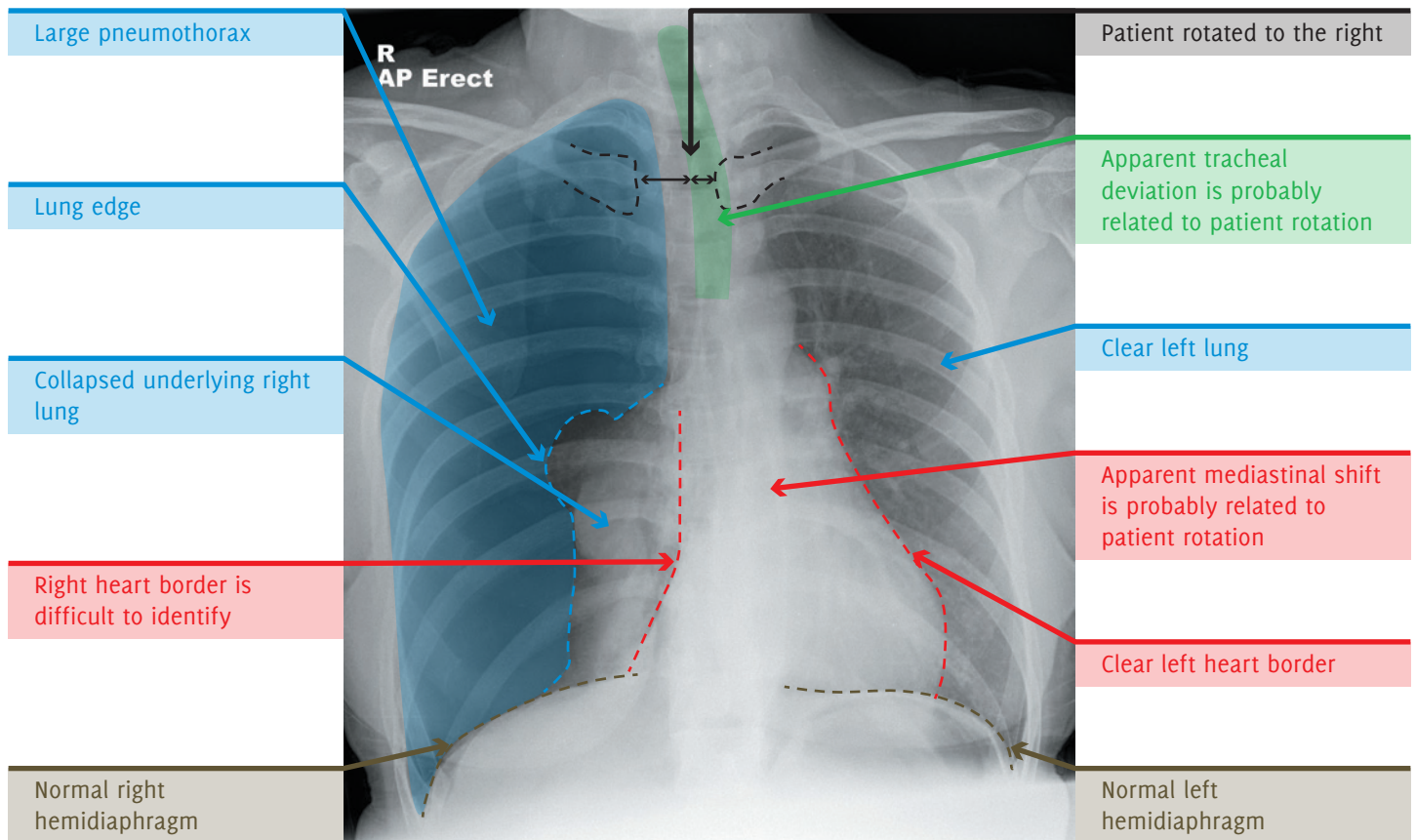
Lung Apices: Right pneumothorax. Normal left apex.

Hila: Right hilum is difficult to identify. Normal left hilum.

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large right-sided pneumothorax with almost complete collapse of the underlying lung. The apparent mediastinal shift to the left is likely due to rotation, however the patient should be assessed for clinical evidence of a tension pneumothorax.

The patient should be given supplementary oxygen.

The pneumothorax will require active intervention due to its large size. Needle aspiration of the pneumothorax should be

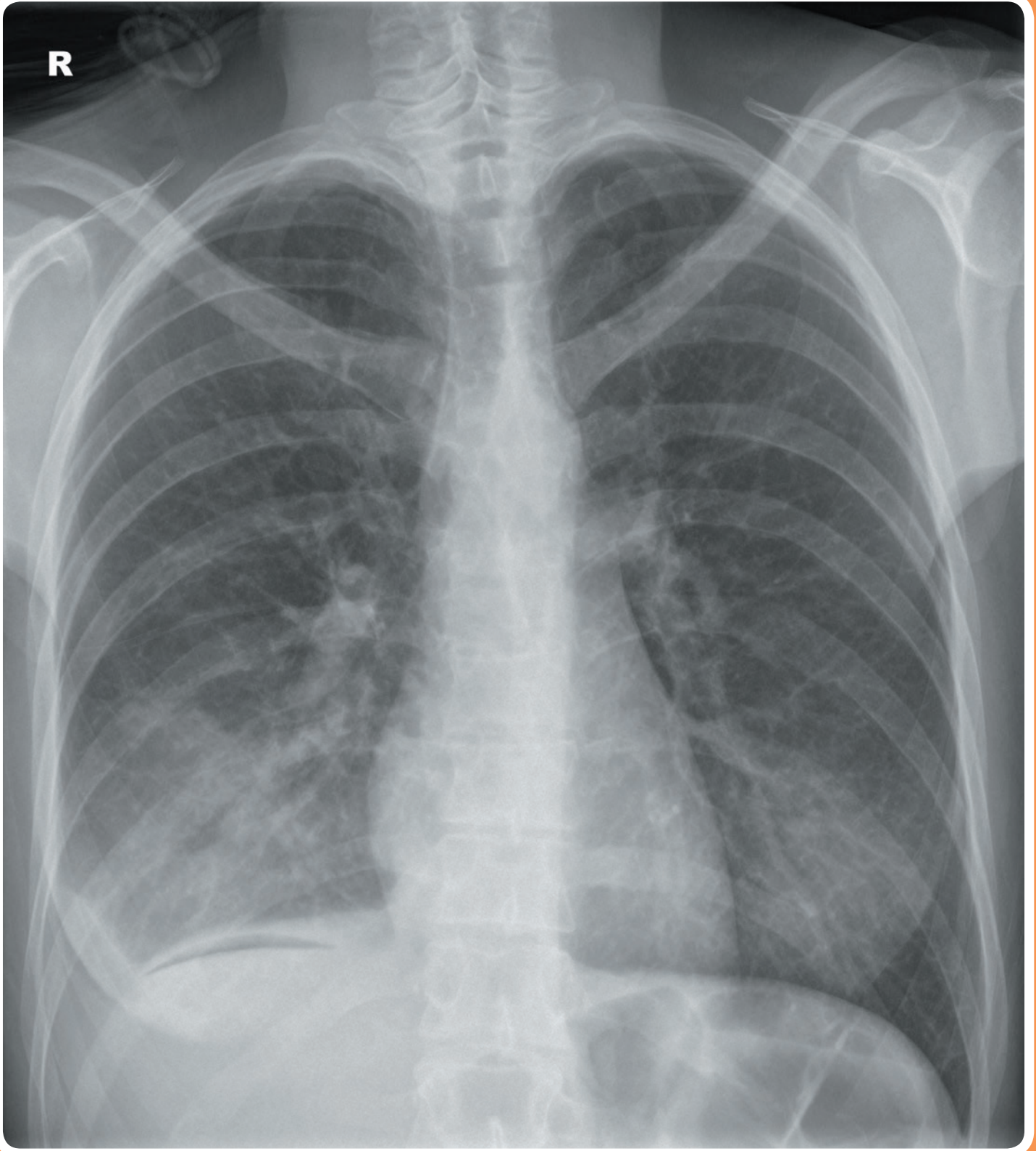
performed in the 1st instance. An intercostal chest drain may still be required depending on the success of the aspiration.

The patient should be referred to respiratory and follow up chest X-rays performed until the pneumothorax has resolved.



CASE 17

A 32 year old female on the surgical ward develops shortness of breath and a fever 36 hours post-appendicectomy. There is no other significant past medical history. She is a non-smoker. On examination, she has saturations of 91% in air, a RR of 25, a HR of 120, and is febrile with a temperature of 39.5°C. There is reduced air entry and crackles in the right lung base. A chest X-ray is requested to assess for possible pneumonia or effusion.



REPORT – RIGHT LOWER ZONE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is right lower zone air space opacification in keeping with consolidation. The remainder of the lungs are clear. The lungs are not hyperinflated.

There is blunting of the right costophrenic angle, consistent with a small pleural effusion. The left pleural space is clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

The lateral aspect of the right hemidiaphragm is obscured by the pleural effusion. The remainder of the diaphragm is clear.

There is a lucent crescent below the right hemidiaphragm consistent with a small volume of pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

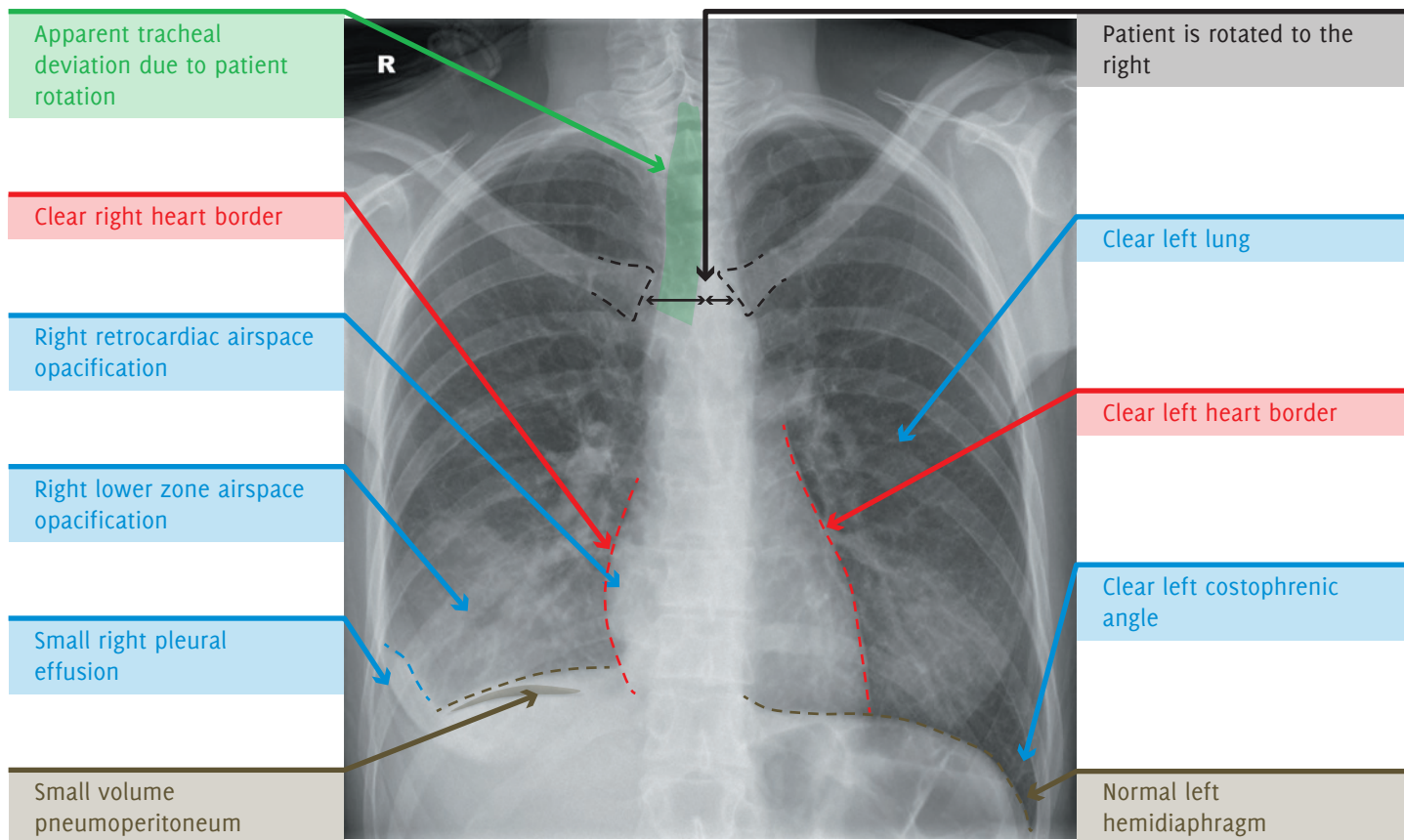
Lung Apices: Normal

Hila: Normal

Behind Heart: Increased right retrocardiac opacification consistent with consolidation

Costophrenic Angles: Blunting of the right costophrenic angle. Normal left costophrenic angle.

Below the Diaphragm: Small-volume pneumoperitoneum beneath the right hemidiaphragm



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates right lower zone consolidation, associated with a pleural effusion. This is consistent with pneumonia and a parapneumonic effusion. There is also a small-volume pneumoperitoneum, which is in keeping with the recent surgery.

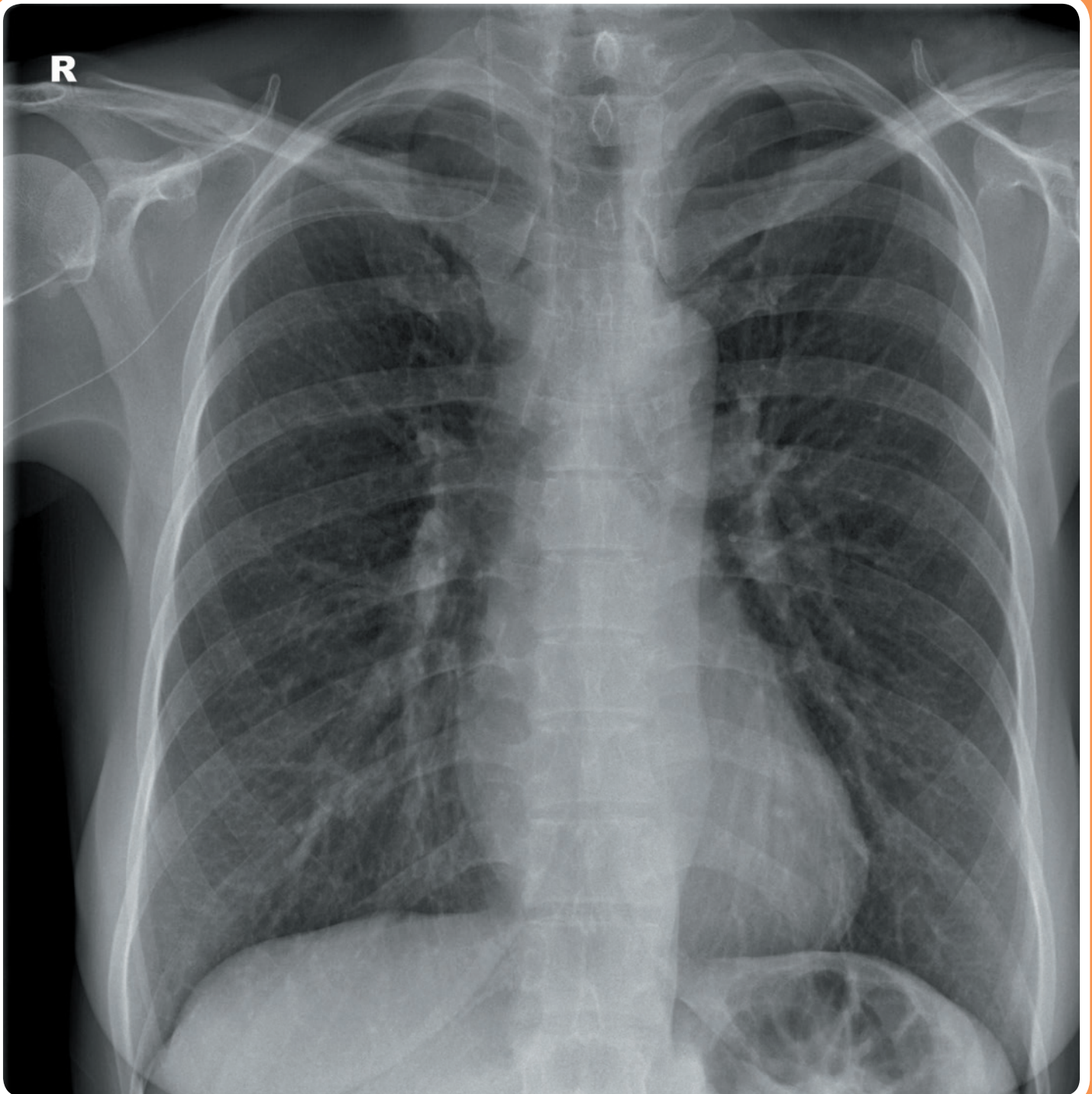
The patient should be started on supplementary oxygen. Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken.

She will require IV fluids and appropriate antibiotics for hospital-acquired pneumonia, and a follow up X-ray to ensure resolution of the consolidation should be performed. An ultrasound could be considered to assess the size of the parapneumonic effusion, and permit ultrasound-guided aspiration/drainage if required.



CASE 18

A 38 year old female has had a PICC inserted for chemotherapy. She has a past medical history of breast cancer. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A routine post-procedure chest X-ray is requested to assess PICC position.



REPORT – LINES: PERIPHERALLY INSERTED CENTRAL CATHETER (MALPOSITIONED)

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear. No pneumothorax.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

The right PICC is projected over the right axillary and subclavian veins. It then courses cranially to enter the right internal jugular vein, rather than going into the superior vena cava.

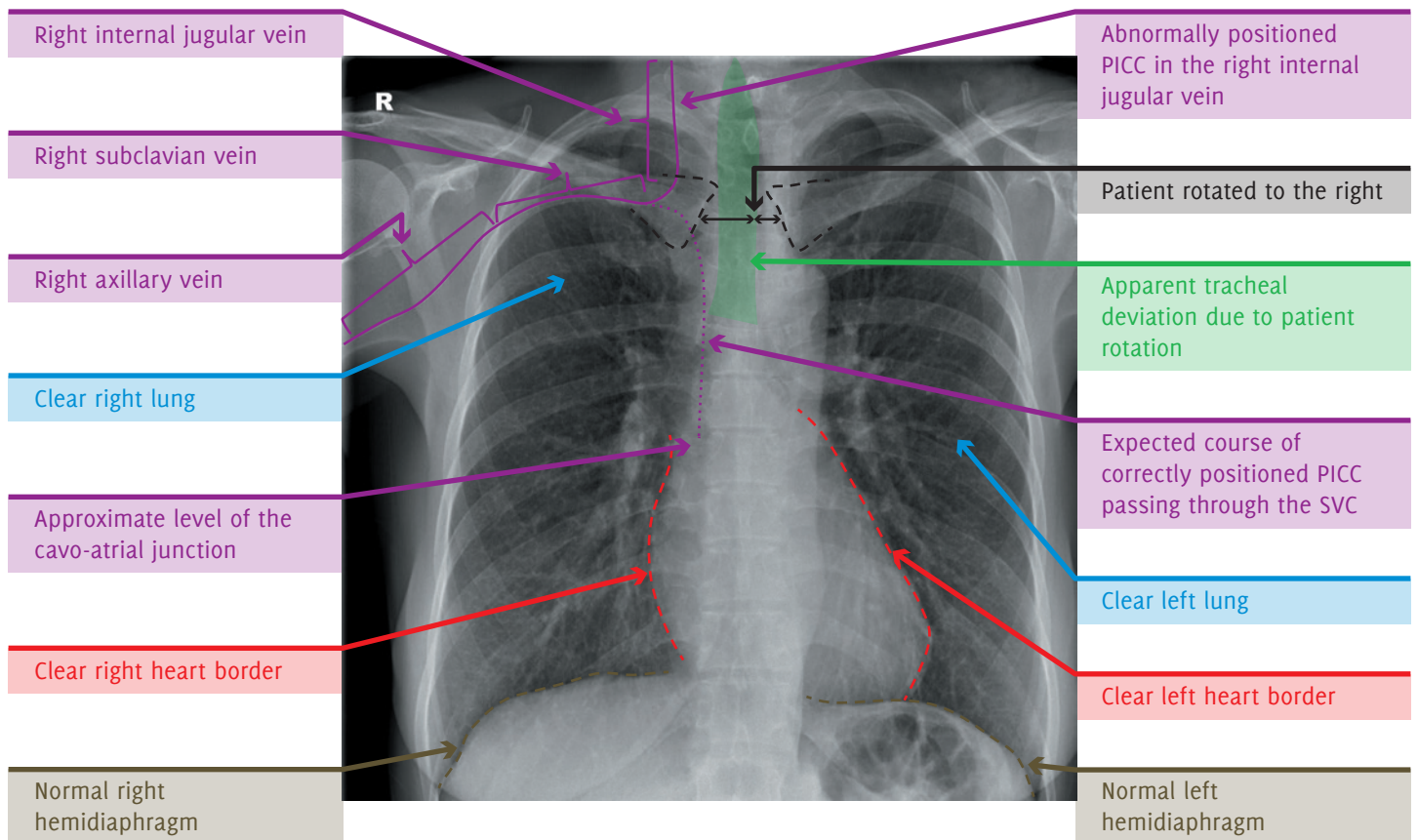
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates the right PICC is malpositioned, with its tip in the right internal jugular vein.

The right PICC needs to be re-sited, and its position checked with a repeat X-ray prior to use.



CASE 19

A 40 year old female presents to ED with a 1 week history of cough and fever. There is no significant past medical history and she is a non-smoker. On examination, she has saturations of 85% in air, and is febrile with a temperature of 38.2°C. There is dullness to percussion and crackles in the right lower zone. A chest X-ray is performed to assess for possible pneumonia, collapse or effusion.



REPORT – RIGHT MIDDLE AND LOWER LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central.

BREATHING

There is heterogeneous airspace opacification of the right lower zone consistent with consolidation. The lungs are otherwise clear. The lungs are not hyperinflated.

There is blunting of the right costophrenic angle in keeping with a small right pleural effusion. The left-sided pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The right heart border is largely clear, although its inferior margin is indistinct. Clear left heart border.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of the hila.

DIAPHRAGM + DELICATES

The right hemidiaphragm is obscured by consolidation. Normal position and appearance of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

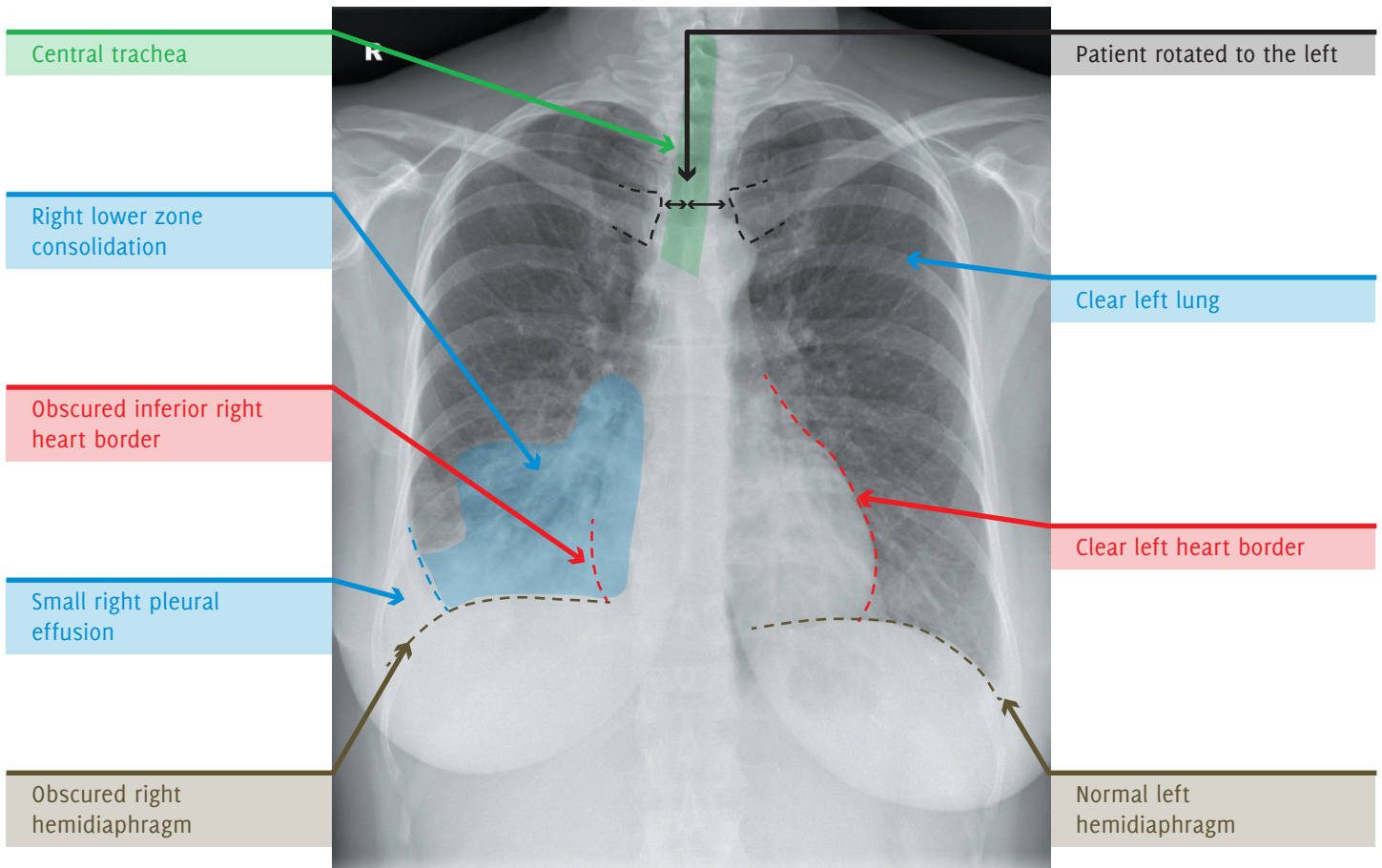
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Blunted right costophrenic angle. Normal left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates right lower zone consolidation which obscures the right hemidiaphragm, consistent with right lower lobe pneumonia. There may also be pneumonia affecting the right middle lobe, as the right heart border appears partially obscured. A small right parapneumonic effusion is also present.

Initial blood tests may include FBC, U/Es, CRP, and blood cultures. A sputum culture may also be obtained.

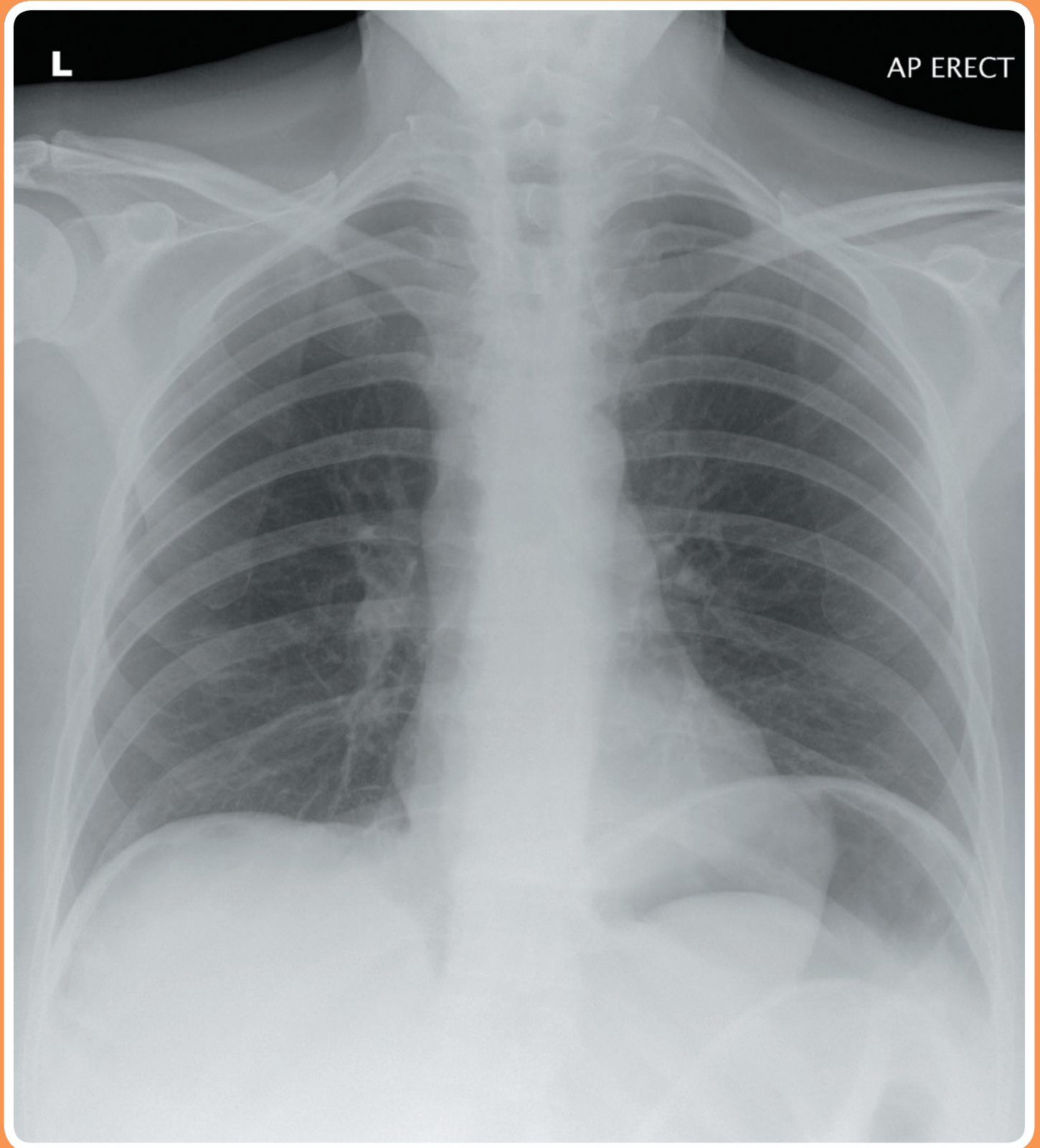
The patient should be treated with appropriate antibiotics for community-acquired pneumonia, and a follow-up chest X-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

Ultrasound could be used to further assess the volume of the pleural effusion, particularly if a diagnostic pleural aspiration is being considered.



CASE 20

A 50 year old female presents to ED with worsening abdominal pain. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 92% in air, a RR of 24, a HR of 123 bpm, and is febrile with a temperature of 38.8°C. Lungs are resonant throughout with good bilateral air entry. The abdomen is extremely tender, with absent bowel sounds and percussion tenderness. An erect chest X-ray is requested to assess for possible perforation.



REPORT – PNEUMOPERITONEUM

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear. They are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

There is a large lucency beneath the left hemidiaphragm, and a smaller lucency beneath the right hemidiaphragm, in keeping with pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips.

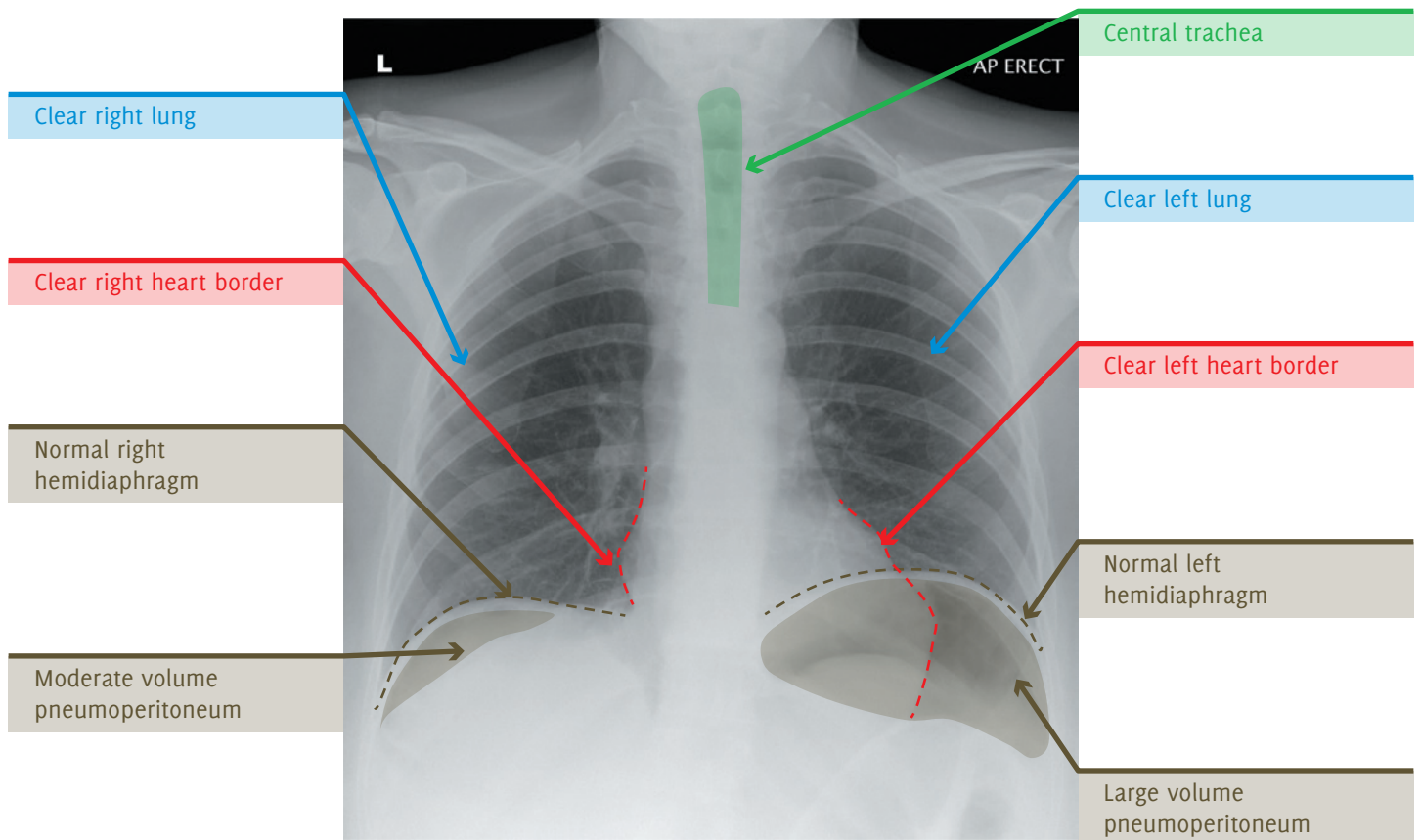
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Pneumoperitoneum



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large volume pneumoperitoneum in keeping with a perforated hollow viscus within the abdomen.

The patient should be urgently resuscitated using an ABCDE approach. Oxygen should be administered, wide-bore cannulae should be inserted, and a fluid bolus should be given, as well as broad spectrum antibiotics. Initial blood tests may include FBC, U/Es, LFTs, CRP, coagulation, group/save, and blood cultures.

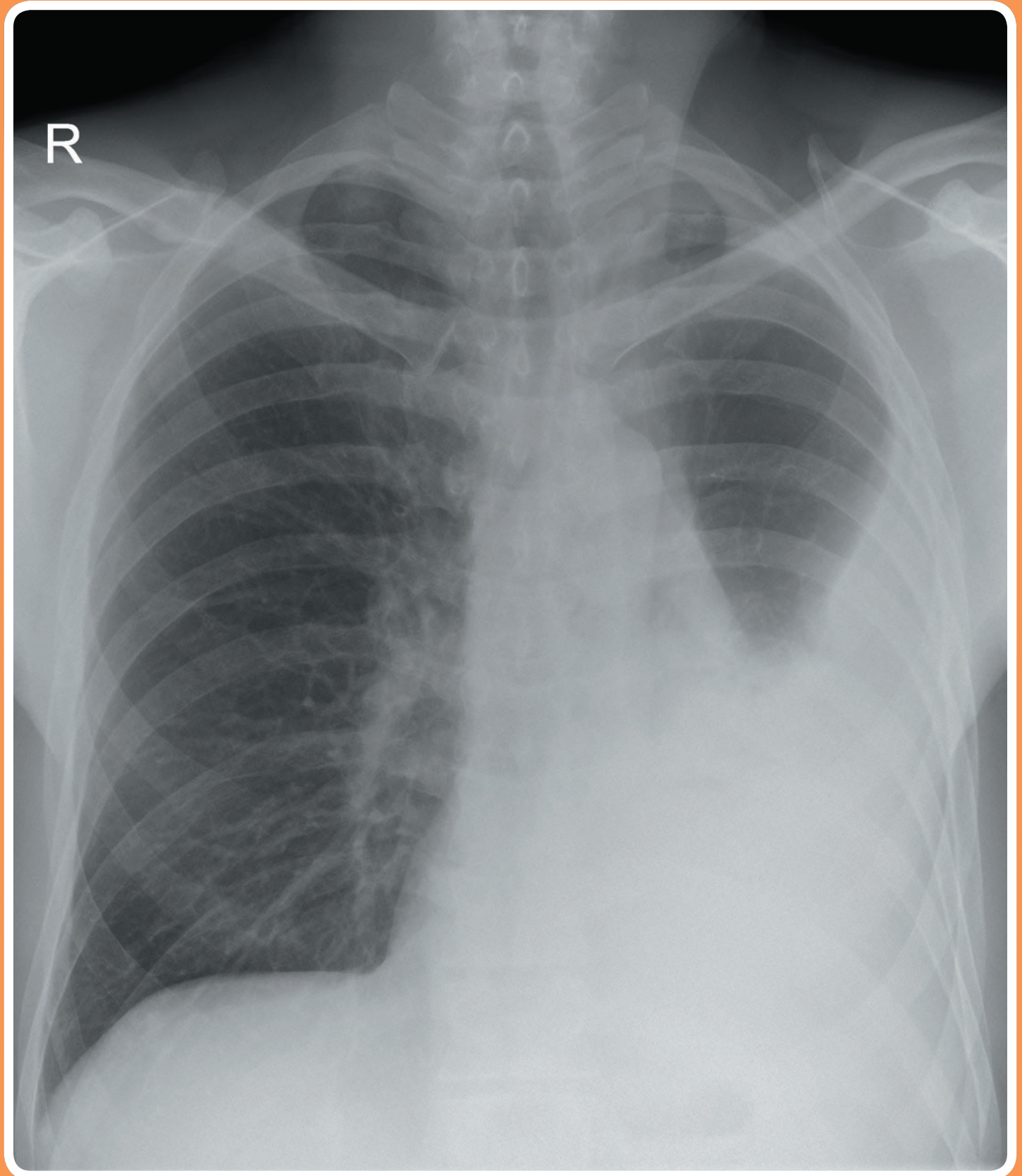
Urgent surgical review is required. Depending on the clinical picture, the patient may be taken straight to theatre, have an urgent CT abdomen/pelvis with IV contrast (to identify the site

and cause of the perforation), or require further stabilisation before any action.



CASE 21

A 50 year old male presents to ED with worsening shortness of breath. He has a history of granulomatous vasculitis (previously known as Wegener's) and is a non-smoker. On examination, he has saturations of 90% in air and is afebrile. There is dullness to percussion and reduced air entry in the left middle and lower zones. A chest X-ray is requested to assess for possible pneumonia, collapse, or pleural effusion.



REPORT – PLEURAL EFFUSION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is homogenous opacification in the left mid and lower zones. A meniscus is present at the upper margin. The rest of the lungs are clear. The lungs are not hyperinflated.

The right pleural space is clear.

Normal pulmonary vascularity.

CIRCULATION

There is loss of the left heart border. It is therefore not possible to comment on cardiac size. The right heart border is clear.

The descending thoracic aortic contour is also obscured.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of right hila. The left hilum is obscured.

DIAPHRAGM + DELICATES

The left hemidiaphragm is obscured. Normal position and appearance of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

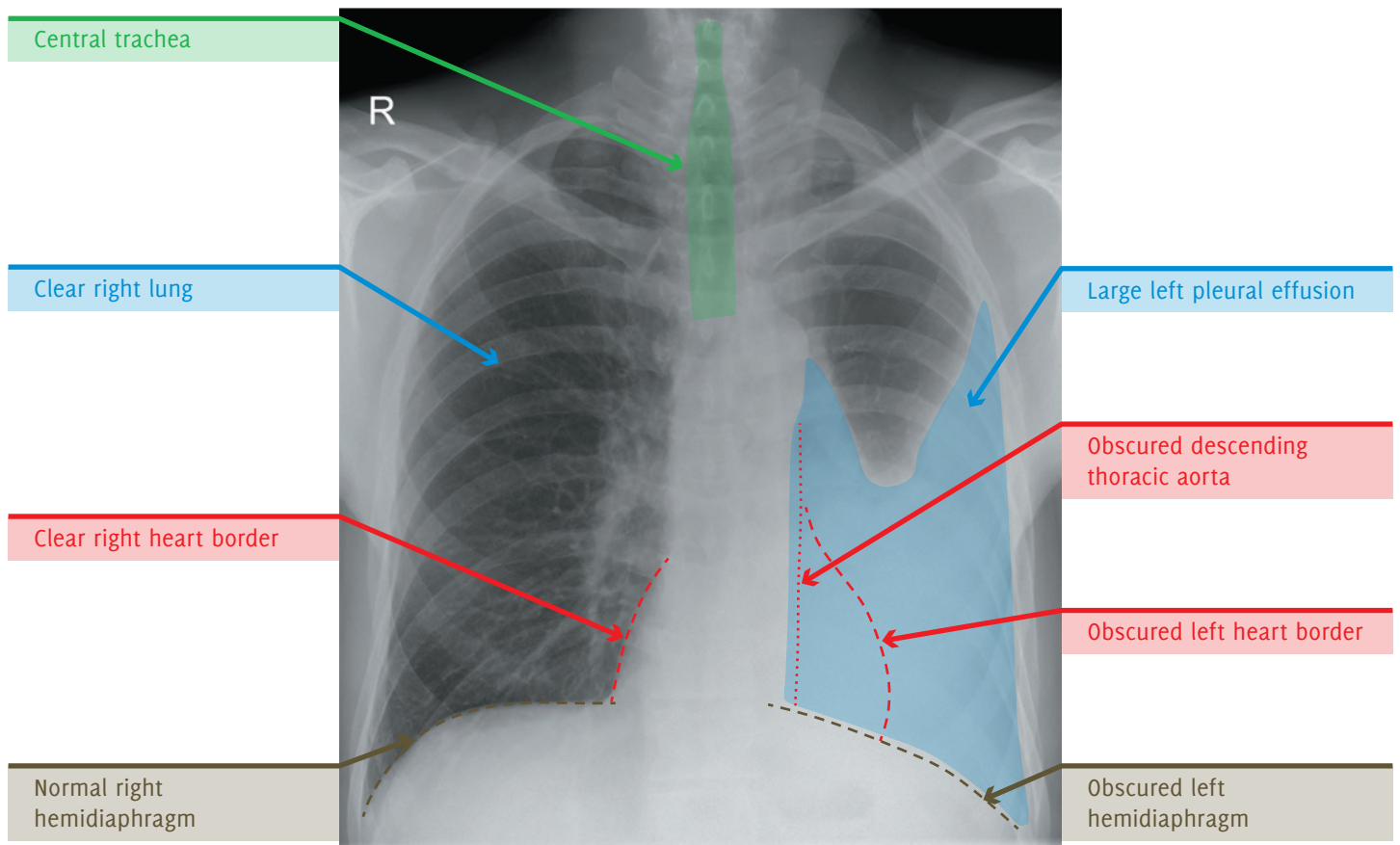
Lung Apices: Normal

Hila: Left hilar region is obscured by opacification

Behind Heart: Obscured by opacification on the left

Costophrenic Angles: Loss of the left costophrenic angle, normal right costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large left-sided pleural effusion. This may be directly related to the patient's granulomatous vasculitis, although other causes for effusions such as infection and malignancy are also possible.

Supplementary oxygen should be given.

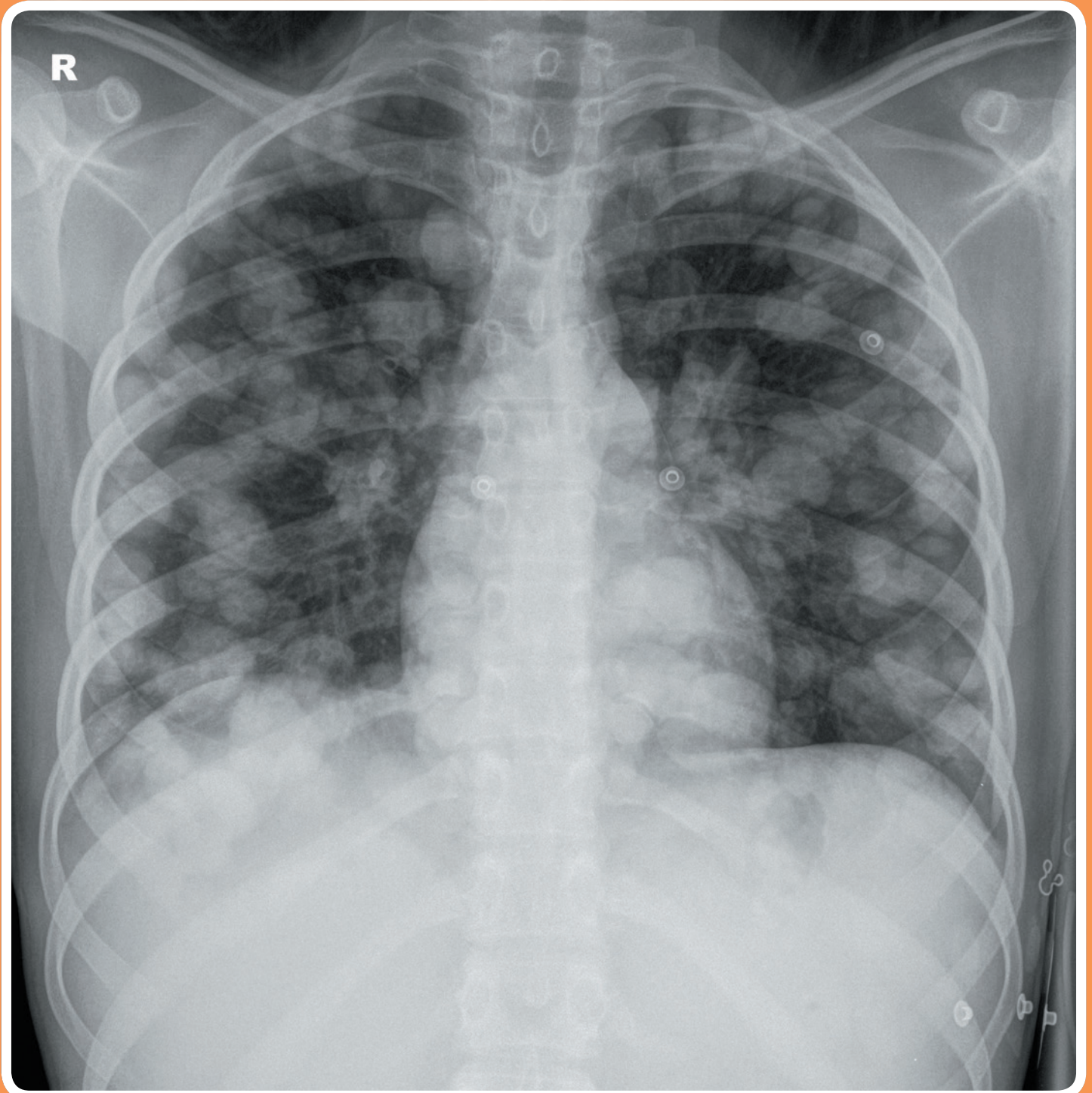
Initial blood tests may include FBC, U/E/s, LFTs, coagulation, and CRP. An ultrasound-guided chest drain should be inserted, with pleural fluid sent for protein, albumin, glucose, microscopy, white cell count and cytology. A CXR should be performed to ensure adequate positioning of the drain.

Further management will be guided by the underlying aetiology of the effusion. If the patient has recurrent pleural effusions then referral to thoracic surgery with a view to pleurodesis may be considered.



CASE 22

A 52 year old female presents to ED with a 12 week history of cough. She has a 30 pack year smoking history. On examination, she has saturations of 99% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible malignancy.



REPORT – LUNG METASTASES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There are innumerable, well-circumscribed round soft tissue opacities distributed throughout both lungs. The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The hila appear bulky bilaterally.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There are ECG electrodes in situ.

No vascular lines, tubes, or surgical clips.

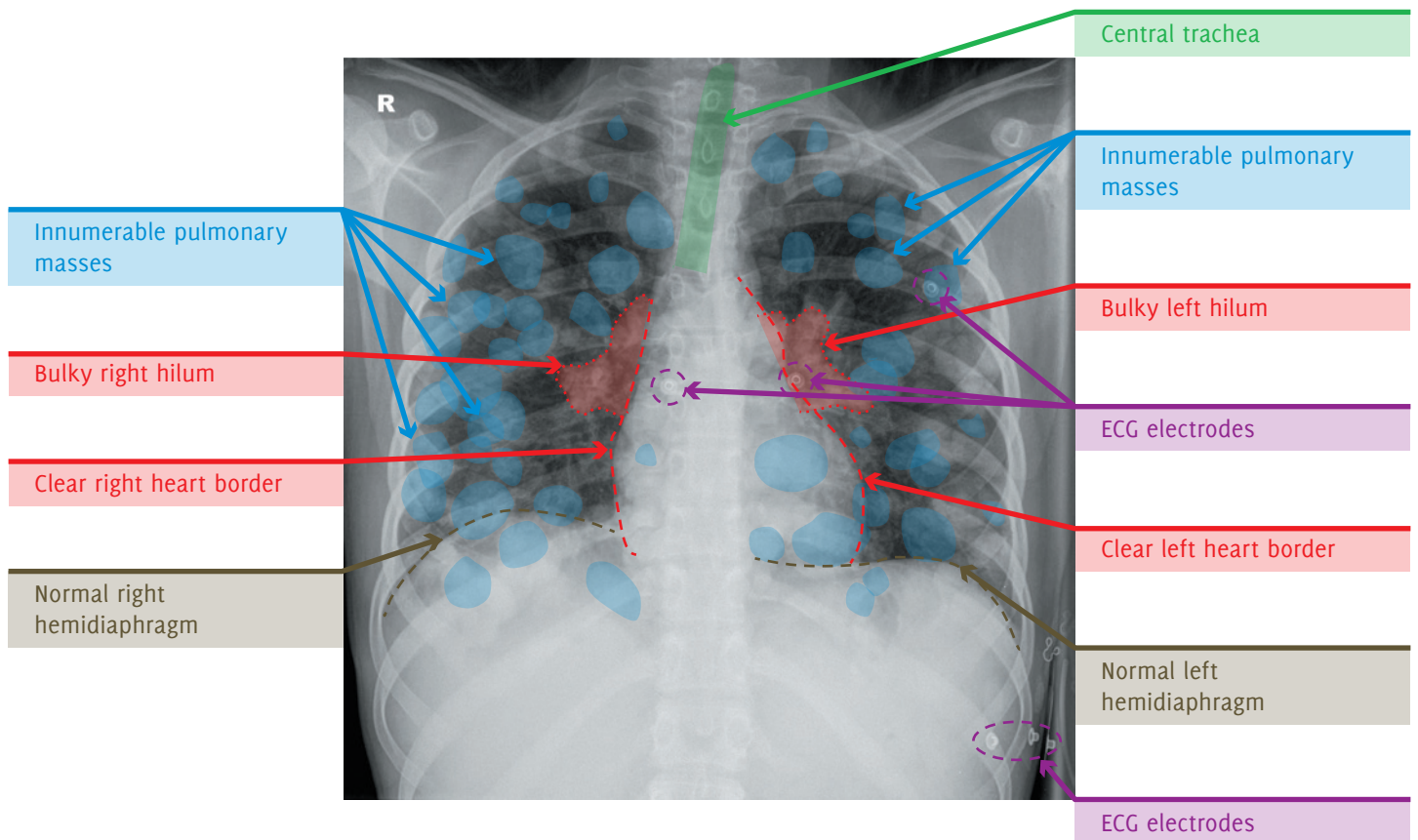
Lung Apices: Multiple masses

Hila: Enlarged lobulated contours of the hilum bilaterally

Behind Heart: Multiple masses

Costophrenic Angles: Multiple masses

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates innumerable rounded pulmonary masses in keeping with metastases. The hila appear bulky – this could be due to pulmonary metastases projected over them or related to enlarged hilar lymph nodes. The differential diagnosis for “cannonball” metastases includes breast cancer, renal cell carcinoma, choriocarcinoma and endometrial carcinoma.

The patient needs a thorough clinical examination, including the breasts. Initial blood tests may include FBC, U/Es, CRP, LFTs, bone profile.

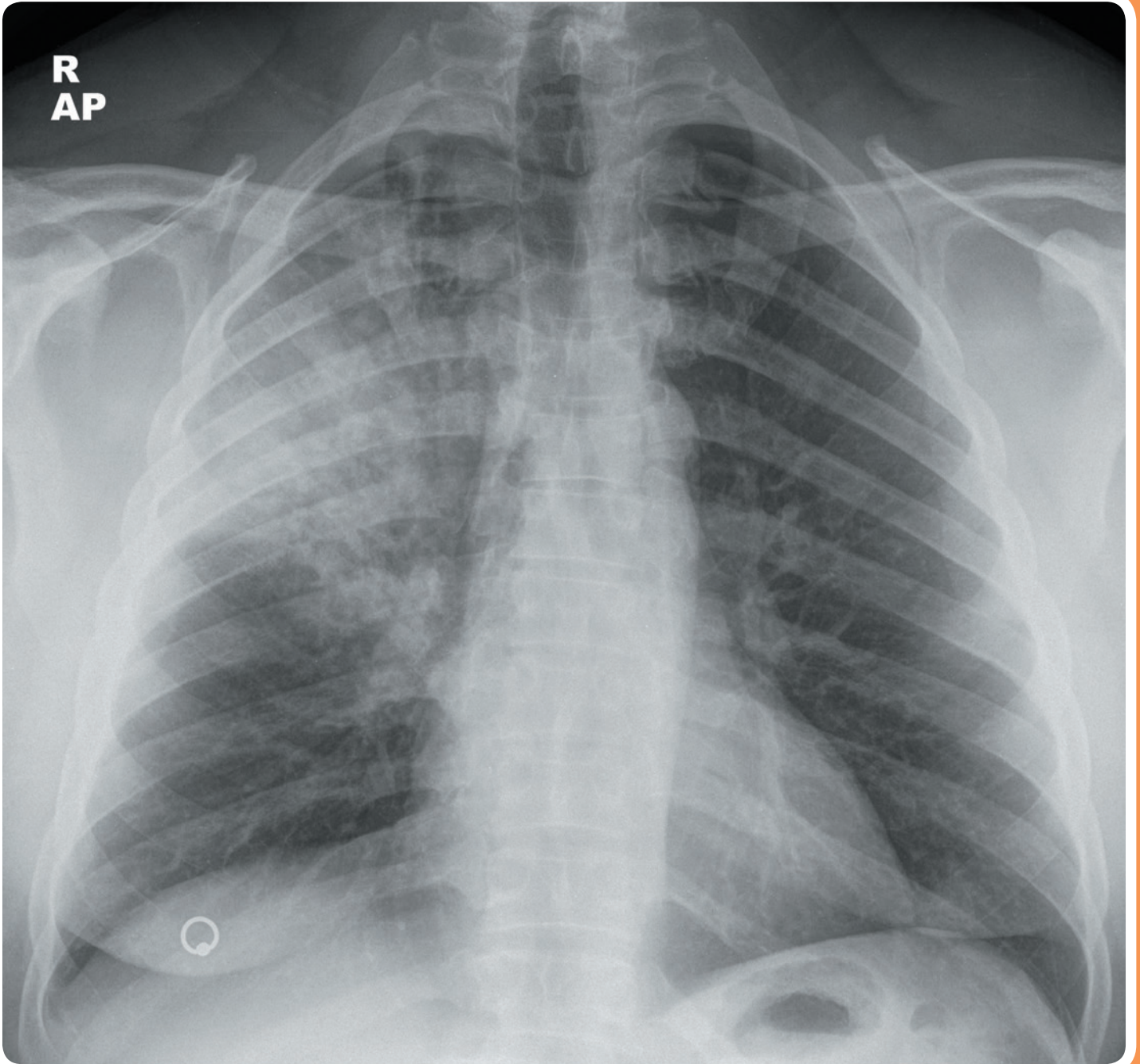
A staging CT chest, abdomen and pelvis with IV contrast should be performed to identify the underlying primary and fully stage the cancer.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient’s wishes.



CASE 23

A 55 year old female develops a cough productive of 'nasty sputum'. She is in the gynaecology ward having undergone elective surgery 3 days earlier. There is no significant past medical history other than uterine fibroids. She is a non-smoker. On examination, she has saturations of 91% in air and is febrile with a temperature of 38.5°C. There is dullness to percussion and coarse crackles in the right upper and mid zones. A chest X-ray is requested to assess for possible pneumonia or collapse.



REPORT – RIGHT UPPER LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is slightly deviated to the right.

BREATHING

There is marked heterogeneous airspace opacification in the right upper zone with air bronchograms, in keeping with consolidation. It has a relatively sharp inferior margin which likely indicates a mildly elevated horizontal fissure. The

remainder of the lungs are clear. The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The right hilum is partially obscured by consolidation. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fracture or destructive bony lesion visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips. A right-sided nipple ring is noted.

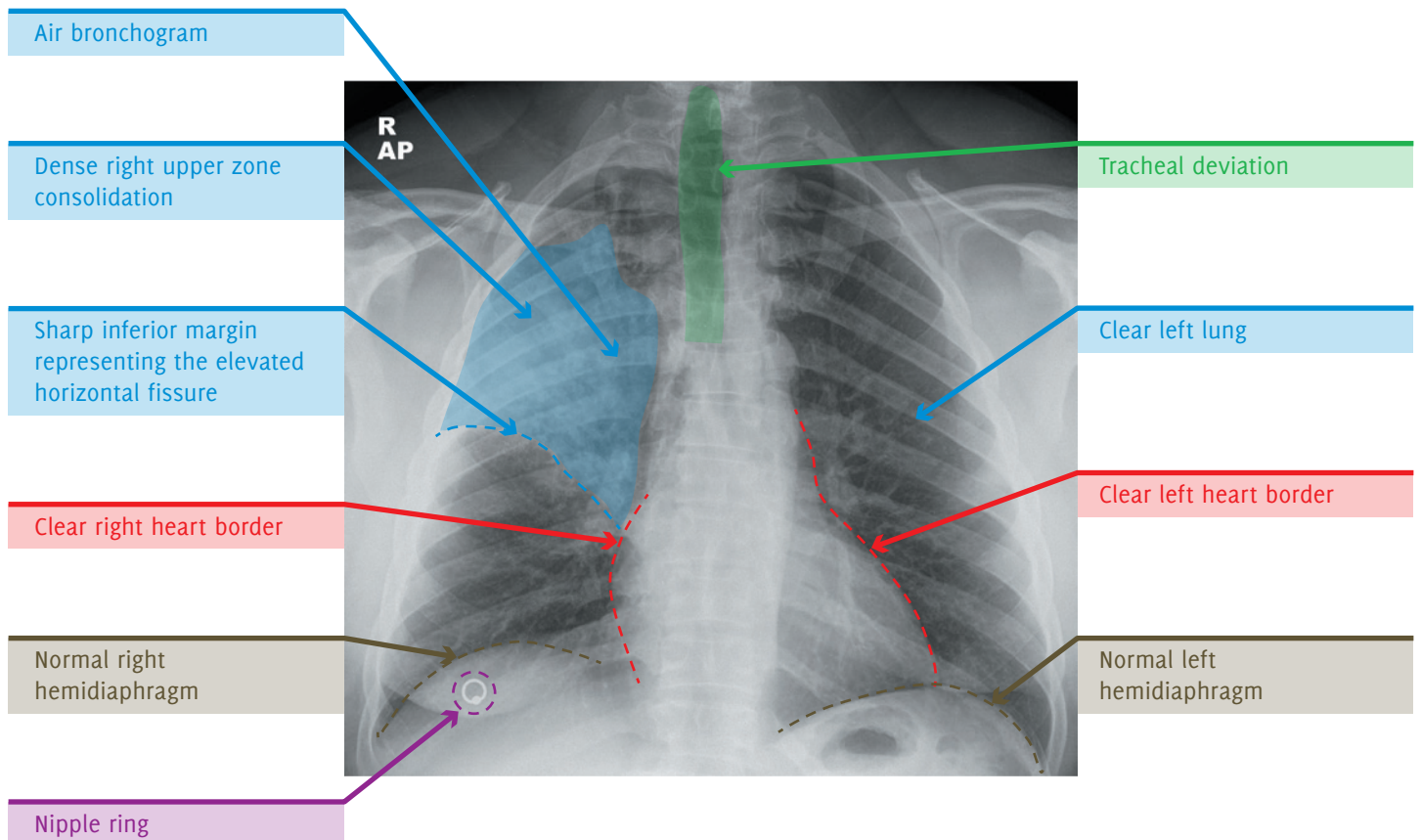
Lung Apices: Heterogeneous right apical consolidation. Normal left apex

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates extensive heterogeneous right upper zone consolidation in keeping with pneumonia. The consolidation has a relatively abrupt inferior margin which represents the horizontal fissure, indicating this is right upper lobe pneumonia. There is mild tracheal deviation and elevation of the horizontal fissure indicating concomitant volume loss/partial collapse.

Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken.

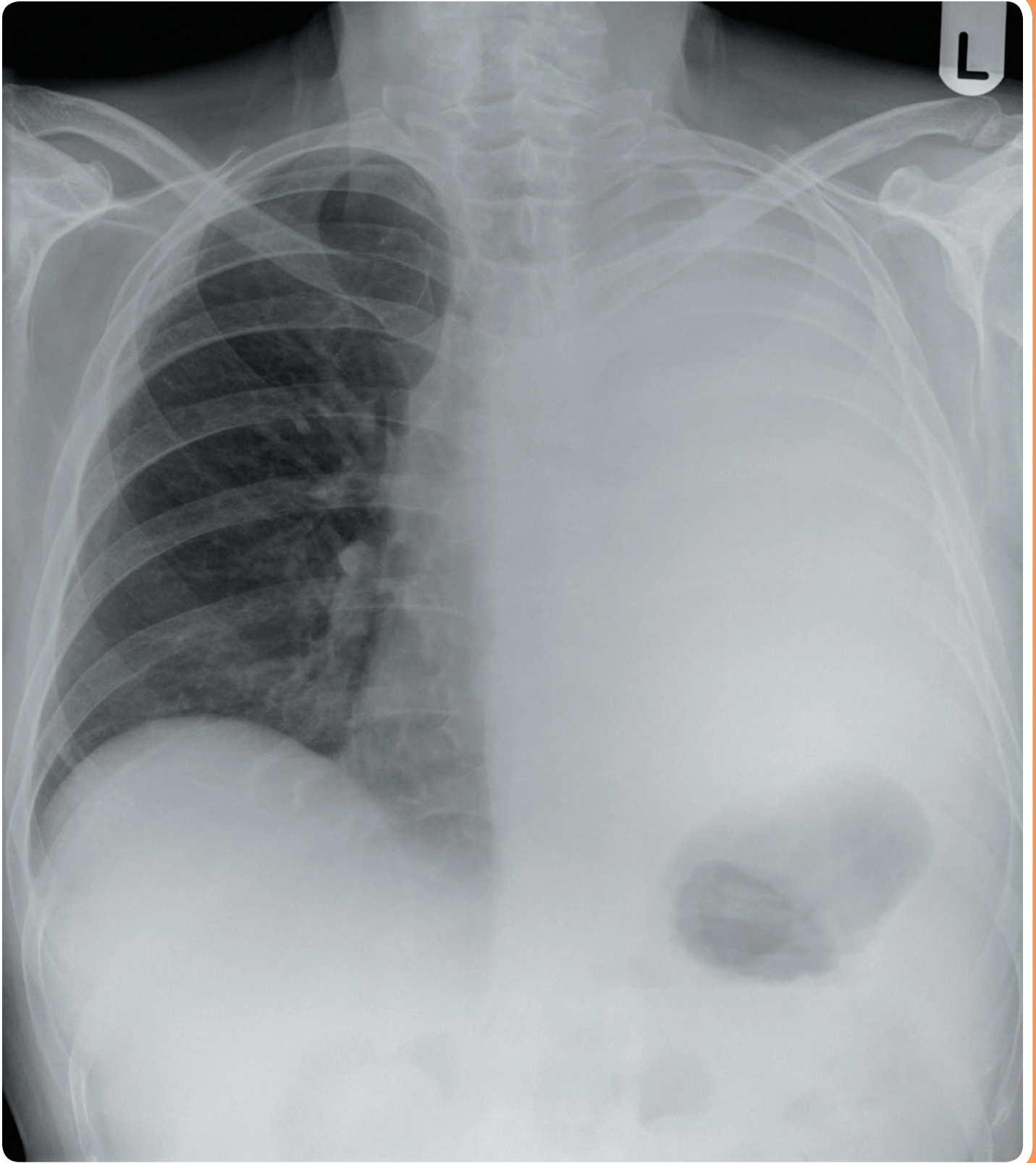
The patient should be treated with appropriate antibiotics for hospital-acquired pneumonia and a follow-up chest X-ray

performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia.



CASE 24

A 60 year old male presents with progressive shortness of breath. He has non-Hodgkin's Lymphoma. He is a non-smoker. On examination, he has saturations of 90% in air and is afebrile. There is reduced air entry and dullness to percussion throughout the left side. A chest X-ray is requested to assess for possible pneumonia, effusion or collapse.



REPORT – PLEURAL EFFUSION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Limited - 5 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is displaced slightly to the right – this may be due to patient rotation or a mass effect.

BREATHING

There is complete, homogeneous opacification of the left hemithorax, in keeping with a large pleural effusion.

The right lung is clear. The lungs are not hyperinflated.

The right pleural space is clear.

Normal pulmonary vascularity.

CIRCULATION

The left heart border is obscured by the effusion. The cardiac size cannot therefore be accurately assessed. The right heart border is clear.

The thoracic aorta is obscured.

The mediastinum is central, not widened, with a clear right border. The left border is obscured.

The left hilum is obscured by the effusion. Normal size, shape, and position of the right hilum.

DIAPHRAGM + DELICATES

The left hemidiaphragm is obscured by the effusion. Normal position and appearance of the right hemidiaphragm.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

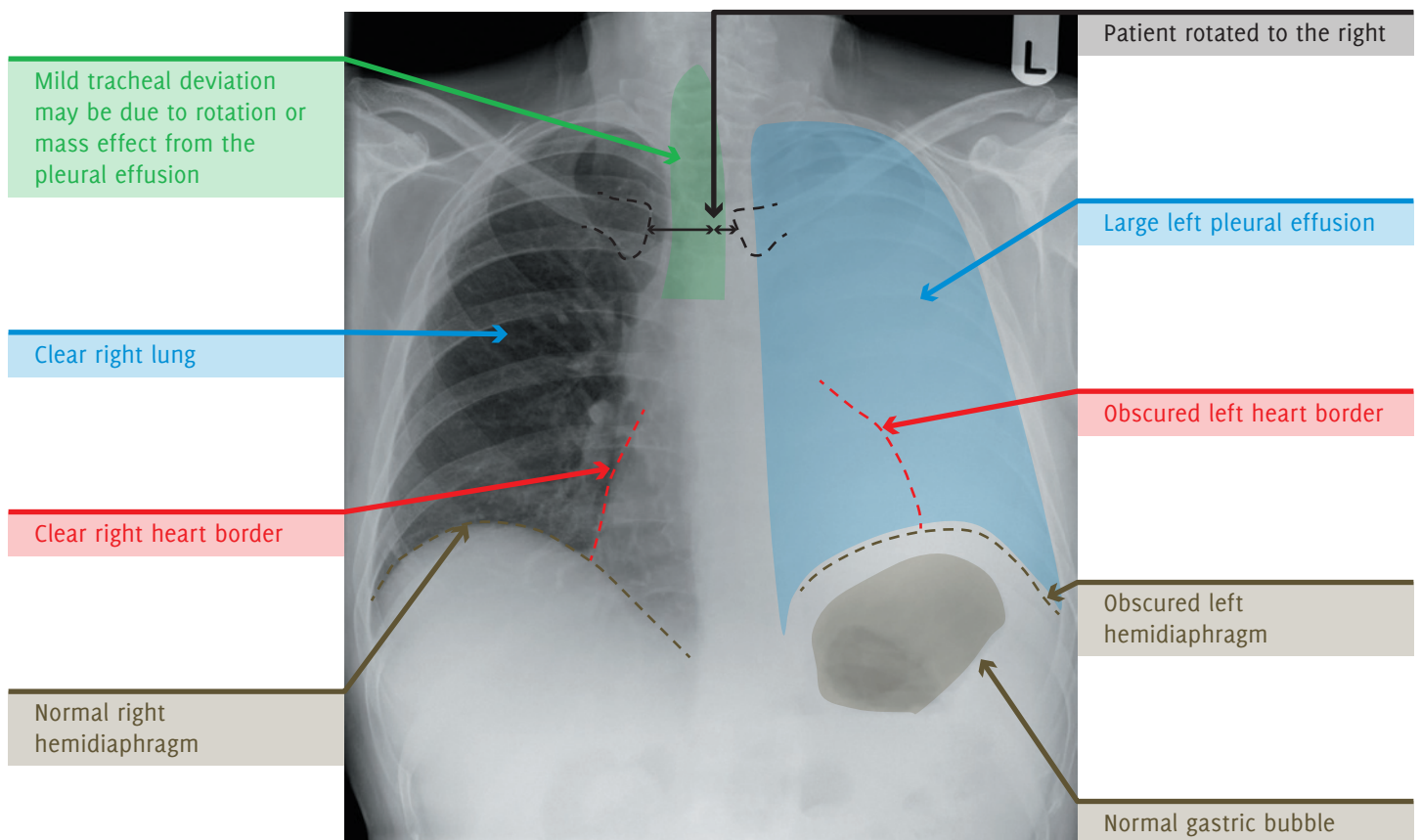
Lung Apices: The left apex is opacified. The right apex is clear.

Hila: Left hilum is obscured. Normal right hilum.

Behind Heart: Left side obscured by the effusion

Costophrenic Angles: Obliteration of the left costophrenic angle. Right side clear.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large left sided pleural effusion, which is likely related to the patient's known malignancy. Other causes of effusion, such as infection, are also possible.

Supplementary oxygen should be given.

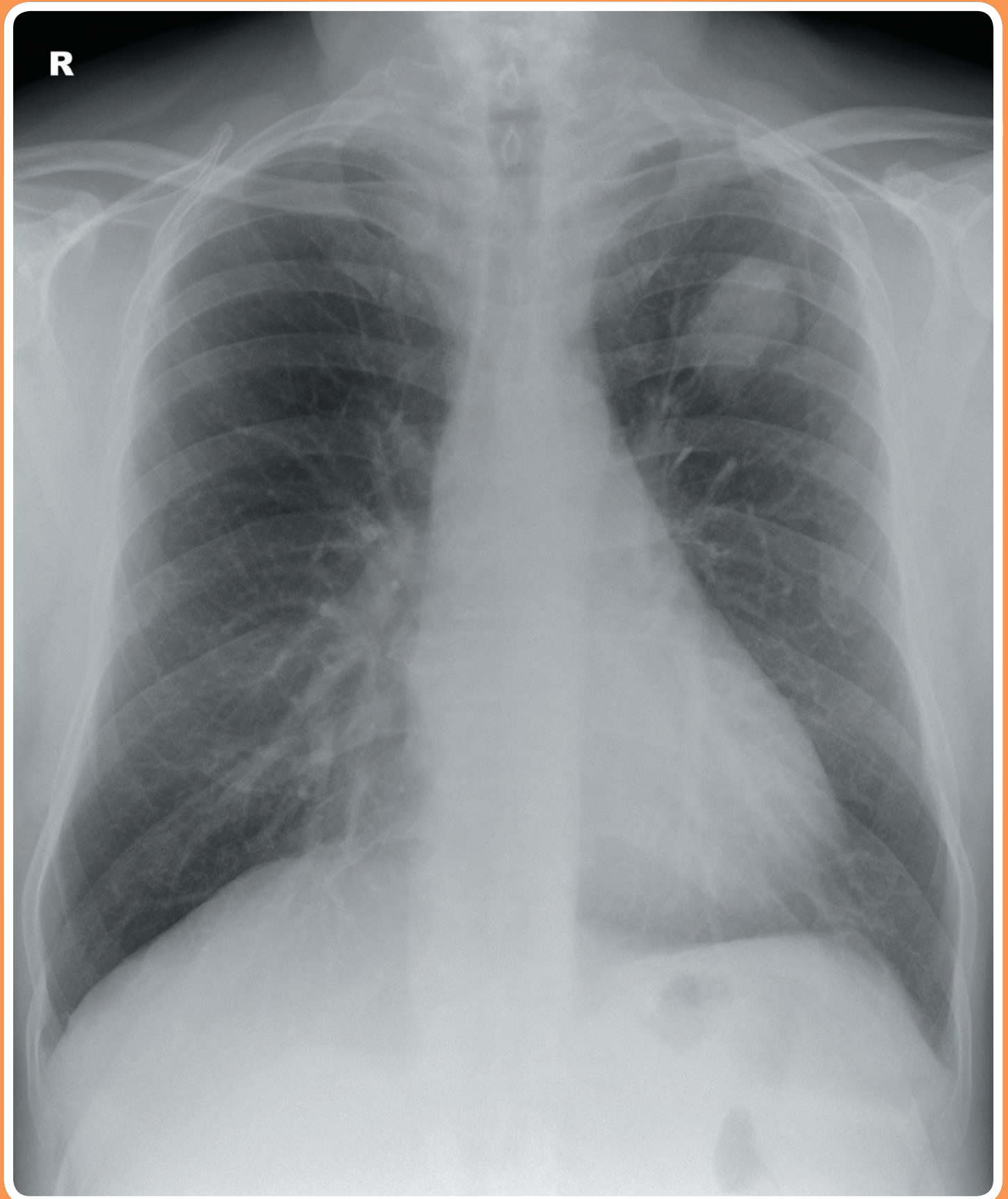
Initial blood tests may include FBC, U/E/s, LFTs, coagulation, and CRP. An ultrasound-guided chest drain should be inserted, with pleural fluid sent for protein, albumin, glucose, microscopy, white cell count and cytology. A CXR should be performed to ensure adequate positioning of the drain.

Further management will be guided by the underlying aetiology of the effusion. Previous imaging should be reviewed to assess for progression of the effusion. Referral to haematology for further management would be very helpful.



CASE 25

A 68 year old male presents to pre-operative assessment clinic prior to a cholecystectomy. He has a 60 pack year smoking history. On examination, he has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A routine preoperative chest X-ray is requested to assess for any underlying lung pathology.



REPORT – LUNG MASS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is a well-defined oval opacity within the left upper zone.

The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear apart from mild biapical pleural thickening.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

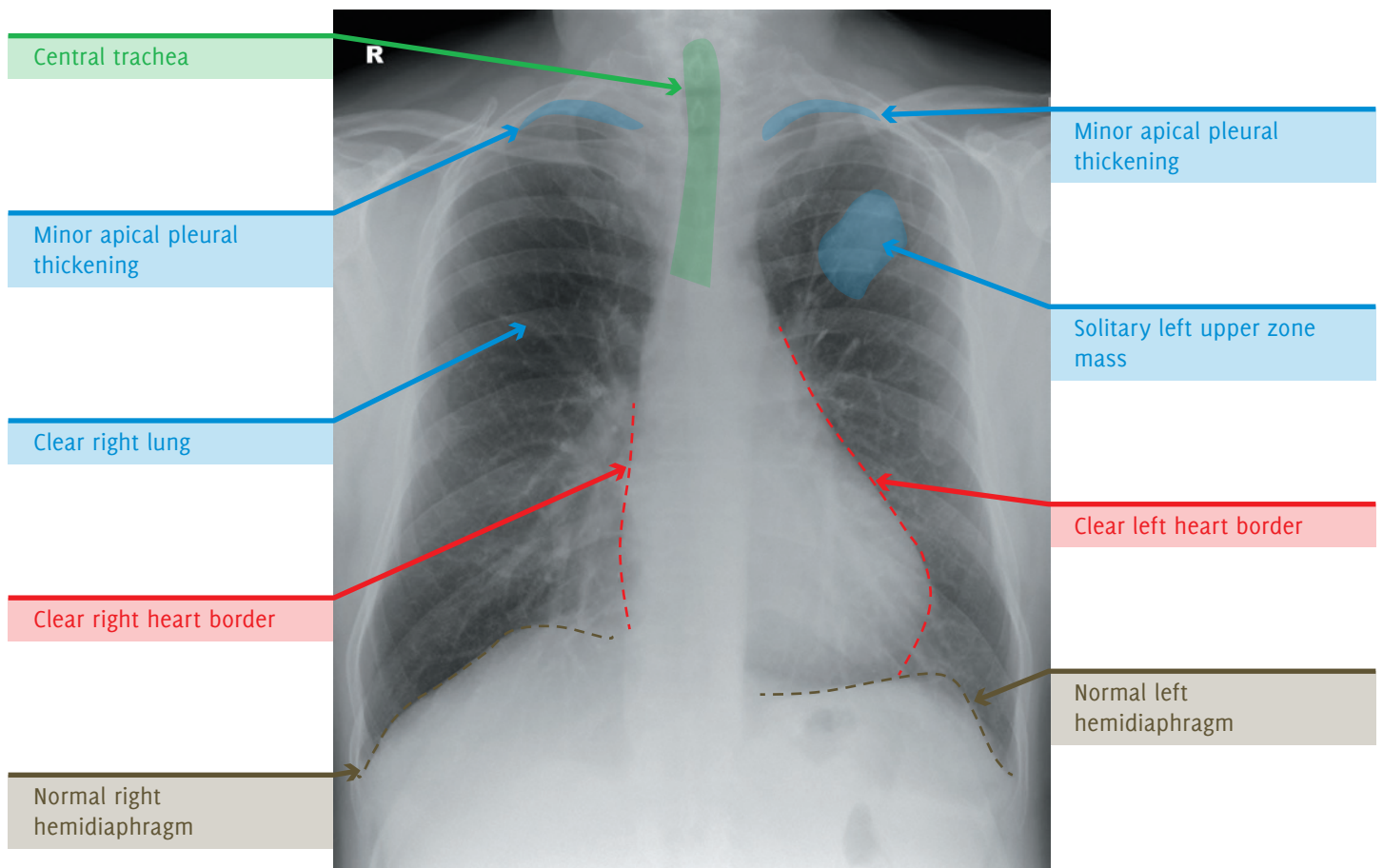
Lung Apices: Mild biapical pleural thickening

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a solitary mass in the left upper zone, which is highly suspicious for lung malignancy.

Initial tests will include FBC, U/Es, LFTs, bone profile, and spirometry.

A staging CT chest, and abdomen with IV contrast should be performed.

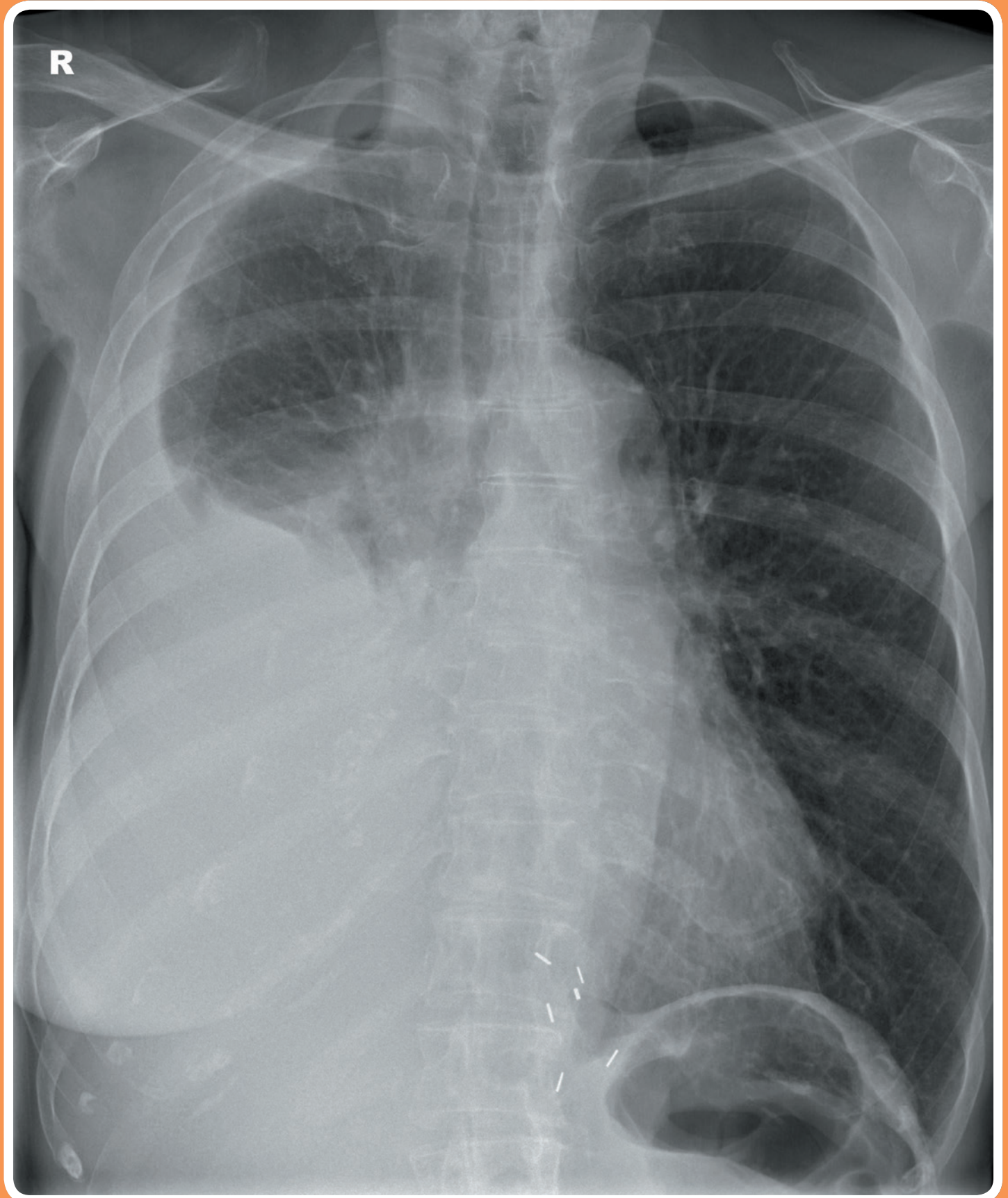
The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will

depend on the outcome of the MDT discussions, investigations and the patient's wishes. The patient's cholecystectomy should be postponed pending further investigations.



CASE 26

A 65 year old female presents to ED with progressive shortness of breath. She has a history of breast cancer and is a non-smoker. On examination, she has saturations of 99% in air and is afebrile. There is dullness to percussion, and reduced air entry in the right middle and lower zones. A chest X-ray is requested to assess for possible pneumonia, collapse or effusion.



REPORT – PLEURAL EFFUSION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is homogeneous opacification over the right mid and lower zones. There is a meniscus present laterally tracking up to the right apex.

The lungs are not hyperinflated.

The left lung and pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The right heart border is obscured, the heart size is therefore difficult to assess. Clear left heart border.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The right hilum is obscured. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

The right hemidiaphragm is obscured. Normal position and appearance of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

There has been a left-sided mastectomy. The visible soft tissues are otherwise unremarkable.

EXTRAS + REVIEW AREAS

Surgical clips are projected medially in the left lower zone. No vascular lines or tubes.

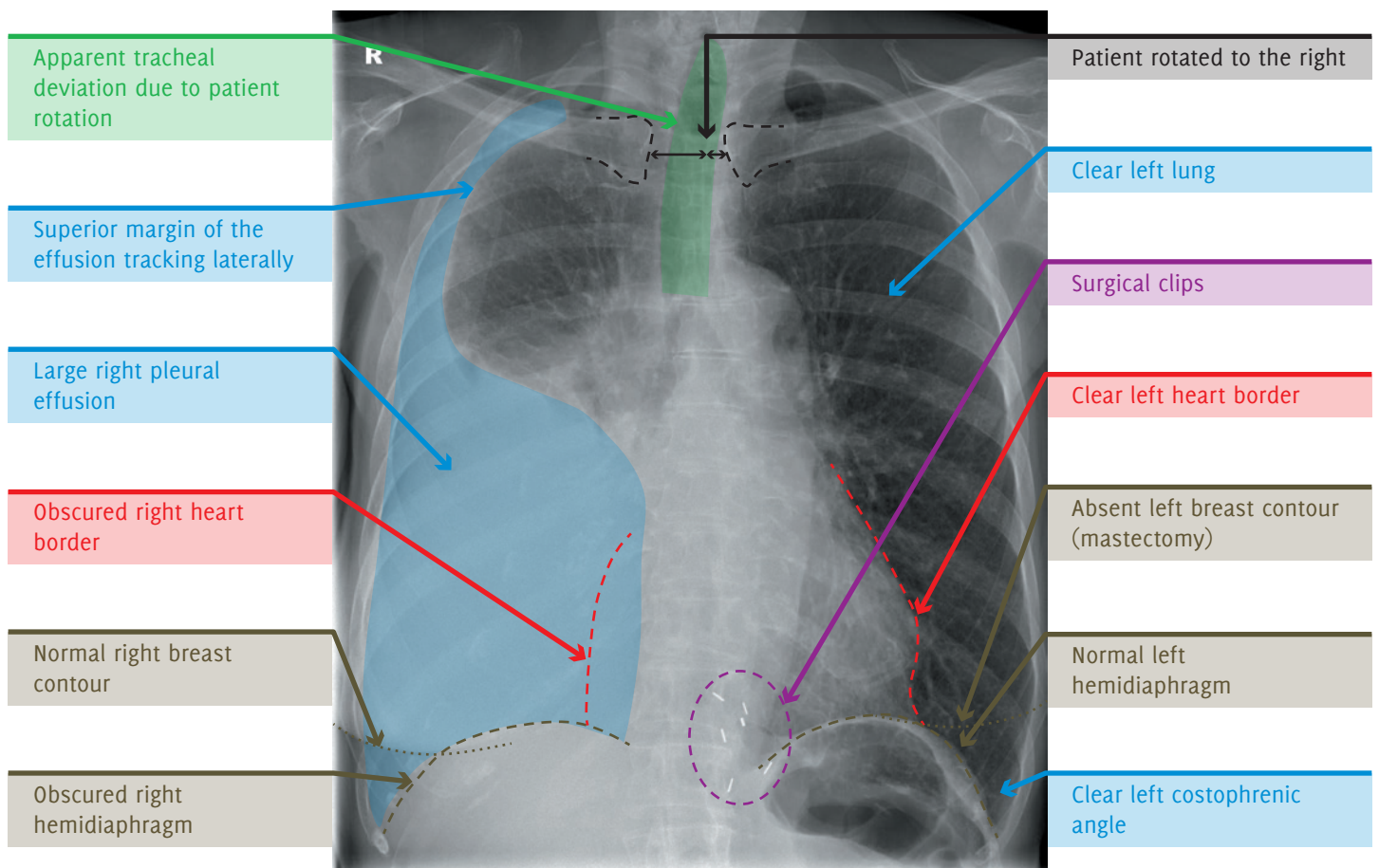
Lung Apices: Opacification tracking up laterally to the right apex. Normal left apex

Hila: Obscured right hilum, normal left hilum

Behind Heart: Right retrocardiac position obscured. Normal on the left

Costophrenic Angles: Obscured right costophrenic angle. Normal left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large right-sided pleural effusion, extending up towards the right apex. Given the previous left mastectomy, the findings are suspicious for a malignant pleural effusion. Other causes of an effusion such as infection are also possible.

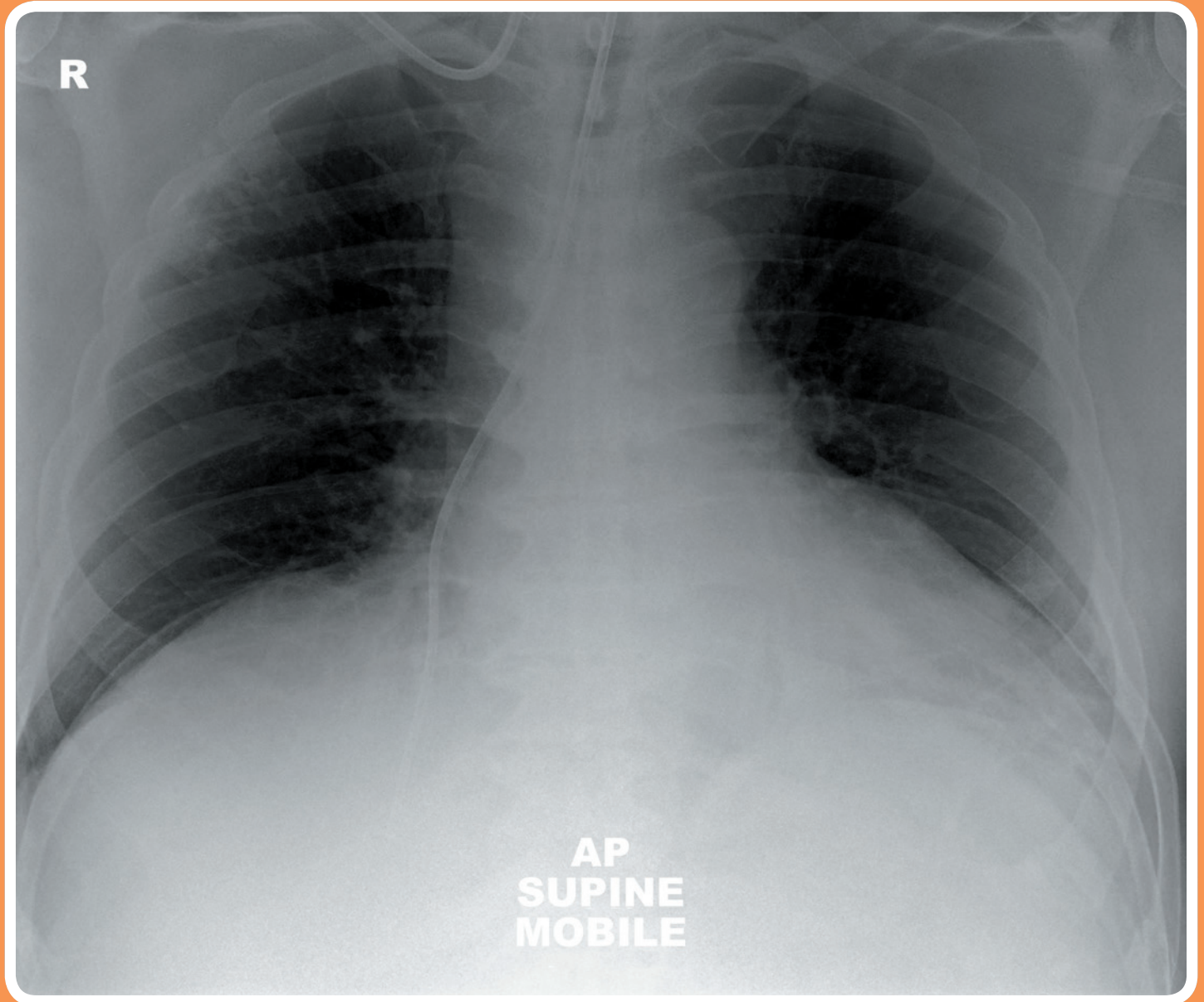
Initial blood tests may include FBC, U/Es, LFTs, coagulation, and CRP. An ultrasound-guided chest drain should be inserted, with pleural fluid sent for protein, albumin, glucose, microscopy, white cell count and cytology. A CXR should be performed to ensure adequate positioning of the drain.

Further management will be guided by the underlying aetiology of the effusion. If this is a new finding the patient should undergo contrast enhanced CT of the chest, abdomen and pelvis for restaging. Referral to oncology for further management would be helpful.



CASE 27

A 72 year old female currently admitted on the stroke ward has had an NG tube inserted for feeding. The nurses are unable to aspirate anything to confirm its position. She has recently suffered an ischaemic stroke. She has a past medical history of 2 MIs and type 2 diabetes. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess the position of the NG tube.



REPORT – NASOGASTRIC TUBE (MALPOSITIONED)

Patient ID: Anonymous
Projection: Portable AP Supine
Penetration: Over penetrated – vertebral bodies visible behind heart
Inspiration: Inadequate – 5 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is minor linear atelectasis at the left costophrenic angle.

The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart appears enlarged, although assessment of the size is difficult due to patient rotation.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central, not widened and with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum, although this is difficult to assess on a supine chest X-ray.

There are multiple bridging osteophytes visible in the thoracic spine. No other bony changes.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

The NG tube is projected over the trachea and right main bronchus. The tip appears to be inferior to the diaphragm but on the right - it is therefore likely to be in the posterior inferior right lower lobe.

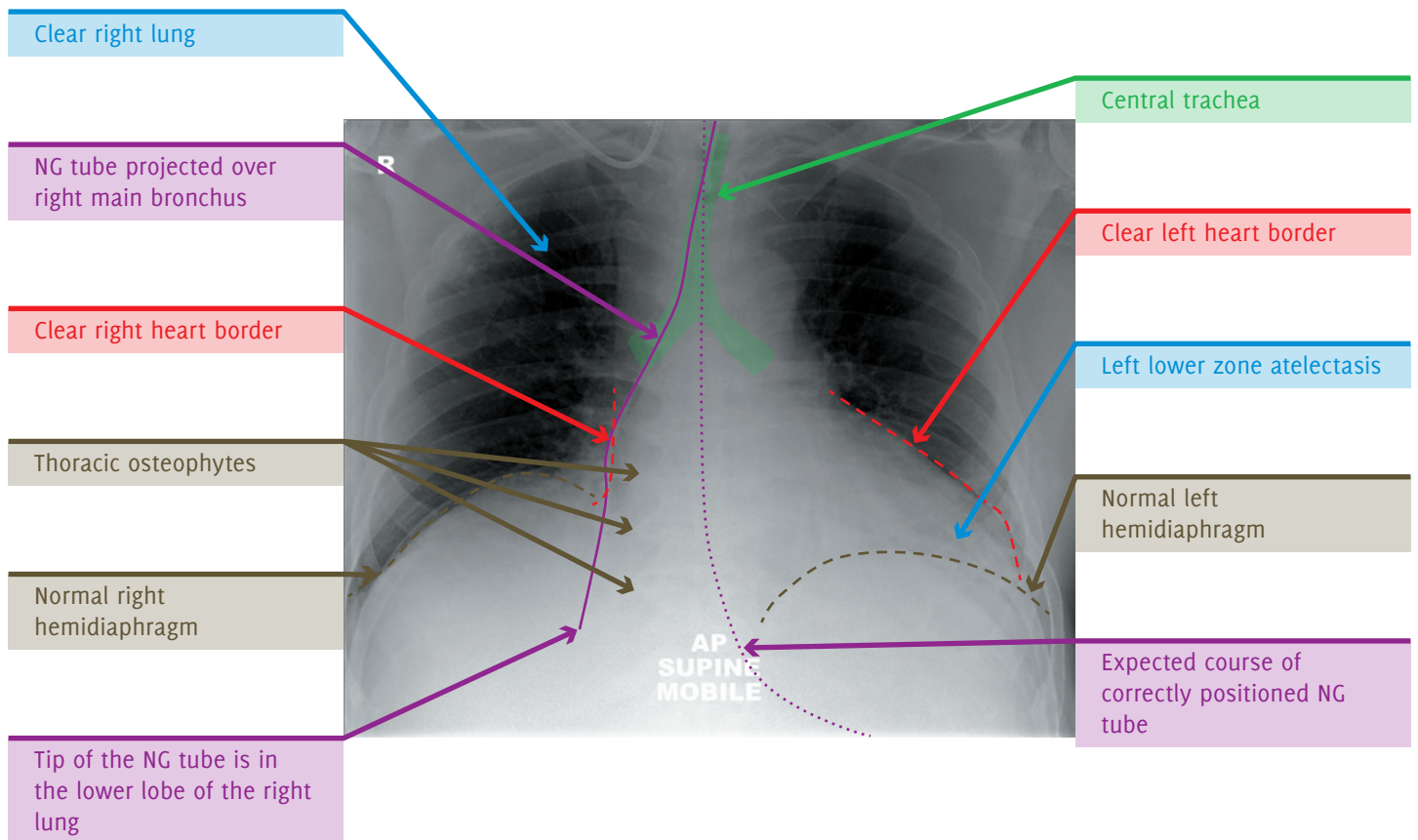
Lung Apices: Normal

Hila: Difficult to identify – no hilar mass visible

Behind Heart: Normal

Costophrenic Angles: Left basal atelectasis

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

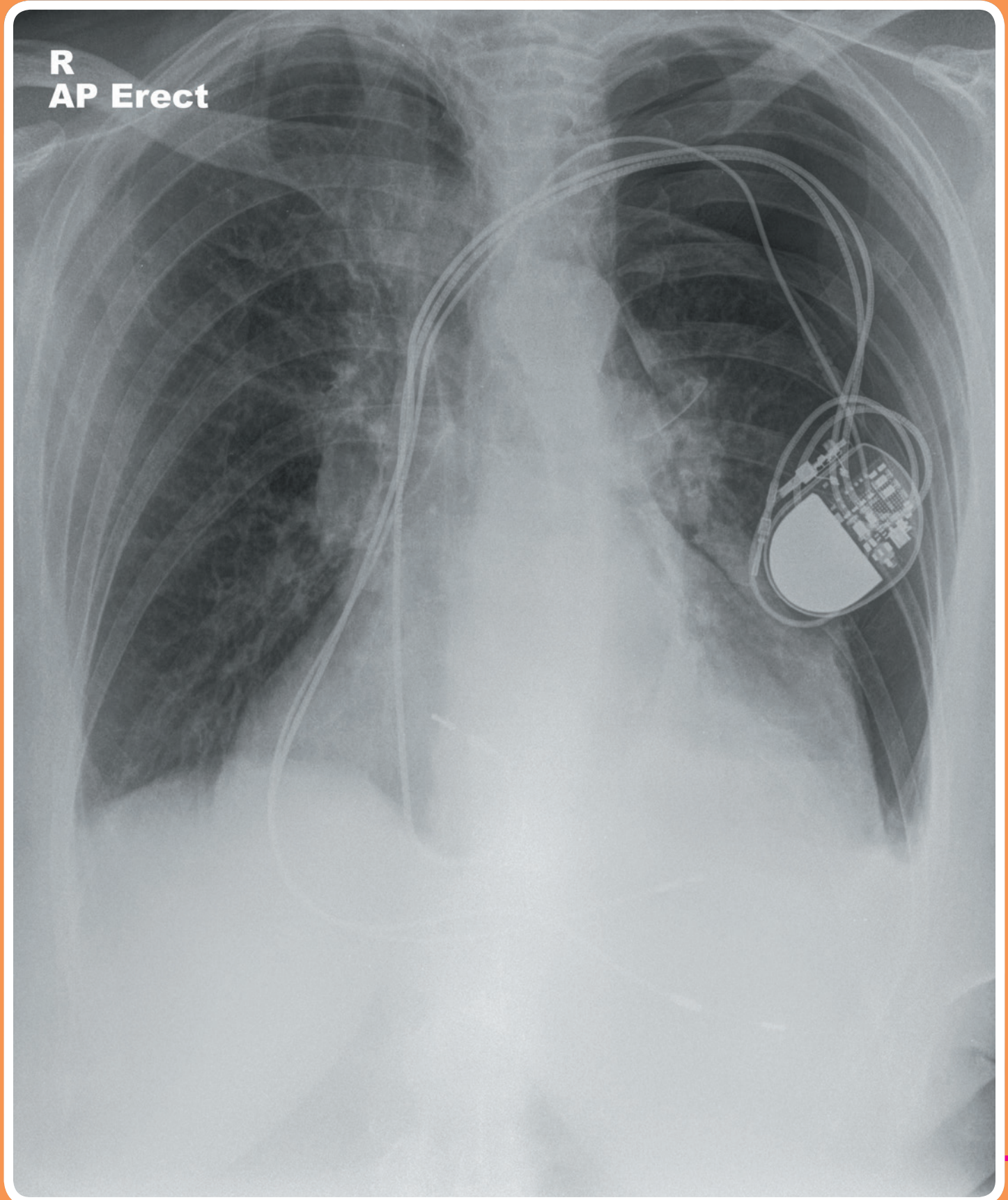
This X-ray demonstrates the NG tube is misplaced in the right lower lobe. There is mild left basal atelectasis.

The NG tube needs to be removed and replaced. A repeat chest X-ray can be performed following reinsertion to confirm its position if necessary.



CASE 28

A 75 year old female on the cardiology ward develops left-sided pleuritic chest pain after pacemaker insertion. She has a background of atrial fibrillation. She is a non-smoker. On examination, she has saturations of 93% in air and is afebrile. There is increased resonance in the left upper zone, with reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.



Patient ID: Anonymous
Projection: AP erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Limited – only 5 anterior ribs visible
Rotation: The patient is rotated to the left

AIRWAY

The upper trachea is central after factoring in patient rotation. The lower trachea is displaced to the right around the aortic arch.

BREATHING

A lung edge is visible in the left hemithorax, beyond which no lung markings are seen, consistent with a pneumothorax. There is possible left-sided retrocardiac consolidation, although this may represent partially collapsed lung secondary to the pneumothorax. There is blunting of the left costophrenic angle, in keeping with a small effusion.

The right lung is not hyper-expanded.

The right pleural spaces are clear.

There is mild increased pulmonary vascularity evident in the right lung.

CIRCULATION

The heart appears enlarged, although its size cannot be accurately assessed given the AP projection and limited inspiratory achievement.

The heart borders are clear.

The aorta appears normal.

The mediastinum is displaced to the right, which is probably related to patient rotation. It is not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the right hemidiaphragm. The left is difficult to identify.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable. Of note, there is no surgical emphysema.

EXTRAS + REVIEW AREAS

There is a triple chamber pacemaker projected over the left mid zone. The tips of the pacing leads are appropriately sited, with one projected over the right atrium, one over the right ventricle and the third over the left ventricle. No vascular lines, tubes, or surgical clips.

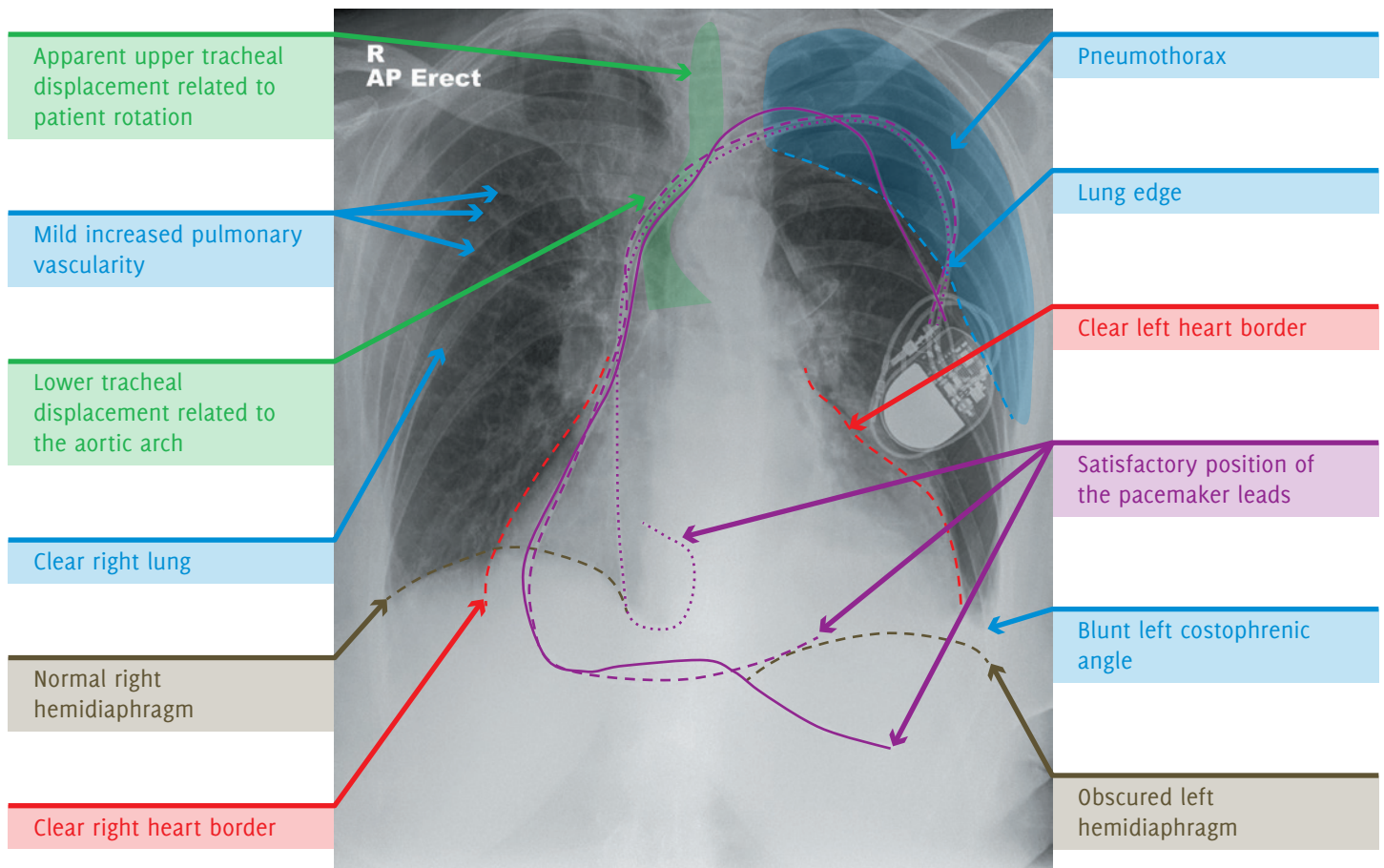
Lung Apices: Left pneumothorax. Clear right apex.

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Blunted left costophrenic angle. Normal right.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large, iatrogenic left-sided pneumothorax secondary to pacemaker insertion. The apparent mediastinal shift to the right is likely due to patient rotation, however the patient should be assessed for clinical evidence of a tension pneumothorax. The heart appears enlarged. Although this cannot be assessed on an AP film, the patient probably has a background of heart failure given the triple chamber pacemaker. There is mild increased pulmonary vascularity on

the right, and a small left pleural effusion, in keeping with pulmonary oedema.

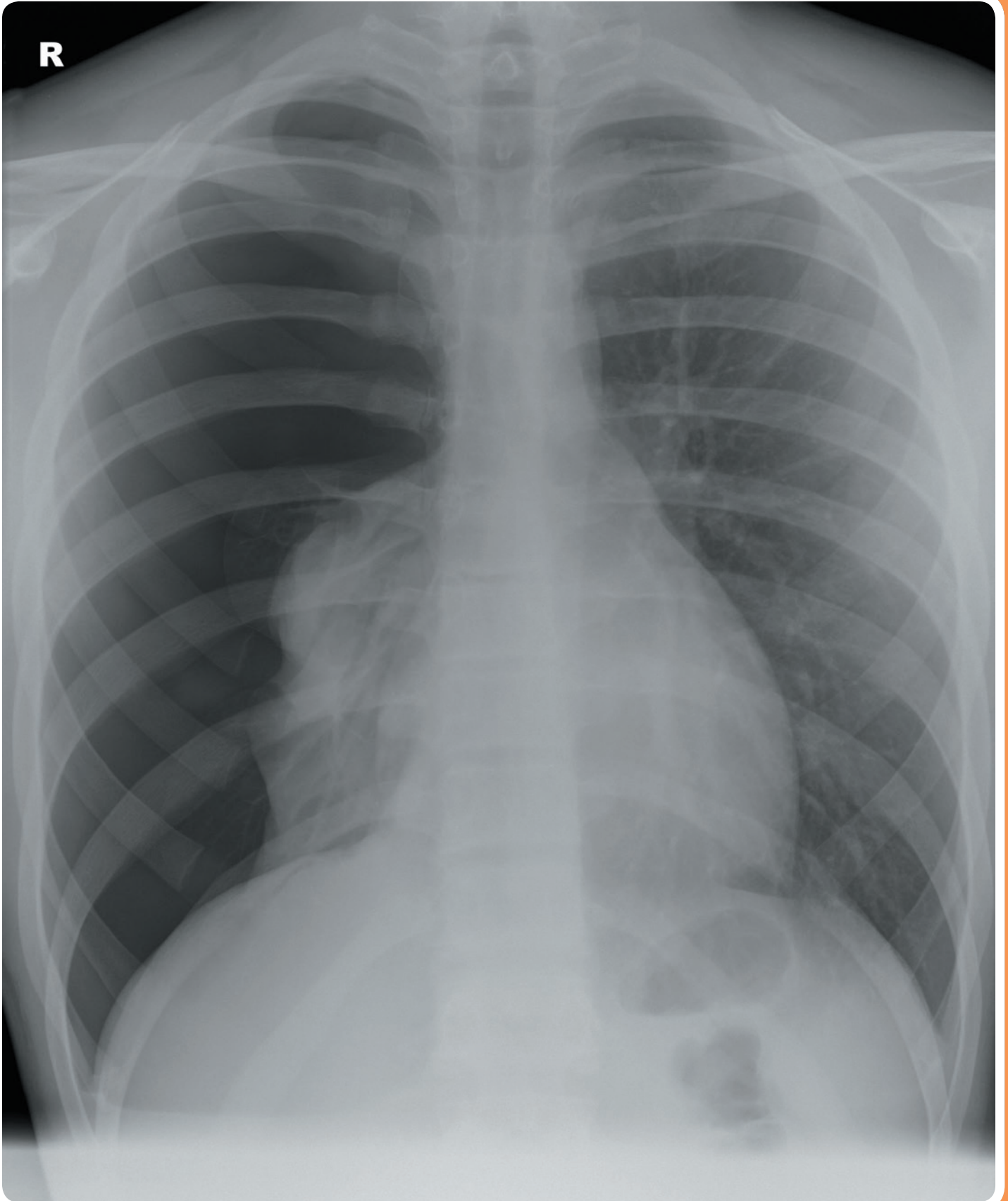
Supplementary oxygen should be given.

The patient needs to be discussed with the respiratory team. Needle aspiration of the pneumothorax should be performed in the 1st instance. An intercostal chest drain may be required depending on the success of the aspiration. A follow-up chest X-ray is needed to ensure resolution post-treatment.



CASE 29

An 18 year old male presents to ED with sudden onset right-sided pleuritic chest pain and breathlessness. He has no significant past medical history and is a non-smoker. On examination, he has saturations of 92% in air and is afebrile. HR is 90 bpm, and BP is 118/82 mmHg. There is increased resonance in the right hemithorax and reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.



REPORT – SPONTANEOUS PNEUMOTHORAX

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

A lung edge is visible in the right hemithorax, beyond which no lung markings are seen, consistent with a large pneumothorax. The underlying right lung is almost completely collapsed (visible medially in the right mid and lower zones).

The left lung is clear, with normal expansion, clear pleural spaces, and normal vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The right hilum is difficult to identify because of the adjacent collapsed right lung. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable. Of note, there is no surgical emphysema.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

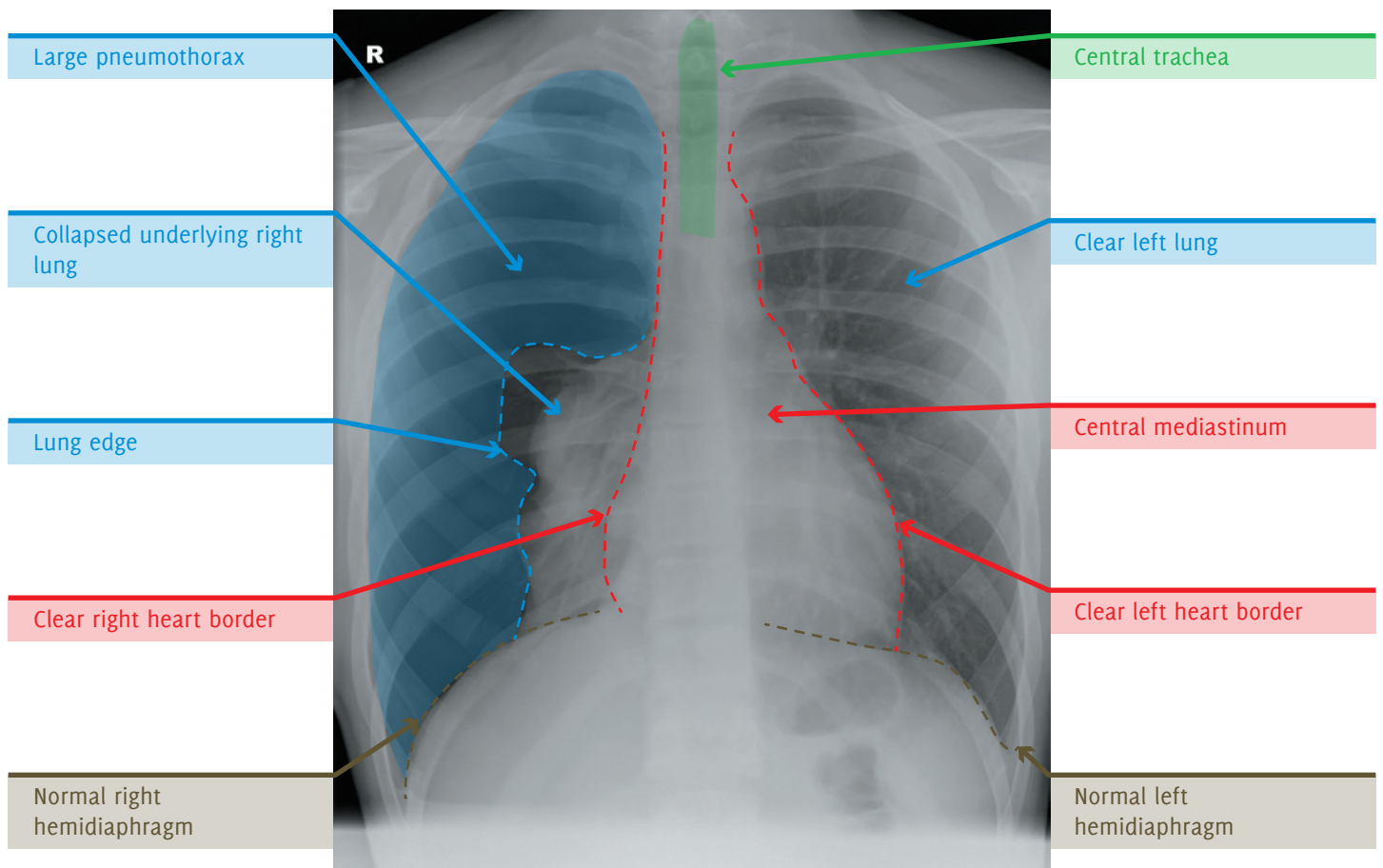
Lung Apices: Right pneumothorax. Normal left apex.

Hila: Right is difficult to identify. Normal left hilum.

Behind Heart: Normal

Costophrenic Angles: Radiolucent on right due to pneumothorax. Normal on left.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large right-sided pneumothorax. The underlying right lung is almost completely collapsed. There is no mediastinal shift or flattening of the right hemidiaphragm to suggest a tension pneumothorax. No rib fracture is visible.

The patient should be given supplementary oxygen.

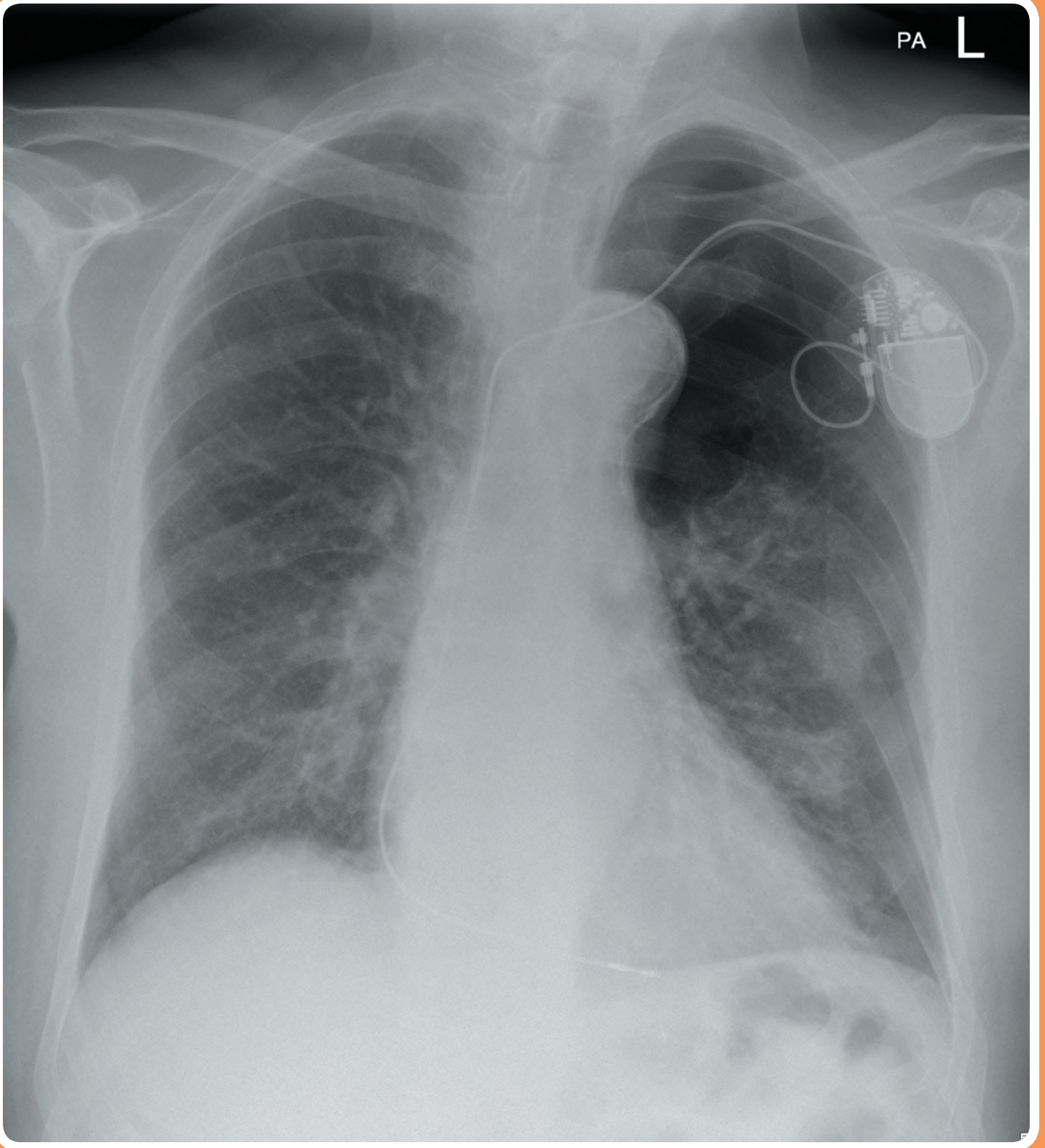
The pneumothorax will require active intervention due to its large size. Needle aspiration of the pneumothorax should be performed in the 1st instance. An intercostal chest drain may be required depending on the success of the aspiration.

The patient should be referred to the respiratory team, with follow up chest X-rays performed until the pneumothorax has resolved.



CASE 30

An 80 year old male on the cardiology ward develops left-sided pleuritic chest pain after pacemaker insertion. He has a background of sick sinus syndrome. He is a non-smoker. On examination, he has saturations of 92% in air and is afebrile. There is increased resonance in the left upper zone, with reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.



REPORT – IATROGENIC PNEUMOTHORAX

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies not clearly visible behind heart
Inspiration: Underpenetrated – 7 anterior ribs visible
Rotation: The patient is rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

A lung edge is visible in the left hemithorax, beyond which no lung markings are seen, consistent with a pneumothorax. Both lungs are otherwise clear. The right lung is not hyperinflated.

The right pleural spaces are clear.

There is normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable. Of note, there is no surgical emphysema.

EXTRAS + REVIEW AREAS

A single chamber cardiac pacemaker is projected over the upper left chest. The tip of the pacing lead is projected over the right ventricle. No vascular lines, tubes, or surgical clips.

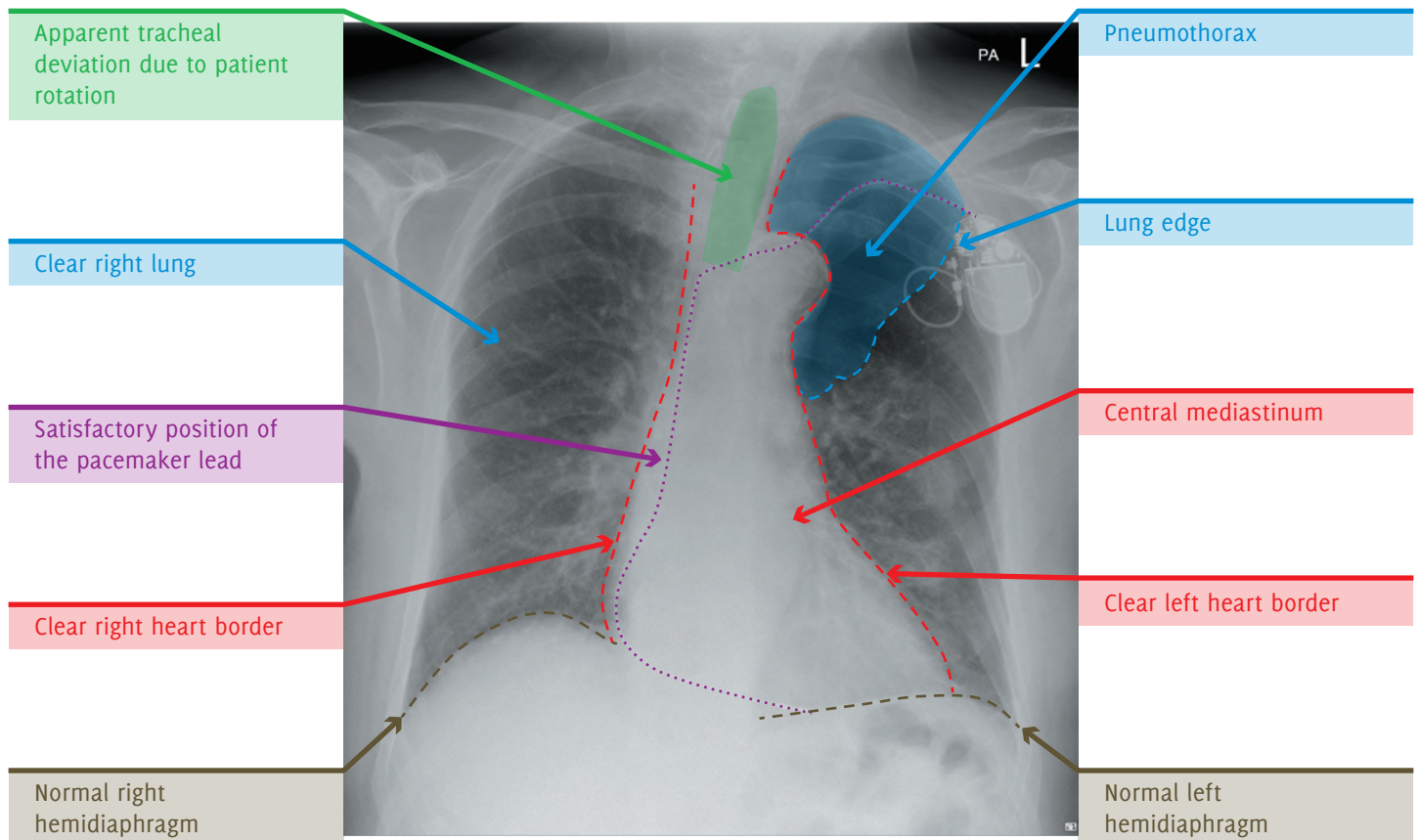
Lung Apices: Left pneumothorax. Normal right apex.

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a left-sided pneumothorax. This is likely to be an iatrogenic pneumothorax secondary to the recent pacemaker insertion. There is no mediastinal shift (allowing for patient rotation) or flattening of the left hemidiaphragm to suggest a tension pneumothorax.

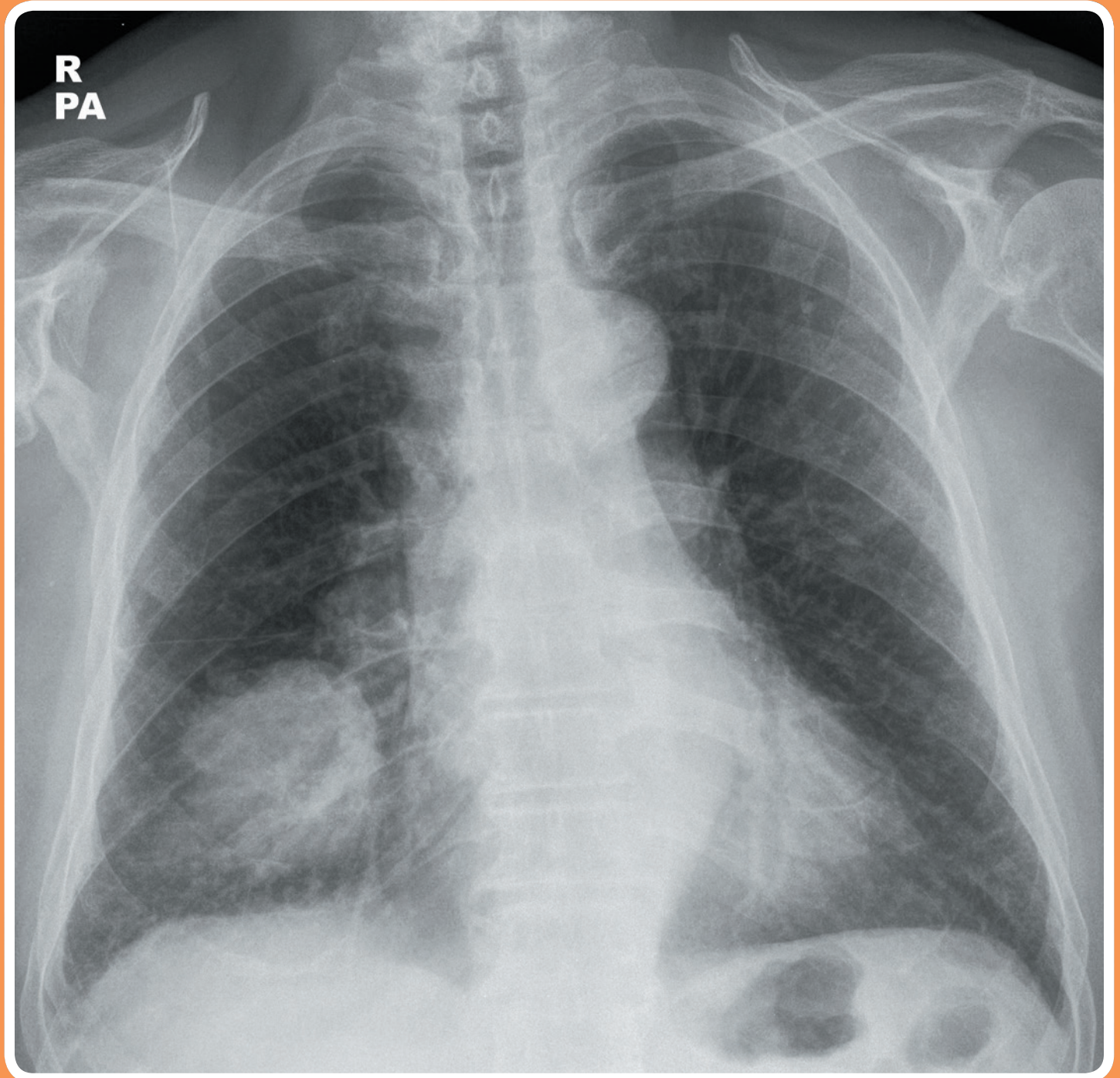
Supplementary oxygen should be given.

Needle aspiration of the pneumothorax should be performed in the 1st instance. An intercostal chest drain may be required depending on the success of the aspiration. A follow-up chest X-ray is needed to ensure resolution post treatment.



CASE 31

An 80 year old male presents to his GP with a 2 month history of productive cough. He has a 40 pack year smoking history. On examination, he has saturations of 100% in air and is afebrile. There are bibasal crackles in the lungs and finger clubbing. A chest X-ray is requested to assess for possible malignancy.



REPORT – LUNG AND HILAR MASSES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is a large rounded mass within the right lower zone. A small dense nodule is present in the left upper zone.

The lungs are otherwise clear.

The lungs appear hyper-inflated and there is coarsening of the lung markings which may represent background COPD.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

There is unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

The right hilum appears bulky. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

Lateral osteophytes are present in the thoracic spine. The imaged skeleton is otherwise intact with no fracture or destructive bony lesion visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

Lung Apices: Normal

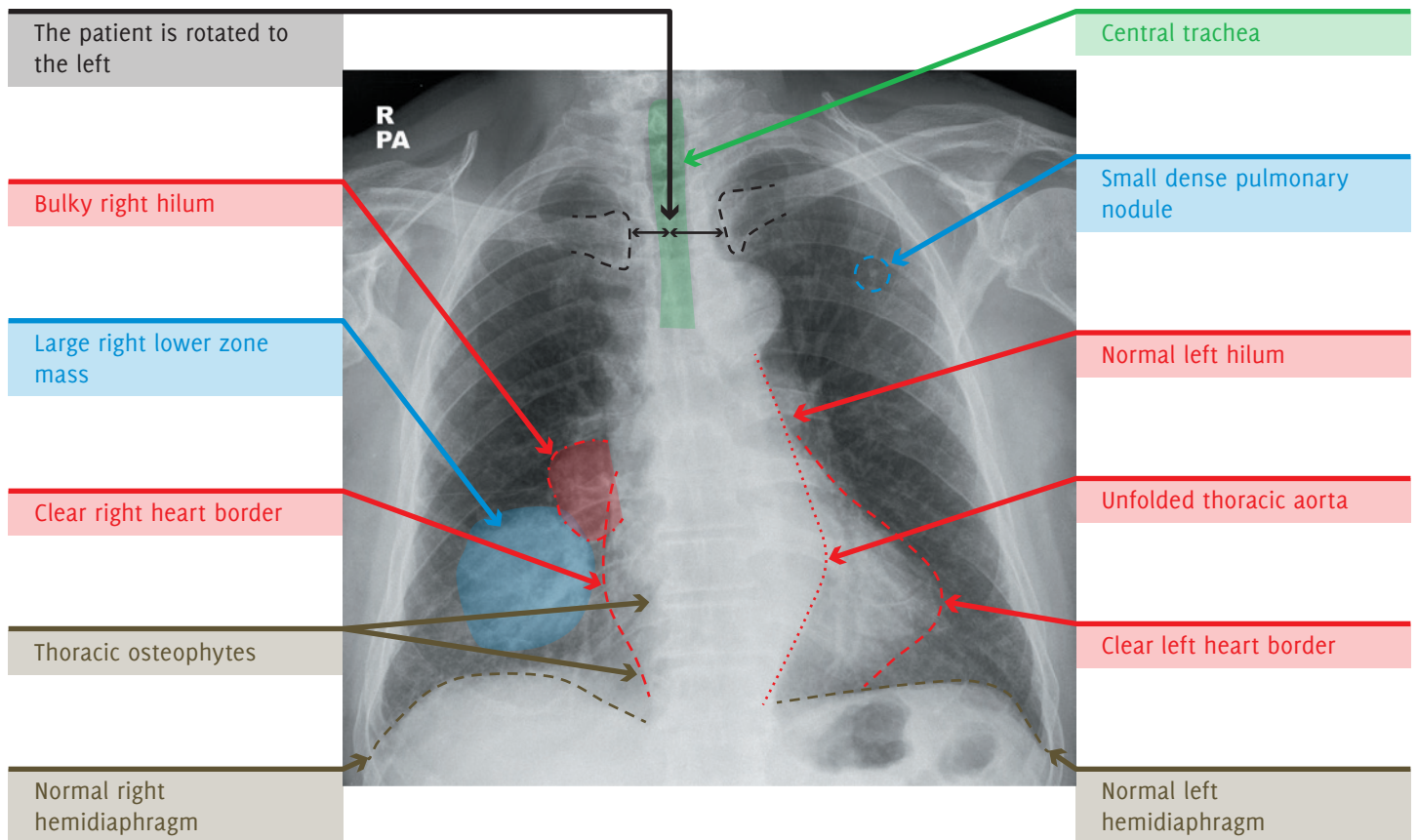
Hila: The right hilum appears bulky.

Normal left hilum.

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large mass in the right lower zone, which is highly suspicious for lung malignancy. The right hilum appears bulky, suggestive of hilar lymph node enlargement. There are background changes of COPD.

Initial tests will include FBC, U/Es, LFTs, bone profile, and spirometry.

A staging CT chest and abdomen with IV contrast should be performed.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations and the patient's wishes.



CASE 32

An 81 year old female presents to ED with a 2 week history of progressive shortness of breath. She also reports lethargy and weight loss. She has a 50 pack-year smoking history. On examination, she has saturations of 92% in 2L of oxygen, and is afebrile. There is scattered diffuse expiratory wheezing with reduced air-entry in the right upper zone. In addition, a few crackles that quietened with deep coughing are heard in the right upper zone. A chest X-ray is requested to assess for possible pneumonia or malignancy.



REPORT – RIGHT UPPER LOBE COLLAPSE

Patient ID: Anonymous
Projection: PA
Penetration: Under penetrated – vertebral bodies not visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is deviated to the right.

BREATHING

There is a well-defined homogeneous area of increased density in the right upper zone. It has a concave inferior border, in keeping with an elevated horizontal fissure.

The remainder of the lungs are clear. The lungs are not hyperinflated. The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear. There is a convex opacity at the right right cardio-phrenic angle consistent with an epicardial fat pad.

The aorta appears normal.

The mediastinum is central.

The right hilum is difficult to identify but appears elevated. No clear hilar mass visible. Normal size, shape, and position of the left hilum.

DIAPHRAGM + DELICATES

The right hemidiaphragm is elevated. Its medial aspect is difficult to identify clearly

due to an adjacent epicardial fat pad. Normal appearance and position of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips.

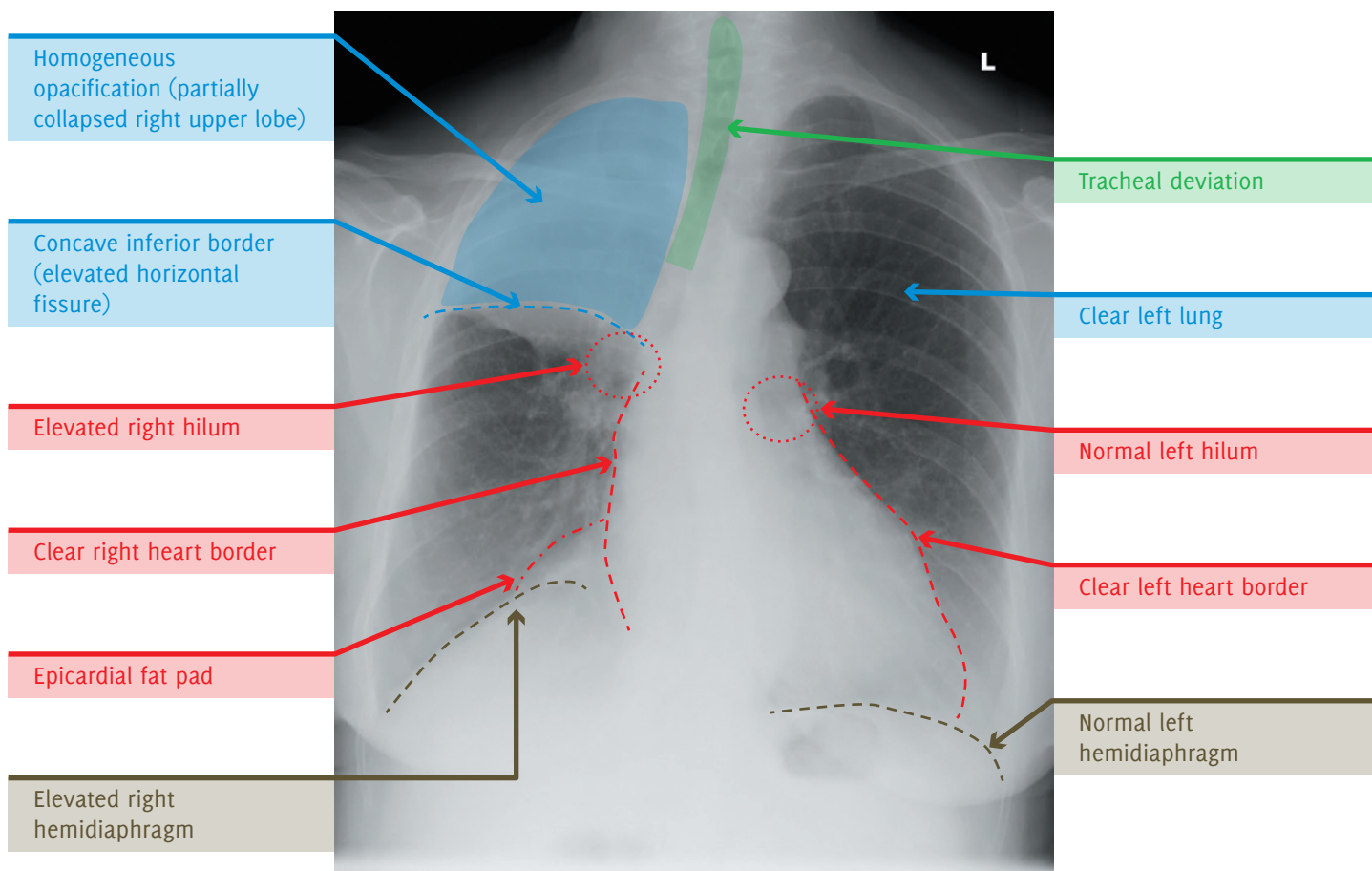
Lung Apices: Increased density in the right upper zone. Normal left apex

Hila: Right hilar elevation but no hilar mass visible. Normal left hilum

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a right upper lobe collapse (homogeneous opacity in the right upper zone, concave inferior margin representing the displaced horizontal fissure) with resultant volume loss demonstrated by tracheal deviation, and elevation of the right hilum and hemidiaphragm.

Given the history, the findings are suspicious for a proximal tumour compressing the right upper lobe bronchus. Other differentials include a mucus plug or an inhaled foreign body.

Supplementary oxygen should be continued.

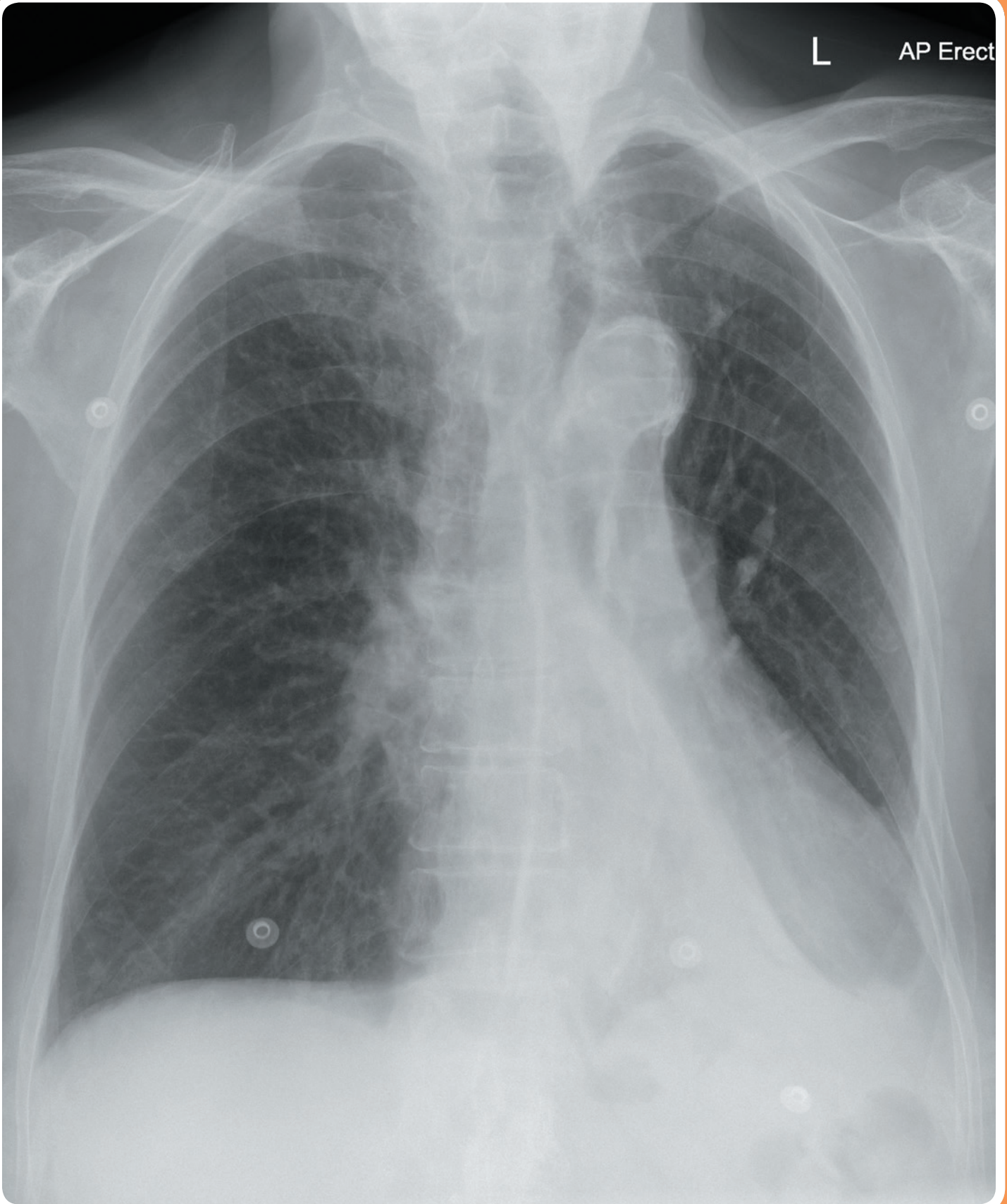
Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, ESR and TFTs. A CT chest with IV contrast should be performed to assess for an underlying tumour. A CT of the abdomen will usually also be acquired at the same time to enable lung cancer staging.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the further investigations and the patient's wishes.



CASE 33

An 88 year old male presents to the ED with 3 weeks of progressive shortness of breath, cough and some haemoptysis. He has a 60 pack year smoking history. On examination, he has saturations of 85% in air and is afebrile. There is dullness to percussion and reduced air entry in the left lower zone. A chest X-ray is requested to assess for possible pneumonia or malignancy.



REPORT – LEFT LOWER LOBE COLLAPSE

Patient ID: Anonymous

Projection: AP

Penetration: Adequate – vertebral bodies just visible behind heart

Inspiration: Adequate – 6 anterior ribs visible

Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is deviated to the left, even when allowing for the patient rotation.

BREATHING

The lungs appear hyperinflated with coarsening of the lung markings.

There is an abnormal triangular opacity projected over the medial aspect of the left mid and lower zones in keeping with the sail sign.

The right lung and pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

There is an apparent double left heart border. The right heart border is difficult to assess as it is projected over the thoracic spine, but appears clear.

The descending thoracic aortic contour is not visible.

The mediastinum is displaced to the left.

Normal size and shape of both hila. There is mild depression of the left hilum.

DIAPHRAGM + DELICATES

The left hemidiaphragm is partially obscured indicating left lower lobe pathology. The right

hemidiaphragm is flattened, in keeping with lung hyperinflation.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG clips in situ.

No vascular lines, tubes, or surgical clips.

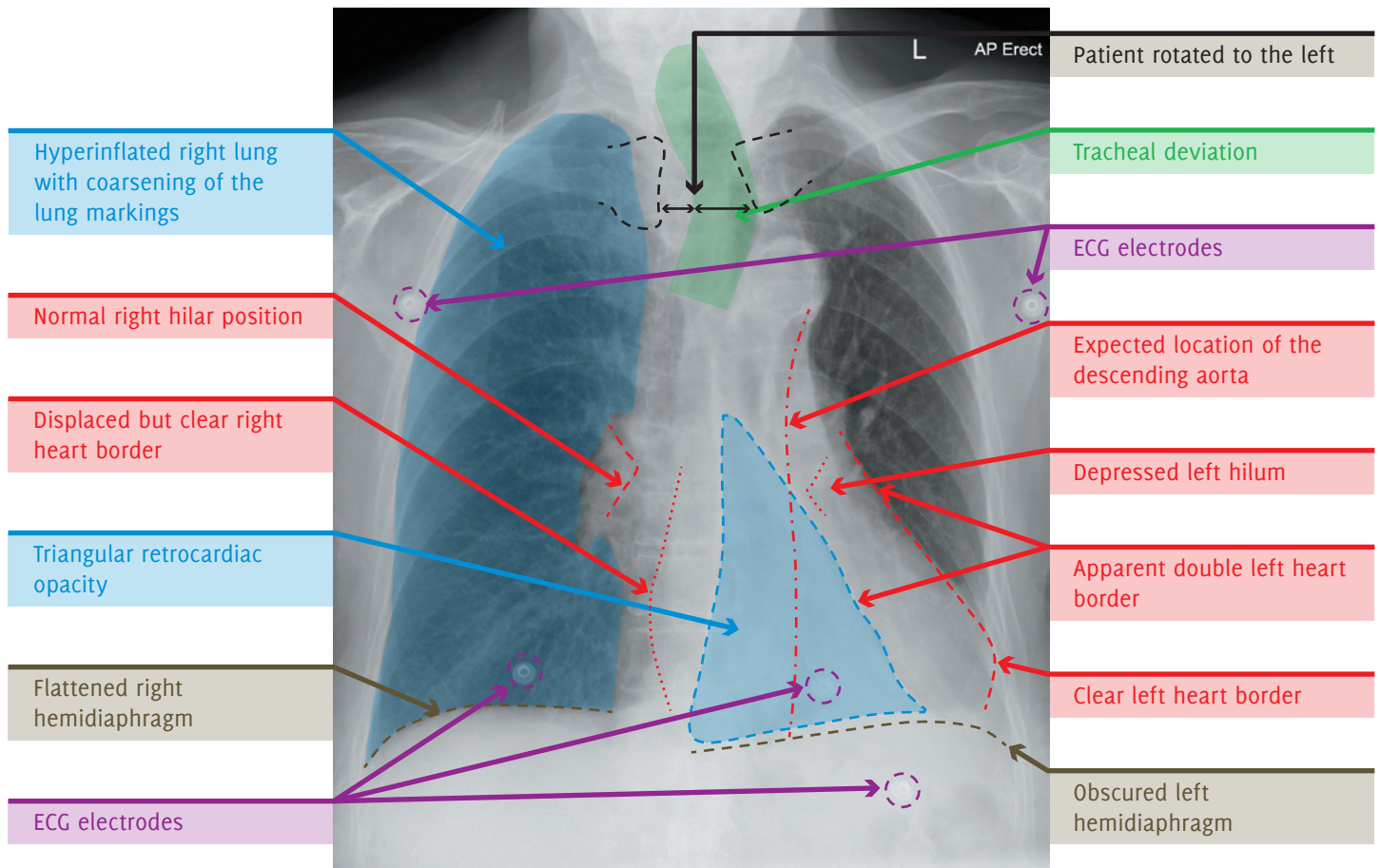
Lung Apices: Normal

Hila: Left hilum is depressed. Normal right hilum

Behind Heart: Sail sign with left double cardiac contour. Loss of outline of the descending thoracic aorta

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a left lower lobe collapse (sail sign, apparent double left heart border and loss of descending aortic outline). Resultant volume loss in the left hemithorax is indicated by mediastinal deviation and depression of the left hilum.

Coarsening of the lung markings and hyperinflation of the right lung are in keeping with chronic obstructive pulmonary disease (COPD).

Given the strong smoking history combined with 3 weeks of progressive symptoms, a proximal obstructing mass (tumour or hilar lymph node) is the most likely cause of the lobar collapse. Other differentials include a mucus plug or an inhaled foreign body.

Supplementary oxygen should be given.

Initial blood tests may include FBC, U/E/s, LFTs, bone profile, CRP, ESR and TFTs. CT chest with IV contrast to assess for a proximal obstructing lesion, such as a tumour, should be performed. A CT of the abdomen will usually also be acquired at the same time to enable lung cancer staging.

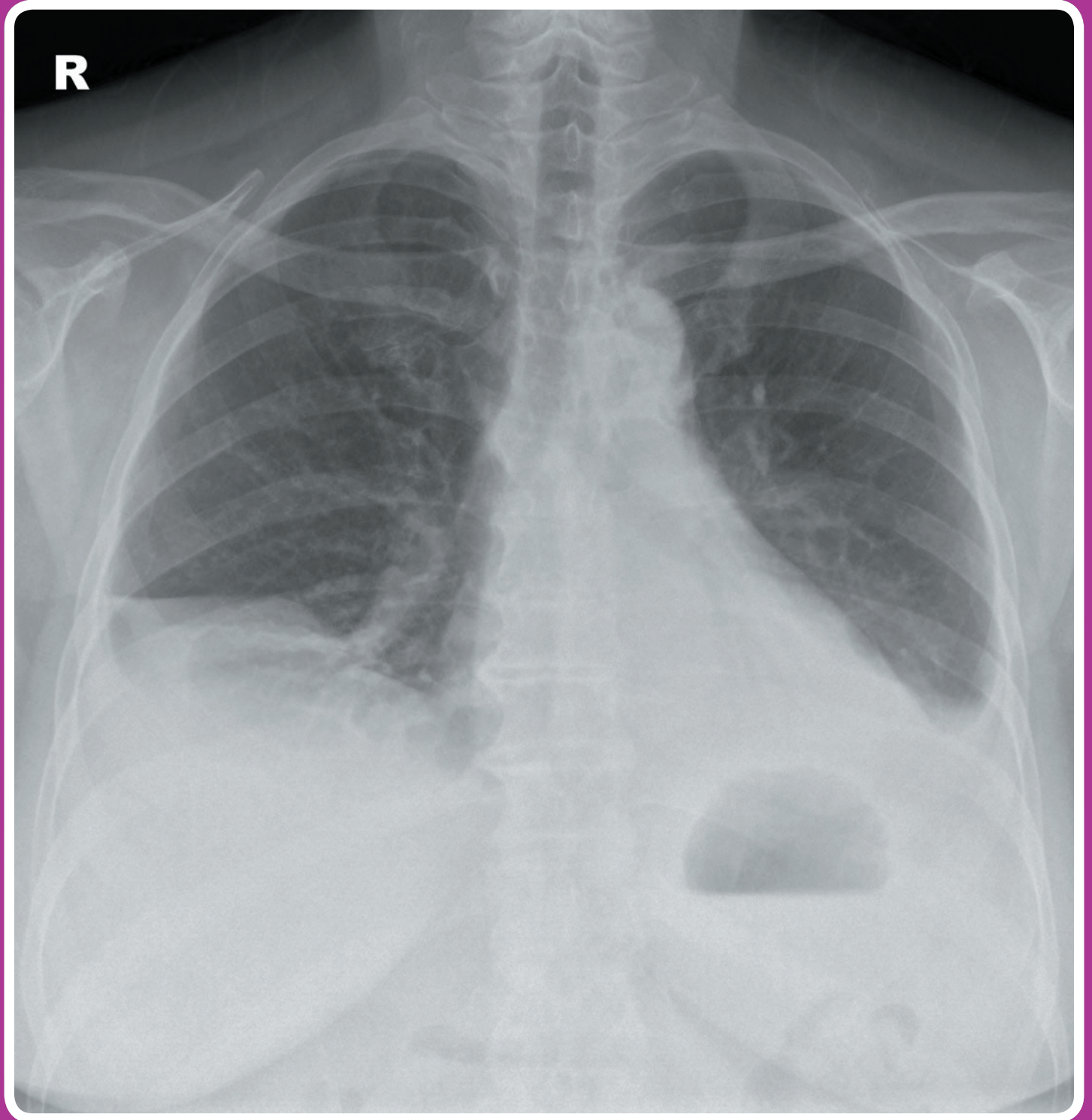
The patient should be referred to respiratory:oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT investigations and the patient's wishes.

INTERMEDIATE CASES



CASE 34

A 75 year old female presents to ED with increasing confusion, a 2 week cough and increasing shortness of breath. There is no significant past medical history and she is a non-smoker. On examination, she has saturations of 85% in air, and is afebrile. There is dullness to percussion and reduced air entry at both lung bases. A chest X-ray is performed to assess for possible collapse, pneumonia or effusions.



REPORT – RETROCARDIAC CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Limited – 5 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is heterogeneous left retrocardiac opacification with air bronchograms, in keeping with consolidation. Further consolidation is visible at the right base. The remainder of the lungs are clear. The lungs are not hyperinflated.

There is blunting of both costophrenic angles in keeping with small pleural effusions.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

The left hemidiaphragm and the lateral aspect of the right hemidiaphragm are

obscured. Normal appearance of the medial aspect of the right hemidiaphragm.

No pneumoperitoneum.

There are osteophytes visible within the thoracic spine. The imaged skeleton is otherwise intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

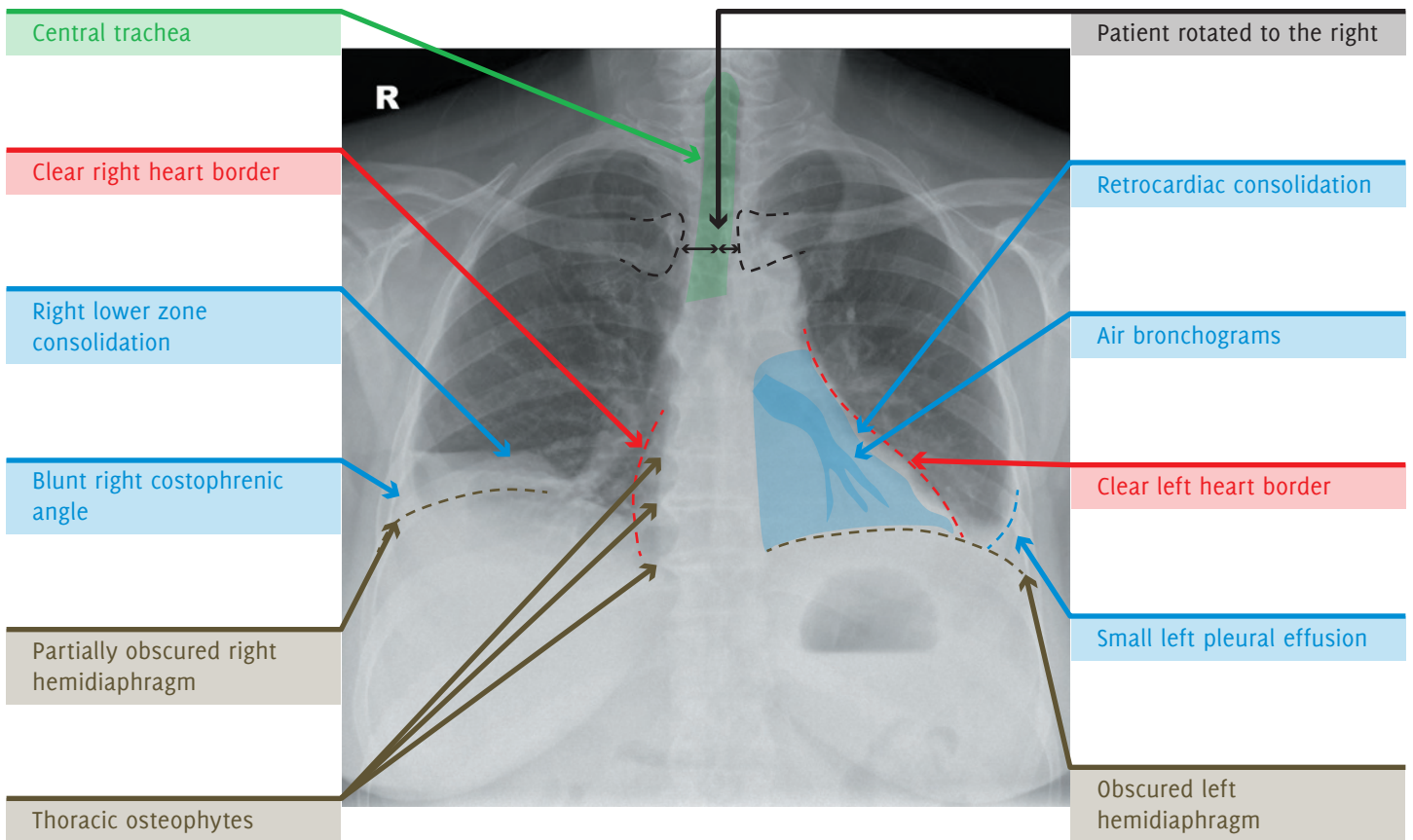
Lung Apices: Normal

Hila: Normal

Behind Heart: Left retrocardiac consolidation

Costophrenic Angles: Bilateral blunting of the costophrenic angles

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates left retrocardiac consolidation obscuring the left hemidiaphragm, consistent with left lower lobe pneumonia. The lateral aspect of the right hemidiaphragm is obscured by right lower lobe pneumonia. There are small bilateral pleural effusions.

Supplementary oxygen should be given. Initial blood tests may include FBC, U/Es, CRP, and blood cultures. A sputum culture may also be obtained.

The patient should be treated with appropriate antibiotics for community-acquired pneumonia, and a follow-up chest X-ray

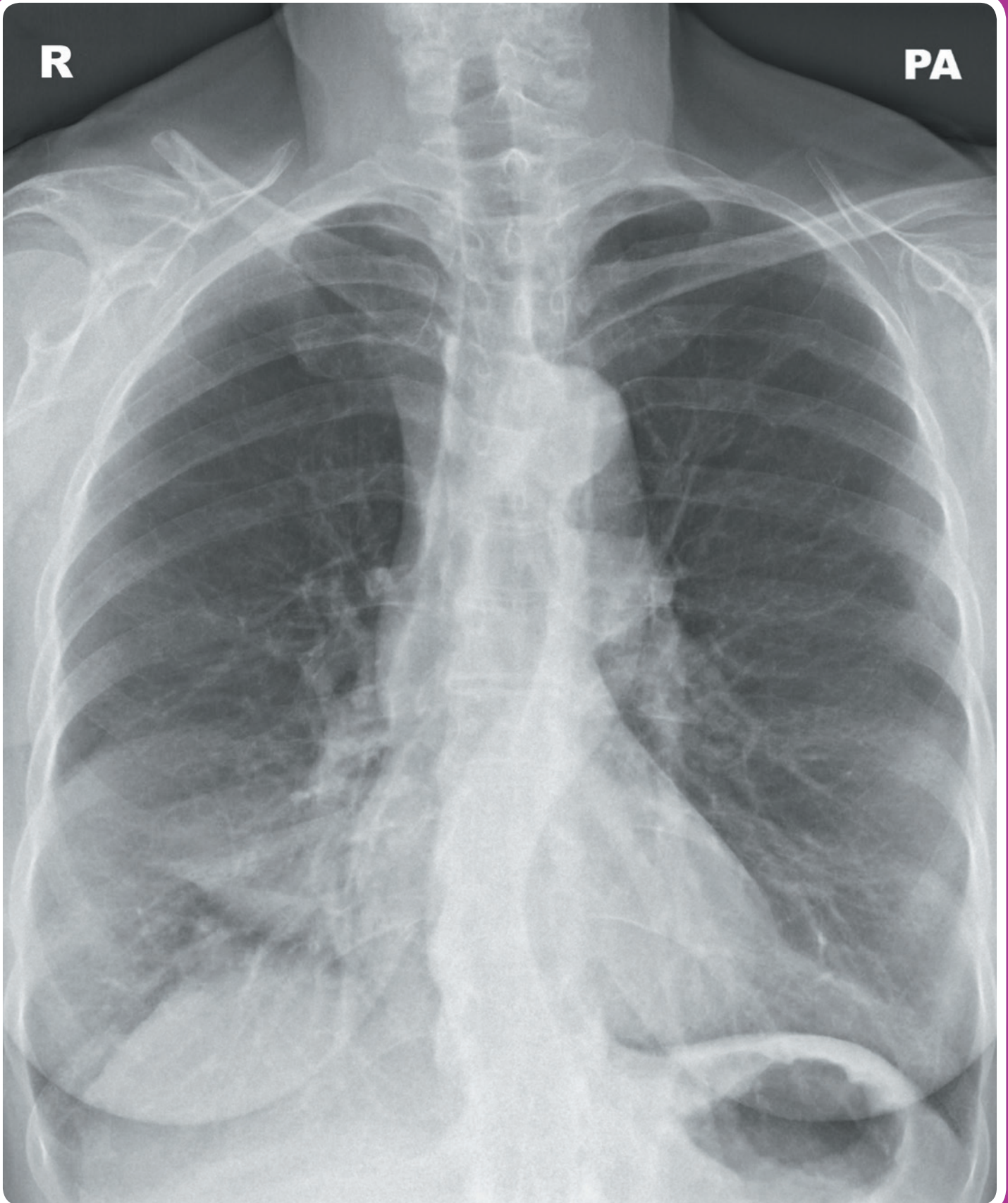
performed in 4-6 weeks to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

Ultrasound could be used to further assess the volume of the pleural effusion, particularly if a diagnostic pleural aspiration is being considered.



CASE 35

A 65 year old female presents to her GP with worsening shortness of breath. She has a 30 pack year smoking history, and has a background of recurrent pneumonia. On examination, she is pyrexial (38.5°C), and her saturations are 98% in air. There is reduced air entry in the right mid-lower zone, with dullness to percussion and occasional crackles. A chest X-ray is requested to assess for possible malignancy, collapse, or consolidation.



REPORT – RIGHT MIDDLE LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is a triangular area of opacification medially in the right lower zone adjacent to the right heart border. The horizontal fissure is not visible.

The remainder of the lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The right heart border is slightly indistinct.

The left heart border is normal.

The descending thoracic aorta is unfolded.

The mediastinum is central.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

There is an old displaced fracture of the distal right clavicle and an old fracture of the left 4th rib posteriorly. No other bony changes.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

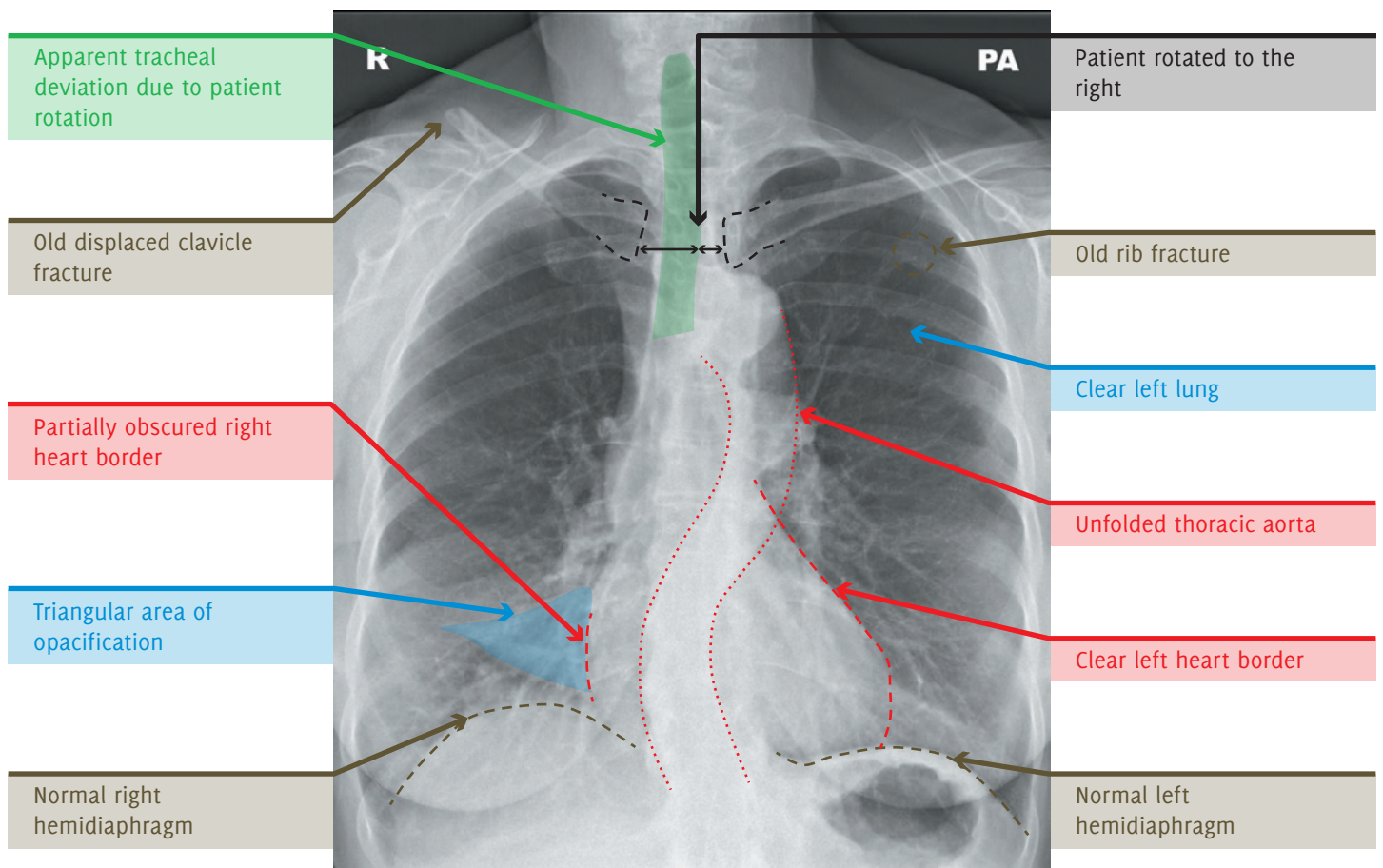
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates opacification medially in the right mid zone obscuring the right heart border. There is no definite volume loss visible.

The most likely differentials are right middle lobe pneumonia or collapse.

Initial blood tests may include FBC, U/Es, LFTs, bone profile, ESR and CRP.

Previous imaging should be reviewed to determine if this is a new finding. A CT of the chest would help differentiate between

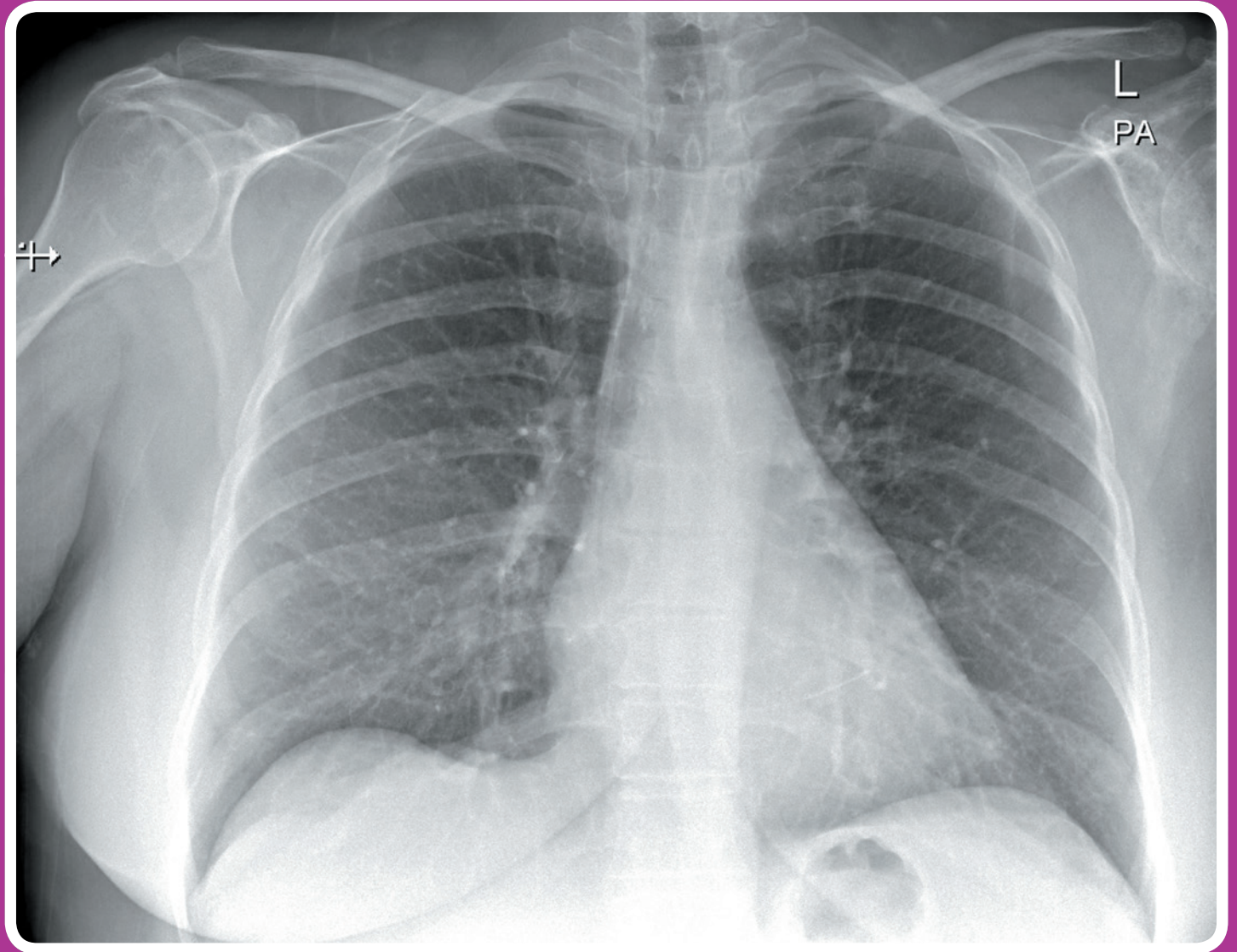
collapse and pneumonia, and could demonstrate an underlying cause.

The management depends on the CT findings, although respiratory referral would be helpful. Appropriate antibiotics should be given to treat a community-acquired pneumonia, which may be oral or intravenous depending on the severity of pneumonia (CURB-65), with a follow up chest X-ray to ensure resolution.



CASE 36

A 57 year old female has had a PICC inserted in her right arm for long-term intravenous antibiotics (she has a persistent infected ulcer). She has a past medical history of multiple myeloma. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A routine post-procedure chest X-ray is requested to assess PICC position.



REPORT – PERIPHERALLY INSERTED CENTRAL CATHETER (MALPOSITIONED)

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is rotated slightly to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear. No pneumothorax.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the diaphragm.

No pneumoperitoneum.

There is a partially imaged patchy sclerotic/lucent abnormality of the left glenoid. No fractures or other bony changes.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

The tip of the right PICC is projected over the right ventricle.

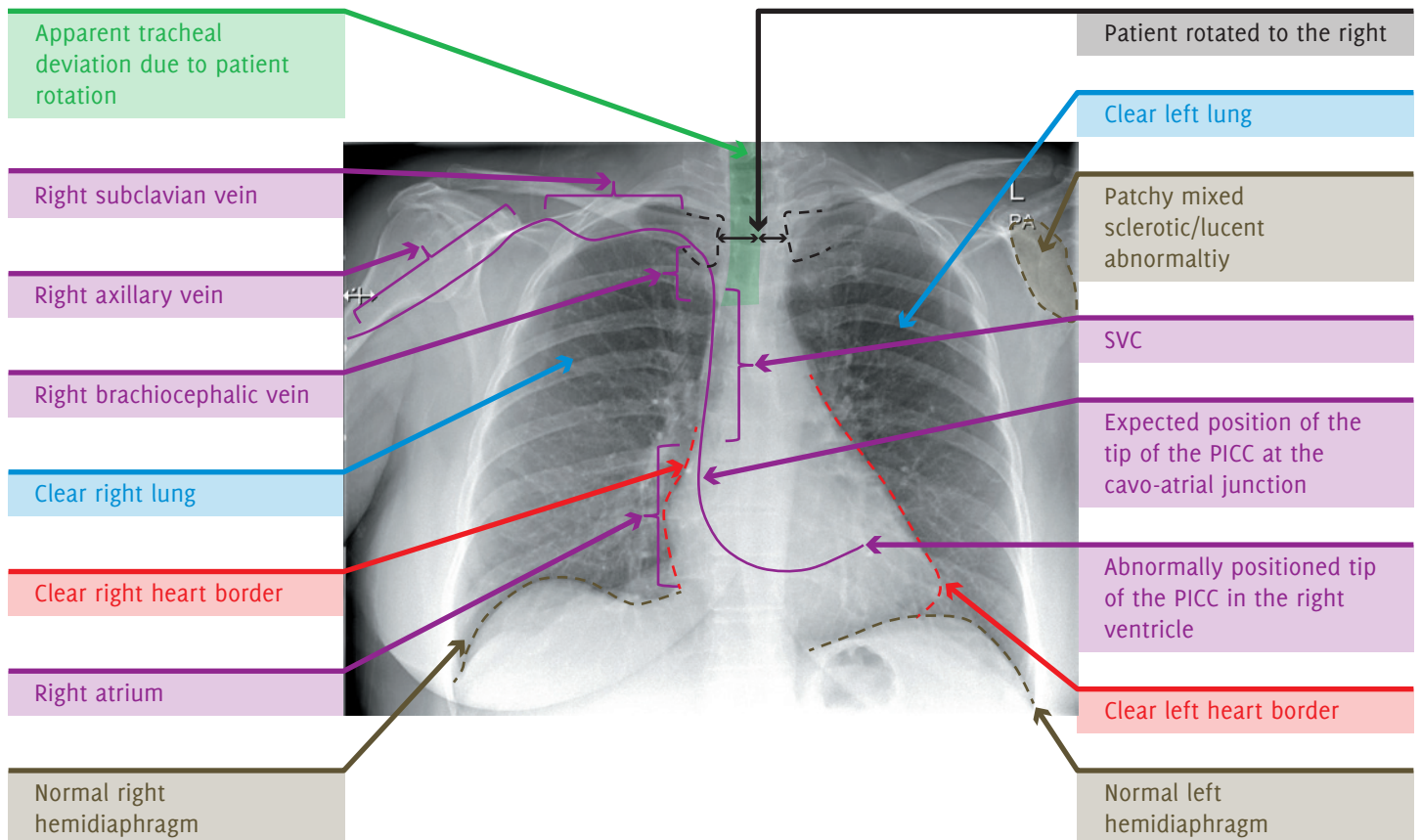
Lung Apices: Normal

Hila: Normal

Behind Heart: Tip of the misplaced right PICC

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates the right PICC line is misplaced, with its tip in the right ventricle. In the context of myeloma, the left glenoid mixed sclerotic/lucent lesion may represent a plasmacytoma.

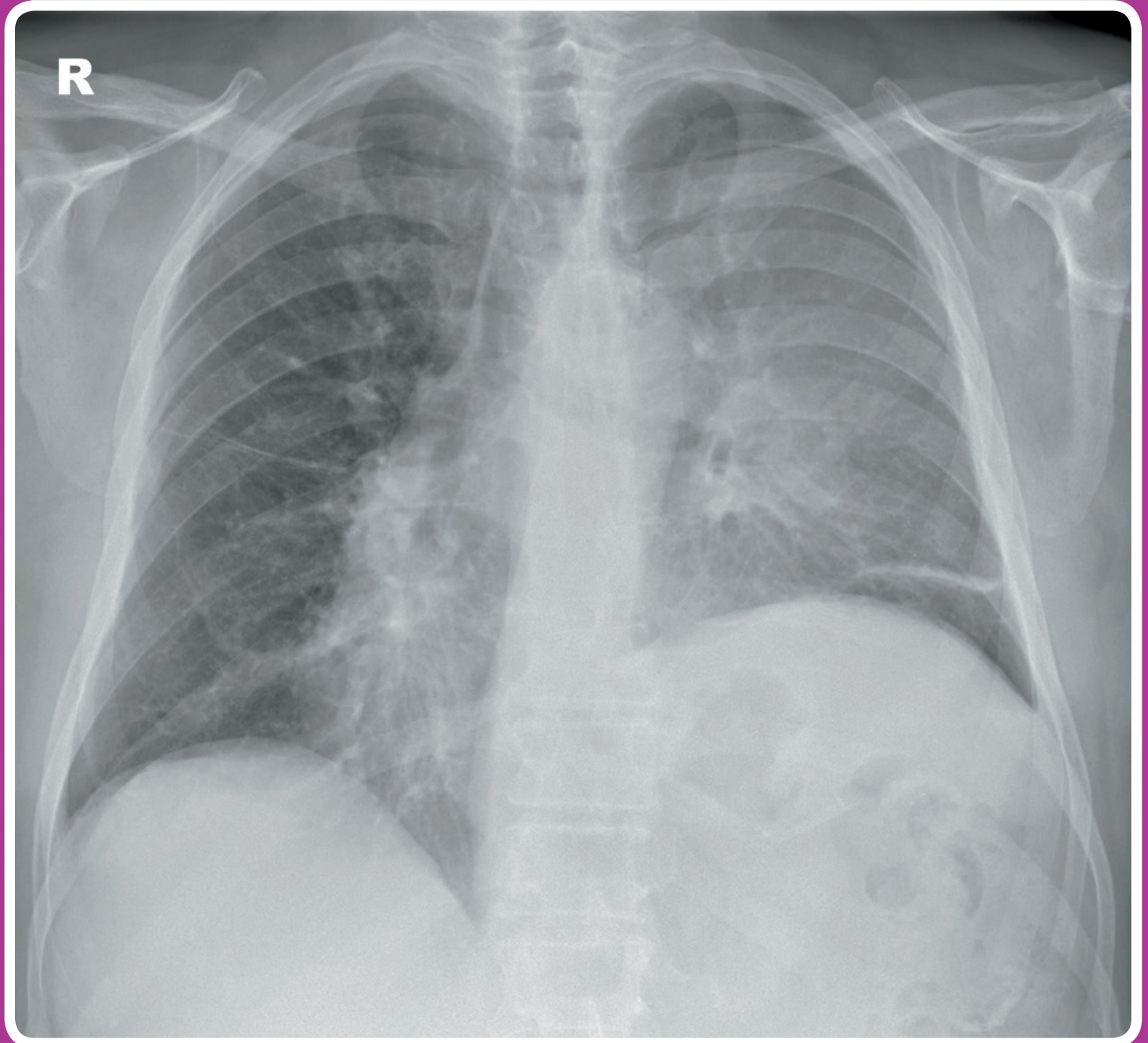
The right PICC should be re-sited (i.e. withdrawn by approximately 10cm) and then re-imaged.

Previous imaging should be reviewed to identify whether the left glenoid lesion is new or old, and any concerns should be discussed with the haematology team.



CASE 37

A 52 year old male presents to ED with worsening shortness of breath. He has known inoperable small cell lung carcinoma, having had palliative radiotherapy. He has a 60 pack year smoking history. On examination, he has oxygen saturations of 83% in air. He is afebrile, and has a respiratory rate of 26. There is reduced air entry throughout the left lung, as well as dullness to percussion and reduced lung expansion. A chest X-ray is requested to assess for progression of the known lung tumour and possible secondary complications such as collapse or consolidation.



REPORT – LEFT UPPER LOBE COLLAPSE

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is a hazy, veil-like opacity in the left hemithorax. A linear opacity is present in the left lower zone, consistent with atelectasis. There is left-sided volume loss.

The right lung is clear and not hyperinflated.

The pleural spaces are clear.
Normal pulmonary vascularity.

CIRCULATION

The heart size and cardiomeastinal contours are difficult to assess due to patient rotation.
The aorta appears normal.

The mediastinum is projected to the right, which is probably due to patient rotation. The aorta appears normal.

There is a rounded mass projected over the left hilum. The hilum itself is normally positioned. The right hilum appears bulky and abnormally dense, but in a normal position.

DIAPHRAGM + DELICATES

The left hemidiaphragm has a normal curvature but is markedly elevated.

Normal position and appearance of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

Lung Apices: Left apical opacification.

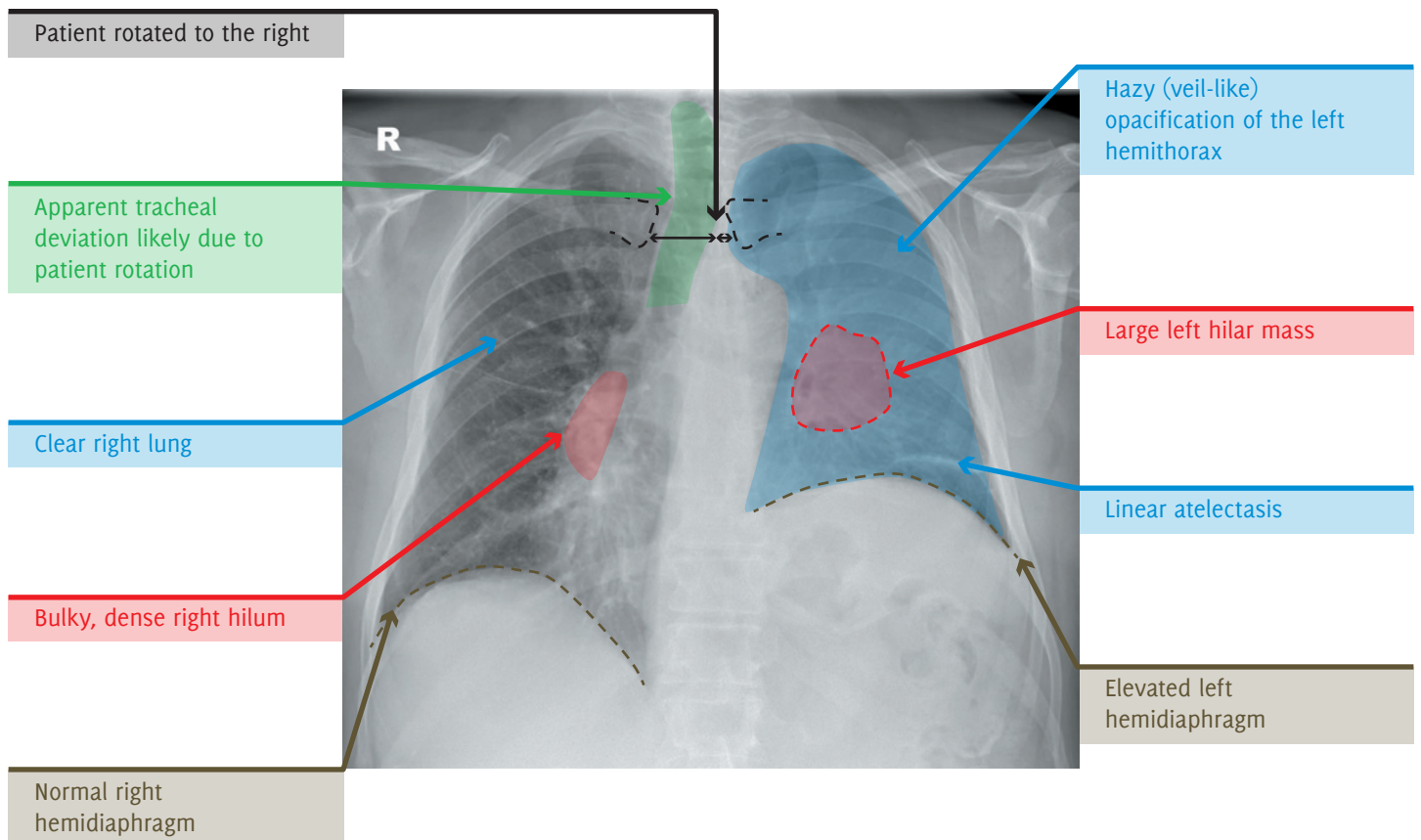
Normal right apex

Hila: Left hilar mass. Bulky, dense right hilum

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a left upper lobe collapse (veil like opacity of the left hemithorax) likely secondary to the left hilar mass. There is associated volume loss demonstrated by the markedly elevated left hemidiaphragm. The right hilum is also abnormal. The apparent mediastinal shift to the right is probably due to patient rotation.

The most likely cause of the collapse is secondary to the left hilar mass. Other differentials for collapse, such as mucus plugging and an inhaled foreign body, are unlikely.

Supplementary oxygen should be given.

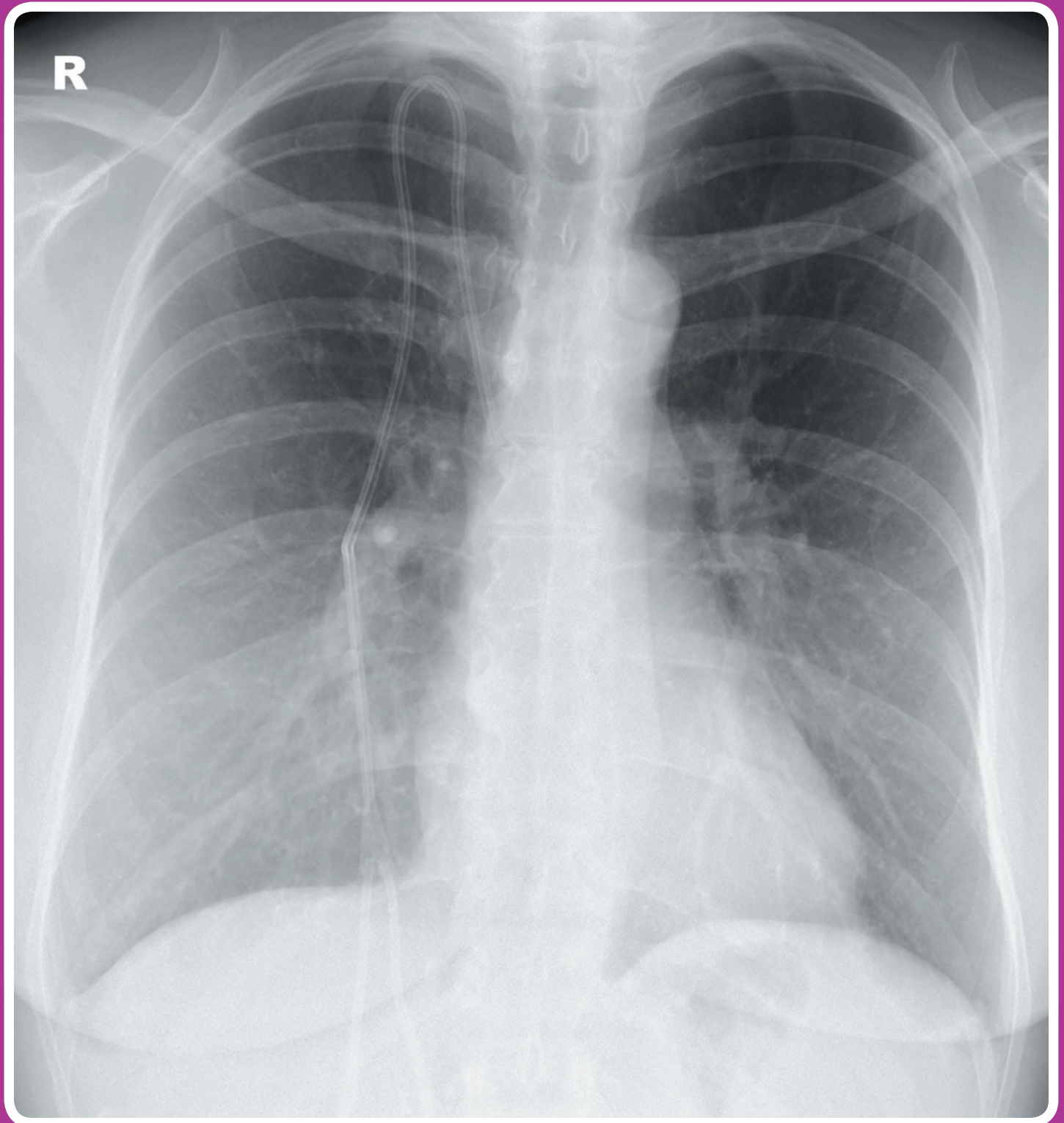
Initial blood tests may include FBC, U/Es, LFTs, bone profile, and CRP. The X-ray should be compared with previous imaging to assess for progression. An up-to-date CT chest and abdomen with IV contrast may be needed for further assessment/restaging.

Discussion with respiratory and oncology for further palliative treatment will be necessary.



CASE 38

A 30 year old female presents to the haematology ward because her Hickman line will no longer flush or aspirate. She has a history of leukemia. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess the Hickman line position.



REPORT – HICKMAN LINE (FRACTURED)

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the diaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

A tunnelled right internal jugular (Hickman) line is visible. Its tip is appropriately sited, projected over the level of the mid superior vena cava. The line is kinked at the cutaneous entry site. The apex of the line (between the tunnelled portion and the intravenous portion) is rather tight. Careful inspection of this region reveals a fracture of the inferior wall of the line at its apex, just proximal to the site of entry into the right internal jugular vein.

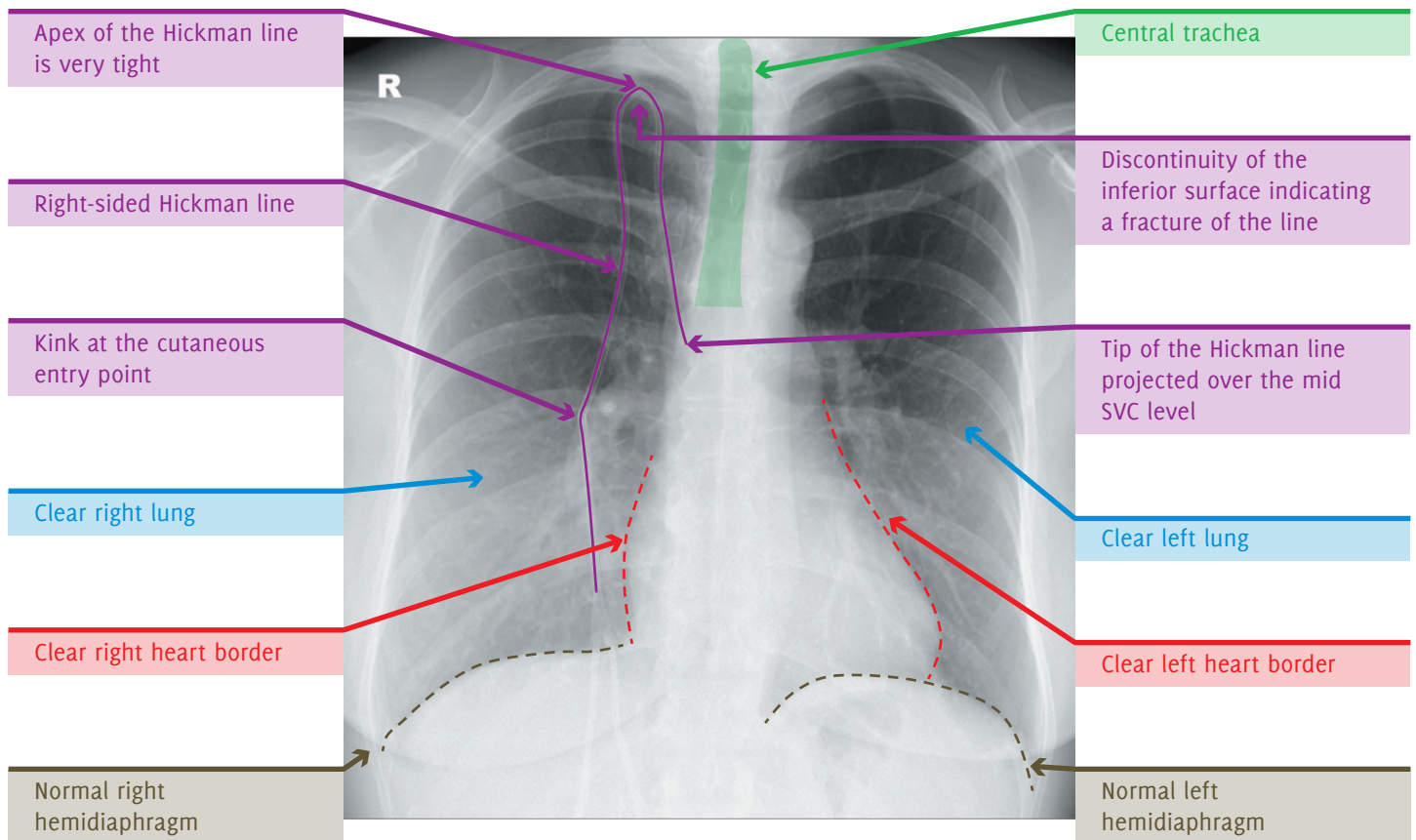
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

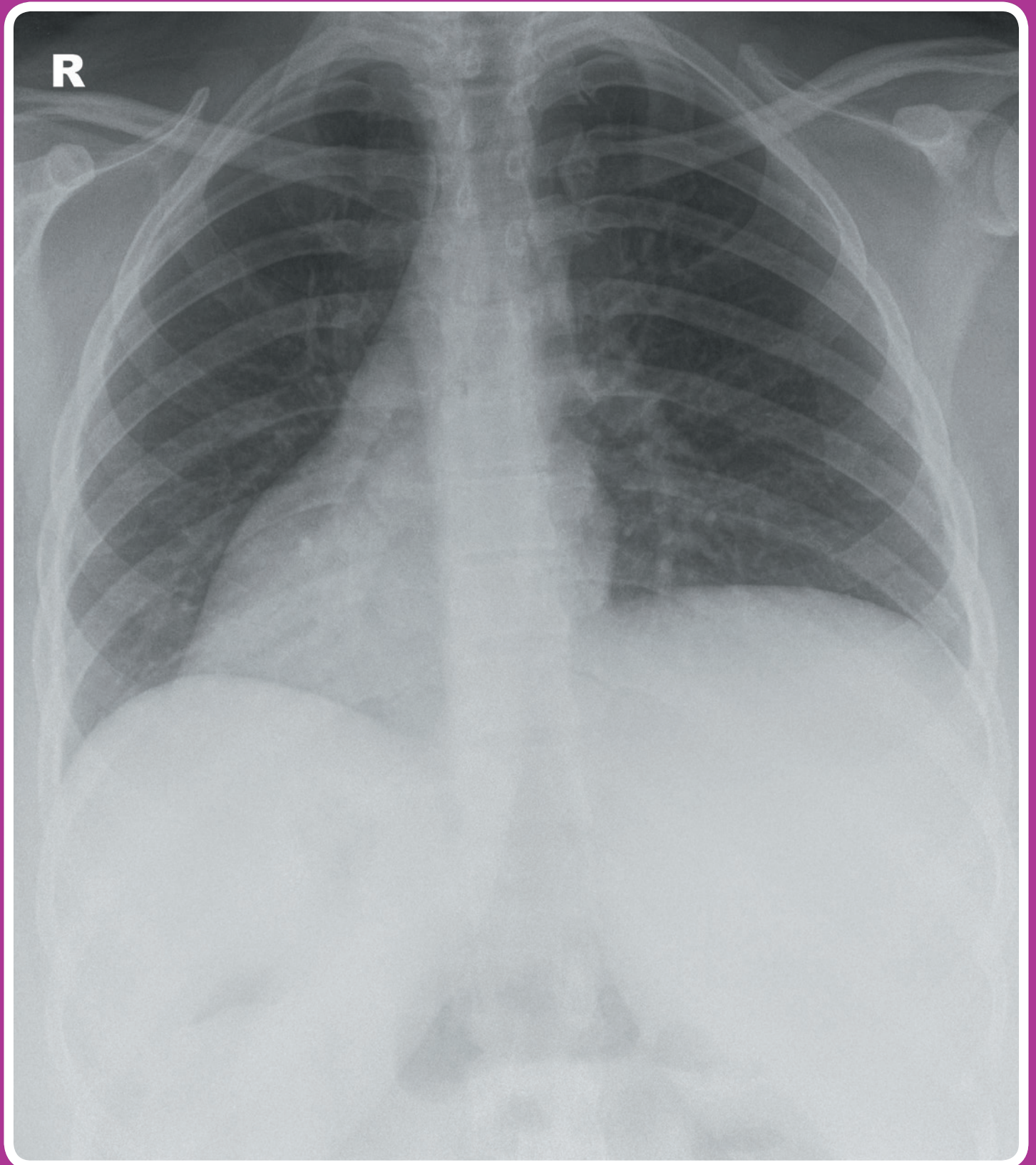
This X-ray demonstrates a fracture of the apex of the right-sided Hickman line. There is also a kink at the cutaneous entry point.

The patient should be discussed with interventional radiology. A linogram (where contrast is injected through the line under fluoroscopy) may be performed to assess the Hickman line in more detail. However, it will likely need removing and replacing.



CASE 39

A 24 year old female presents to her GP for a medical assessment as part of a visa application. She is asymptomatic. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Lungs are resonant throughout, with good air entry bilaterally. A chest X-ray to assess for TB is requested as part of the visa application.



REPORT – DEXTROCARDIA

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart appears as a mirror image, located in the right hemithorax with a right-sided cardiac apex (dextrocardia).

The heart is not enlarged.

The heart borders are clear.

The aortic knuckle is difficult to identify but it is likely to also be right-sided as the descending aortic contour is right-sided.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

The left hemidiaphragm is higher than the right, consistent with a left-sided liver. The

gastric bubble appears more to the right of the midline.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

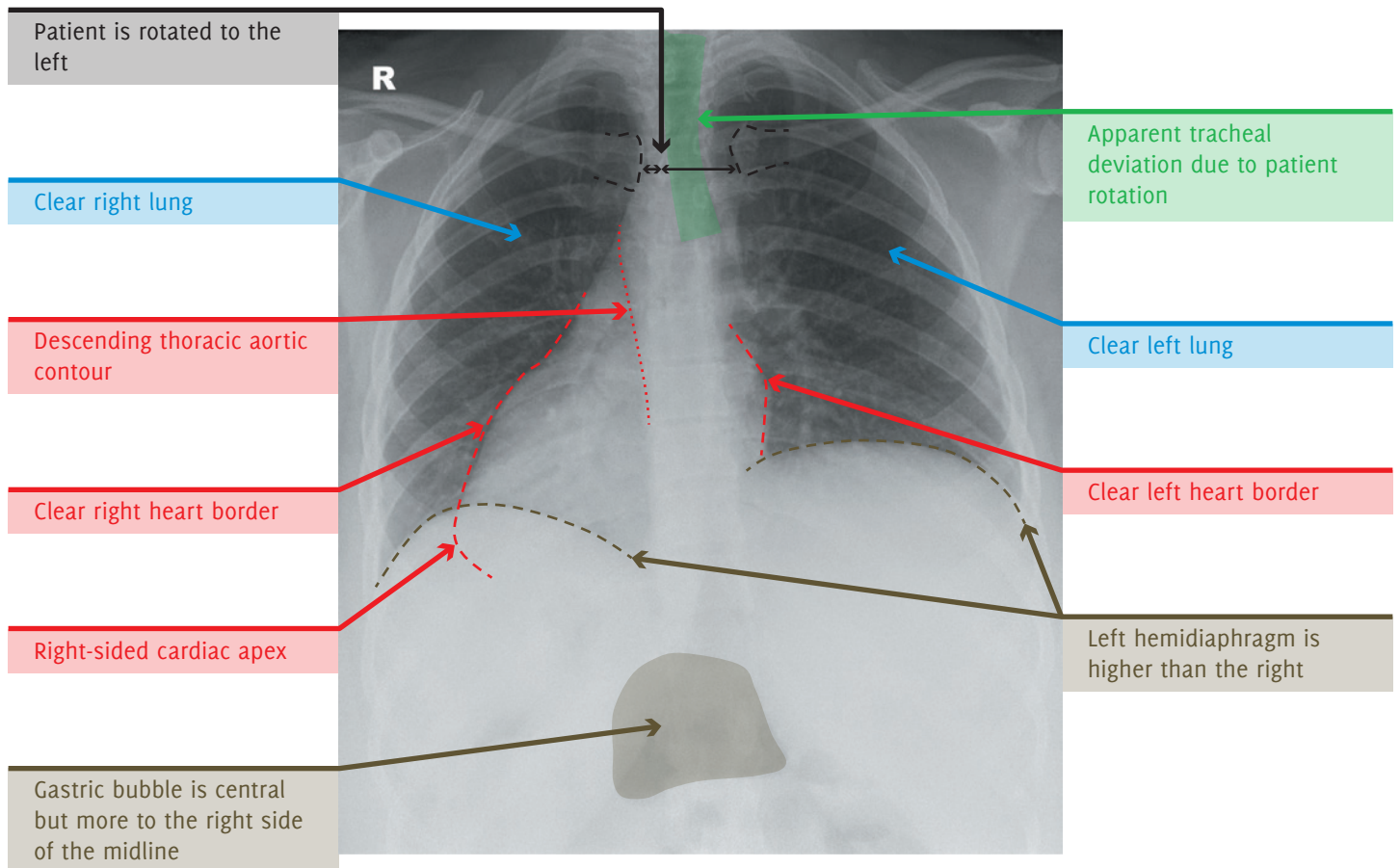
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Abdominal situs inversus



SUMMARY, INVESTIGATIONS & MANAGEMENT

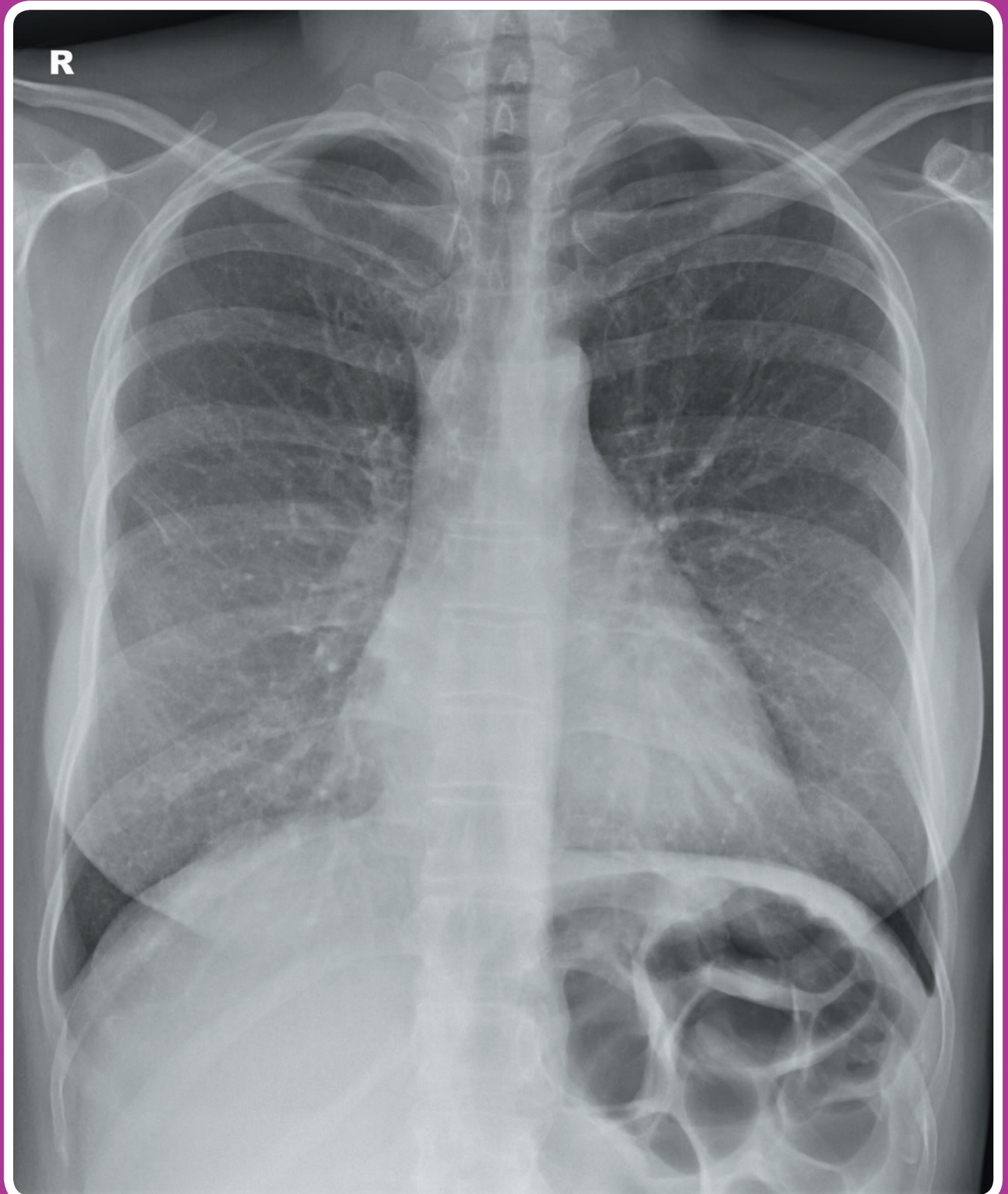
This X-ray demonstrates dextrocardia (the heart appears as a mirror image on the right side) with probable situs inversus (the abdominal organs such as the liver and stomach are mirrored). It is otherwise a normal X-ray with no evidence of pulmonary TB.

The patient will need to be clinically assessed for possible primary ciliary dyskinesia or heart defects. However, no specific investigation or treatment is required.



CASE 40

A 33 year old female presents to ED with haemoptysis, chest pain and shortness of breath. She has recently returned from America. She is a non-smoker. On examination, she has saturations of 95% in air and is afebrile. Her RR is 30 with a HR of 85 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pulmonary embolism or pneumonia.



REPORT – BREAST PROSTHESES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is increased symmetrical circular opacification in both mid and lower zones, extending below the diaphragm and lateral to the rib cage.

The underlying lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

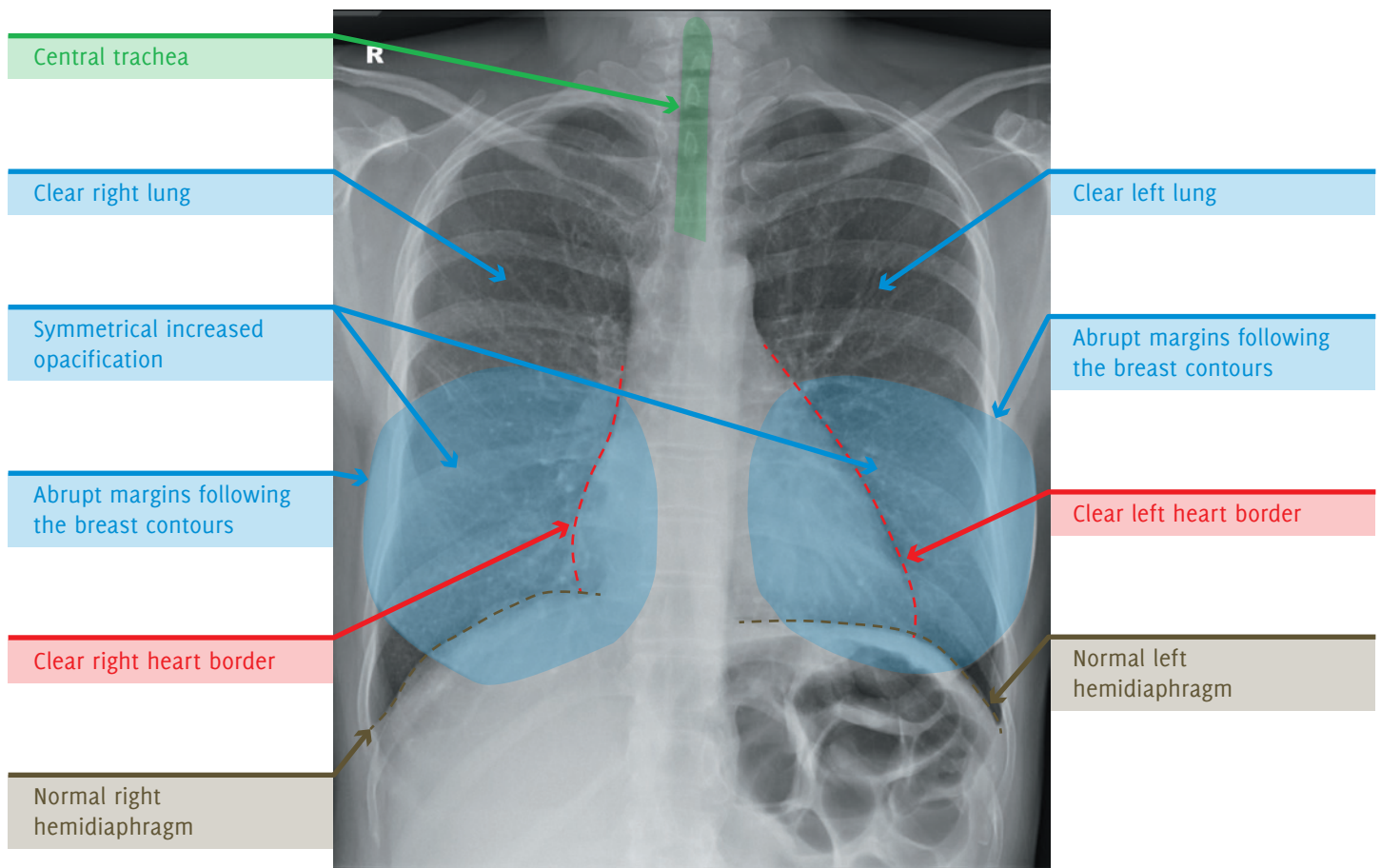
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

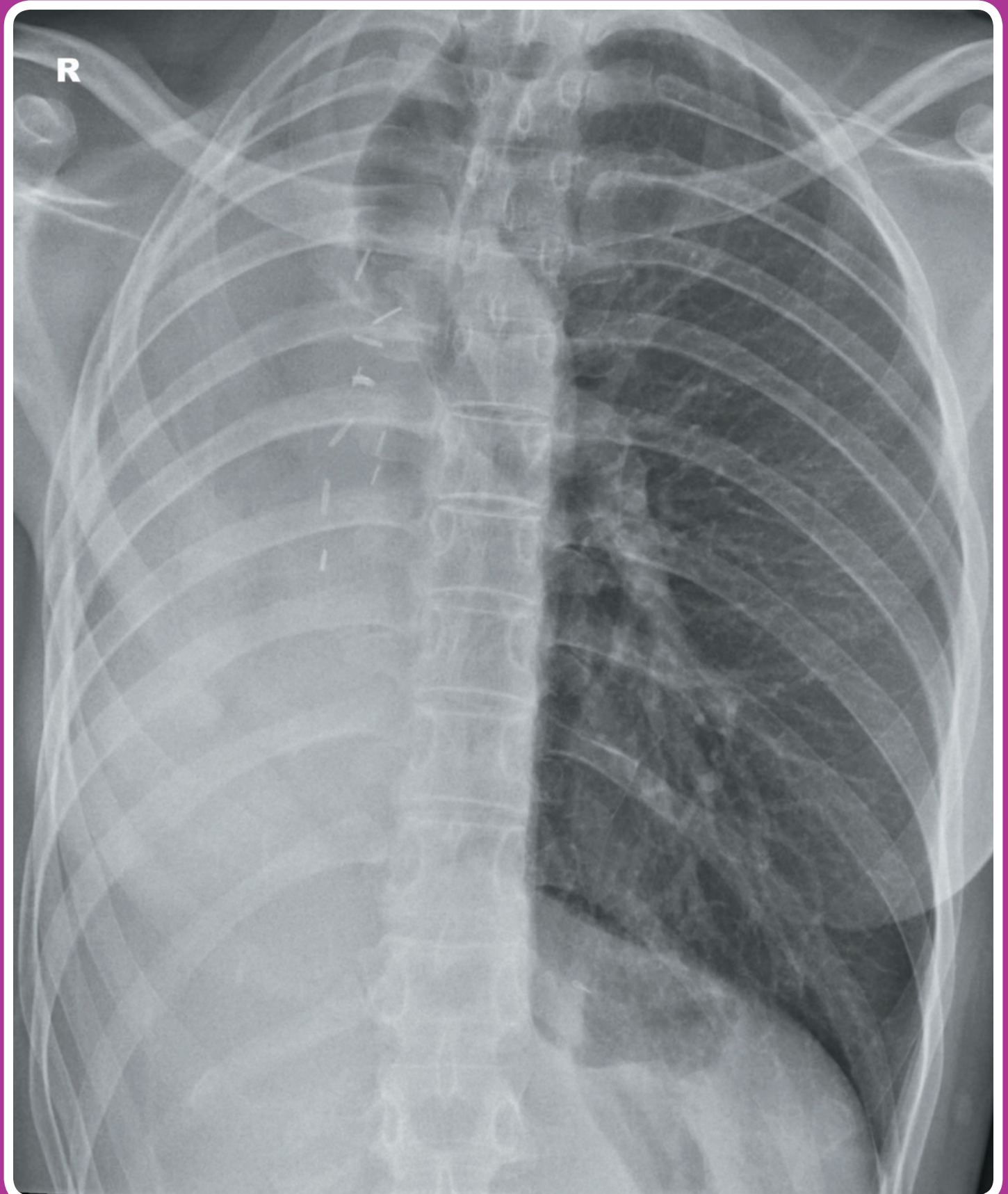
This X-ray demonstrates increased density projected over the mid and lower zones. The increased density follows the contours of the breasts and is consistent with bilateral breast prostheses. No causes for breathlessness are demonstrated.

Initial blood tests may include FBC, U/Es, CRP, and D-Dimer. A blood gas and sputum culture may be helpful. The history is strongly suggested of a pulmonary embolism and so a CTPA or nuclear medicine perfusion scan would be indicated.



CASE 41

A 42 year old female attends the cardiothoracic outpatient clinic for review 10 weeks post lung cancer surgery. Unfortunately her notes are unavailable. She says she has recovered well from the surgery. On examination, she is afebrile, and her saturations are 98% in air. There is reduced chest expansion on the right with no breath sounds and dullness to percussion. Examination of the left lung is normal. A chest X-ray is requested as part of the routine post-operative follow up.



Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is deviated to the right.

BREATHING

There is a white out of the right hemithorax with a total absence of bronchovascular markings.

The left lung appears hyper-expanded but clear with normal pleural spaces and pulmonary vascularity.

CIRCULATION

The heart is difficult to identify. It is presumably displaced into the opacified right hemithorax.

The mediastinum is displaced to the right. The aorta is difficult to identify.

The right hilum is difficult to identify due to the opacification. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

The right hemidiaphragm and costophrenic angle are obscured. Normal appearance and position of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There are surgical clips projected medially over the right hemithorax, near the trachea and right main bronchus.

No vascular lines or tubes.

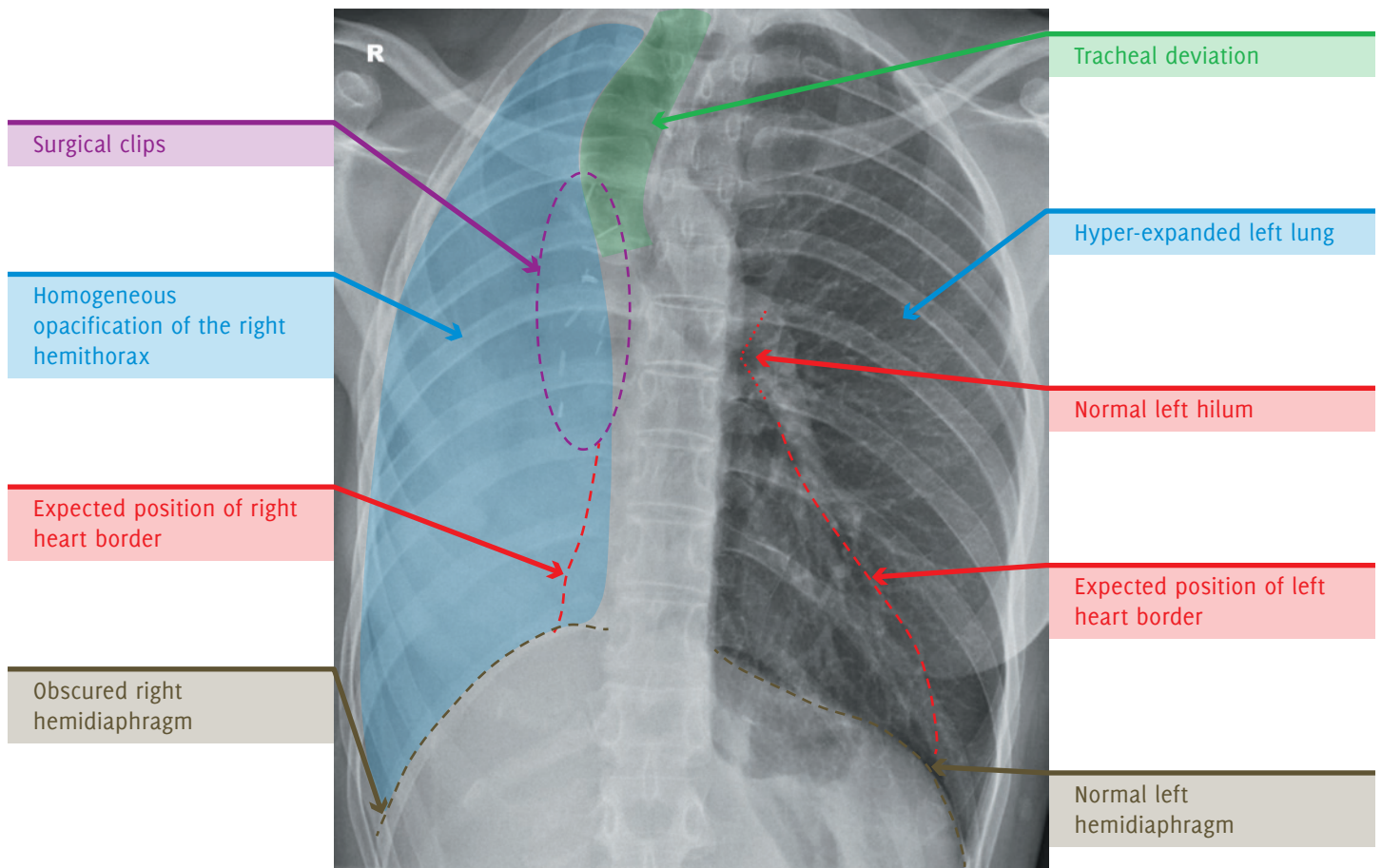
Lung Apices: Opacification of the right apex. Normal left apex

Hila: Right hilum difficult to see. Normal left hilum

Behind Heart: Difficult to assess

Costophrenic Angles: Obscured on the right. Preserved on the left

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a total white out of the right hemithorax with marked volume loss demonstrated by mediastinal deviation. There are surgical clips in the right mid and upper zones.

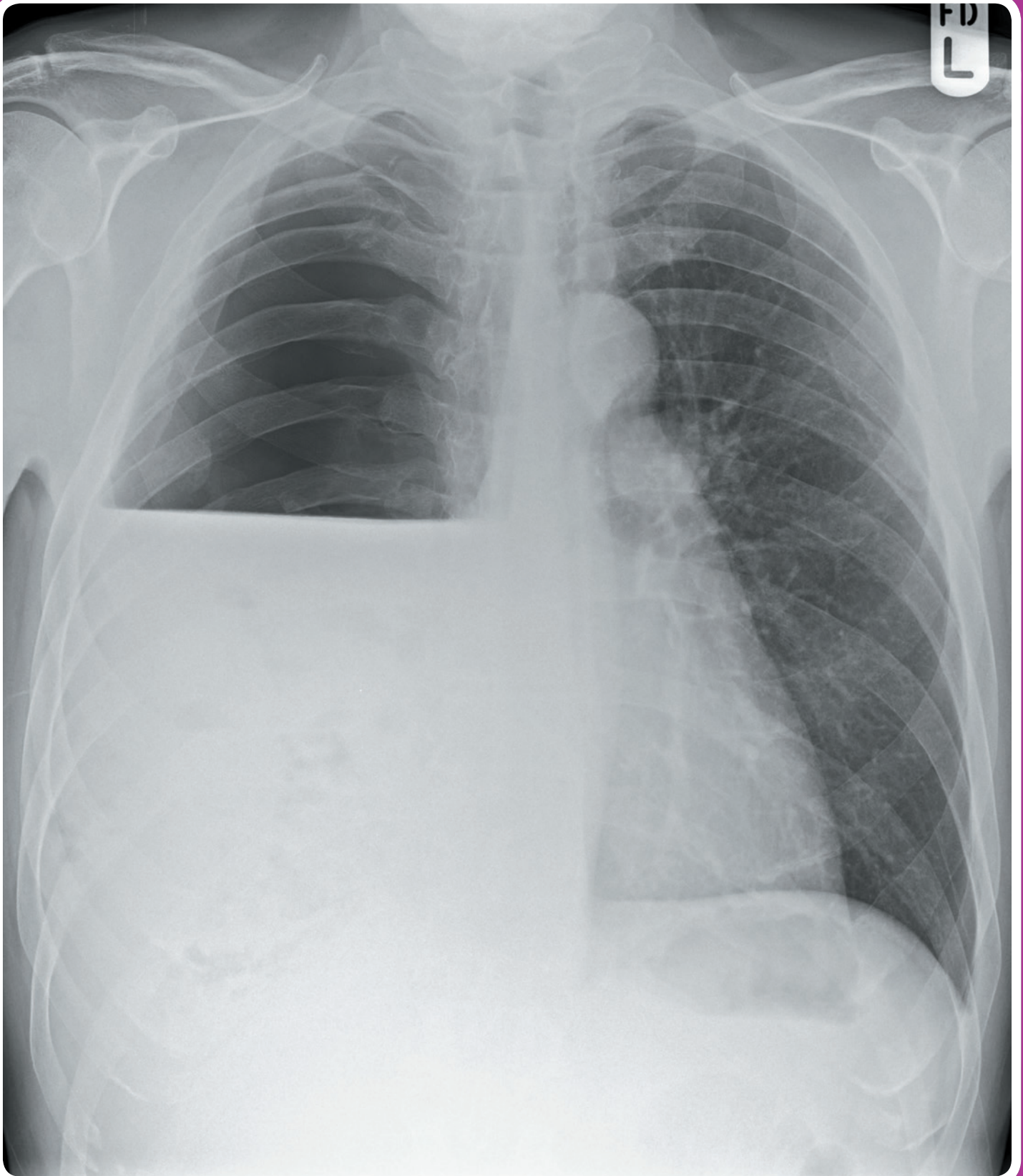
The findings are consistent with the normal appearance of a right pneumonectomy. The white out will be due to fluid filling the postpneumonectomy space. There is no air-fluid level (hydropneumothorax) to suggest a bronchopleural fistula.

It would be helpful to compare the current X-ray with previous imaging, but no specific investigation/action is required.



CASE 42

A 53 year old male presents to ED with fever, productive cough and haemoptysis. He had a right-sided pneumonectomy 4 weeks earlier for lung cancer, and had been recovering well until this point. He is a non-smoker. On examination, he has saturations of 78% in air, has a HR of 90 bpm, and is febrile with a temperature of 38.8°C. There are no breath sounds on the right, with hyperresonance in the right upper zone, and dullness to percussion in the right lower zone. A chest X-ray is requested to assess for possible pneumonia, or bronchopleural fistula.



REPORT – HYDROPNEUMOTHORAX

Patient ID: Anonymous
Projection: PA mobile erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is homogeneous opacification of the right mid and lower zones. Its upper margin is horizontal and there is complete loss of bronchovascular markings in the right upper zone, consistent with an air-fluid level.

The left lung field and pleural spaces are clear. The lungs are not hyperinflated.

Normal left pulmonary vascularity.

CIRCULATION

The right heart border is not visible. The cardiac size therefore cannot be commented on. The left heart border is clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The right hilum is not visible. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

The right hemidiaphragm is obscured. Normal position and appearance of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable with no surgical emphysema.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips visible.

Lung Apices: Right sided pneumothorax. Normal left apex

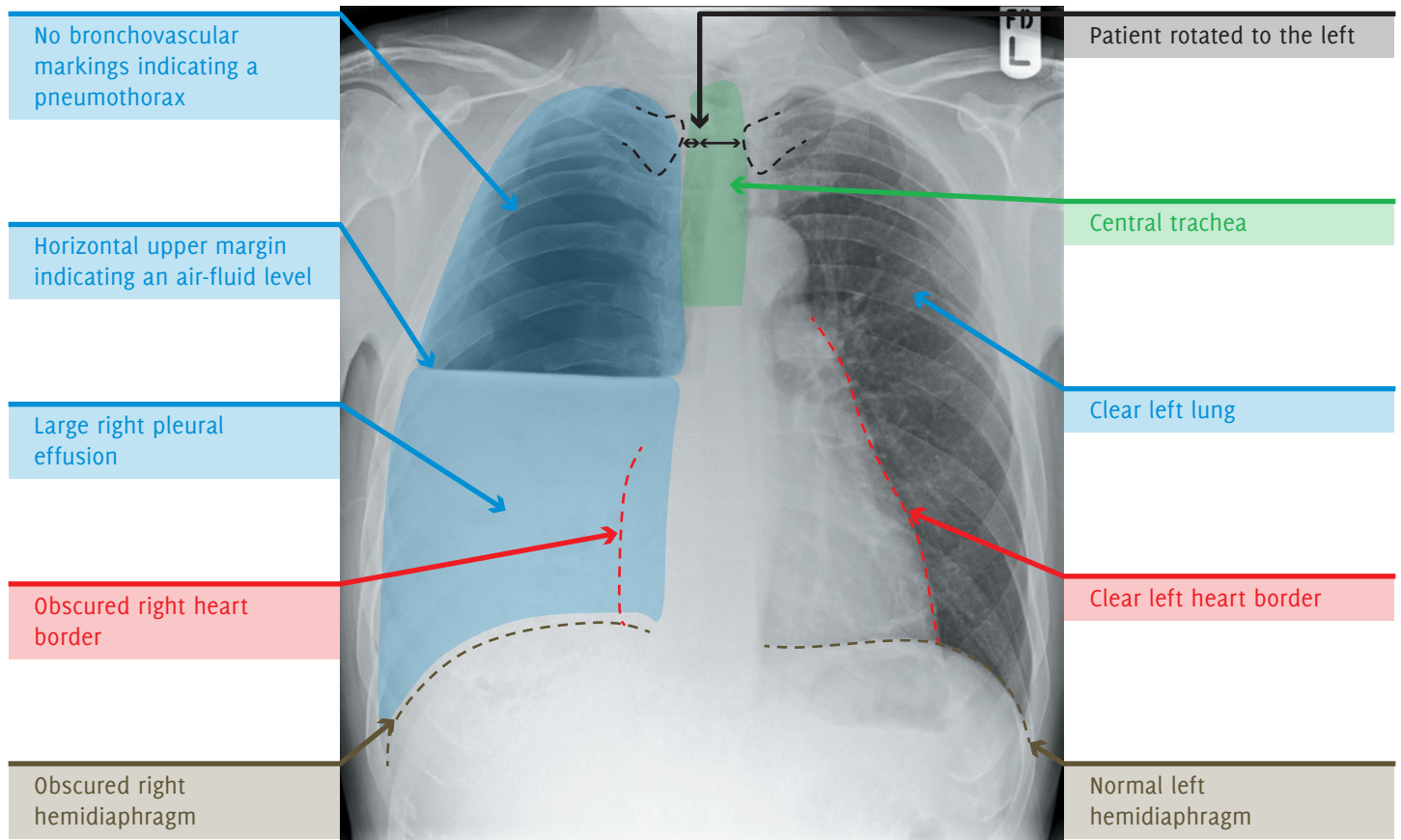
Hila: Right hilum not visible. Normal left hilum

Behind Heart: Right retrocardiac position obscured. Normal on the left

Costophrenic Angles: Right obscured.

Normal left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large right-sided hydropneumothorax, with an air-fluid level. The mediastinum appears central. This may be within normal limits 4 weeks postpneumonectomy. However, the patient is septic with haemoptysis and the amount of air in the right hemithorax is concerning. These features may indicate a bronchopleural fistula and empyema.

This is an acutely unwell patient that needs urgent resuscitation. 100% oxygen should be administered via a non-rebreather mask and there should be a low threshold for escalation of respiratory support. Two points of intravenous access should be rapidly achieved, with an arterial blood gas sent, alongside venous

bloods for FBC, U/E/s, LFTs, coagulation, CRP, and blood cultures. Sputum cultures should be obtained if possible.

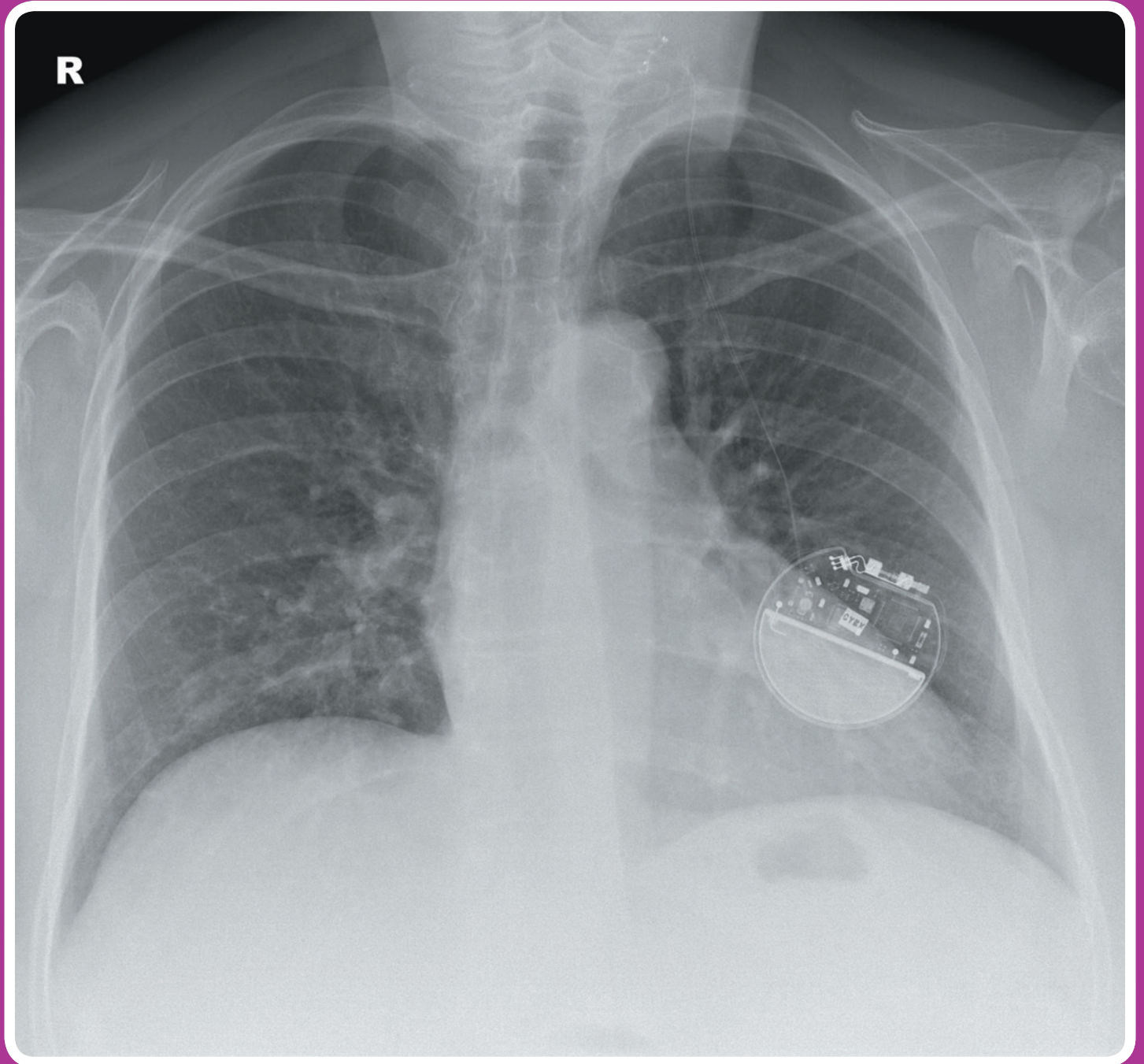
The patient should be given a fluid bolus and appropriate intravenous antibiotics. They should be urgently discussed with cardiothoracic surgery.

The current X-ray needs to be compared with the previous imaging to assess the change in size of the postpneumonectomy space (which should get progressively smaller as it is replaced by fluid). A significant increase in the amount of air in the right hemithorax is suspicious for a bronchopleural fistula +/- empyema. An ultrasound-guided pleural aspiration should be performed to assess for empyema.



CASE 43

A 60 year old female presents to ED with a cough and mild shortness of breath. She has general flu-like symptoms. She has a history of severe epilepsy, for which a vagal nerve stimulator has been inserted. She is a non-smoker. On examination, she has saturations of 95% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia or pulmonary embolism.



REPORT – VAGUS NERVE STIMULATOR

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the diaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There is an electronic device projected over the left lower zone. A wire arises superiorly and travels over the left chest, terminating in the left side of the neck.

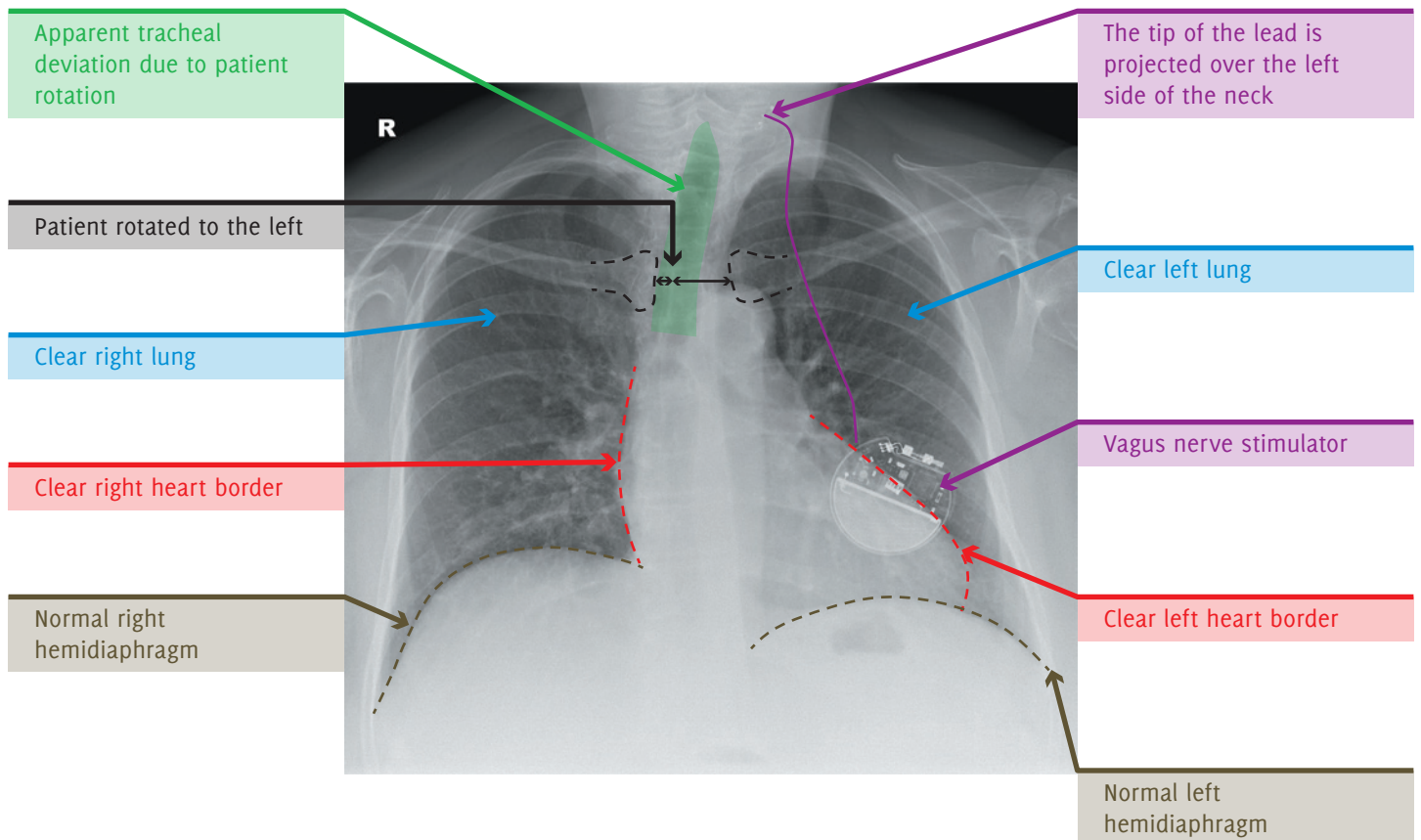
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

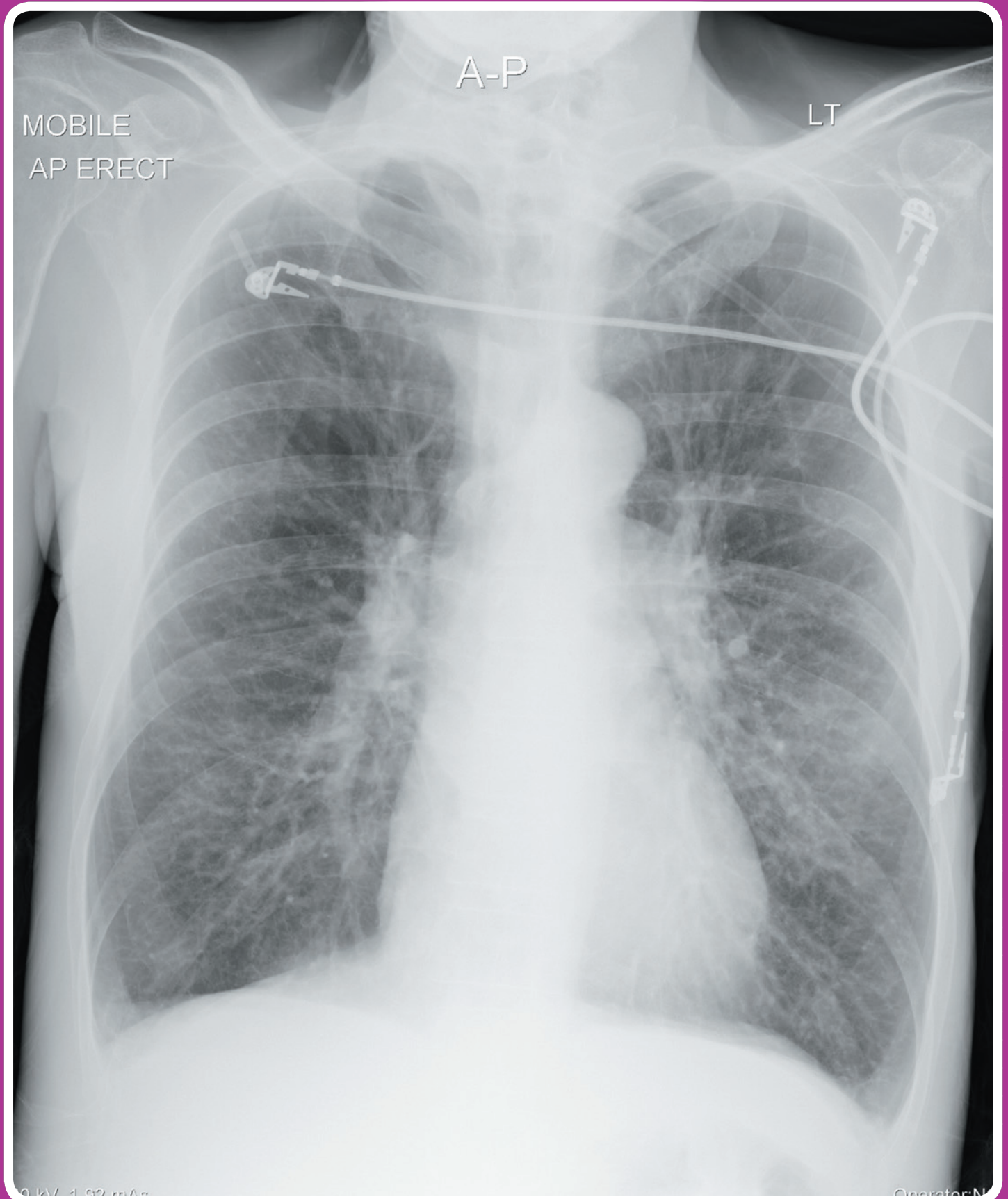
This X-ray demonstrates an electronic device, most likely a vagus nerve stimulator, used in patients to help alleviate intractable epilepsy. The wire tip within the left neck is connected to the left vagus nerve and is appropriately sited.

Initial blood tests may include FBC, U/Es, and CRP. Further investigations and management will be guided by the clinical assessment. The history is suggestive of a viral infection. No specific further investigations or management are required based on the X-ray findings.



CASE 44

A 62 year old male presents to ED with acute-on-chronic shortness of breath. He has a 50 pack year smoking history. On examination, he has saturations of 86% in air and is afebrile. RR is 20 with a HR of 90 bpm. There are bilateral crackles and wheeze throughout the lungs. A chest X-ray is requested to assess for possible pneumonia, effusion or pulmonary oedema.



REPORT – EMPHYSEMA

Patient ID: Anonymous
Projection: AP erect (Mobile)
Penetration: Slightly underpenetrated – vertebral bodies not easily visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

There is increased opacification in the left midzone, with preservation of the left heart border, in keeping with consolidation. The lungs are hyperexpanded with flattening of the hemidiaphragms, and there is coarsening of the bronchovascular markings throughout the lungs, in keeping with COPD. The lungs are otherwise clear.

There is mild blunting of both costophrenic angles, but the pleural spaces are otherwise clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Bilateral flattening of the hemidiaphragms in keeping with lung hyperexpansion.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG monitoring leads and oxygen tubing in situ.

No vascular lines, tubes, or surgical clips.

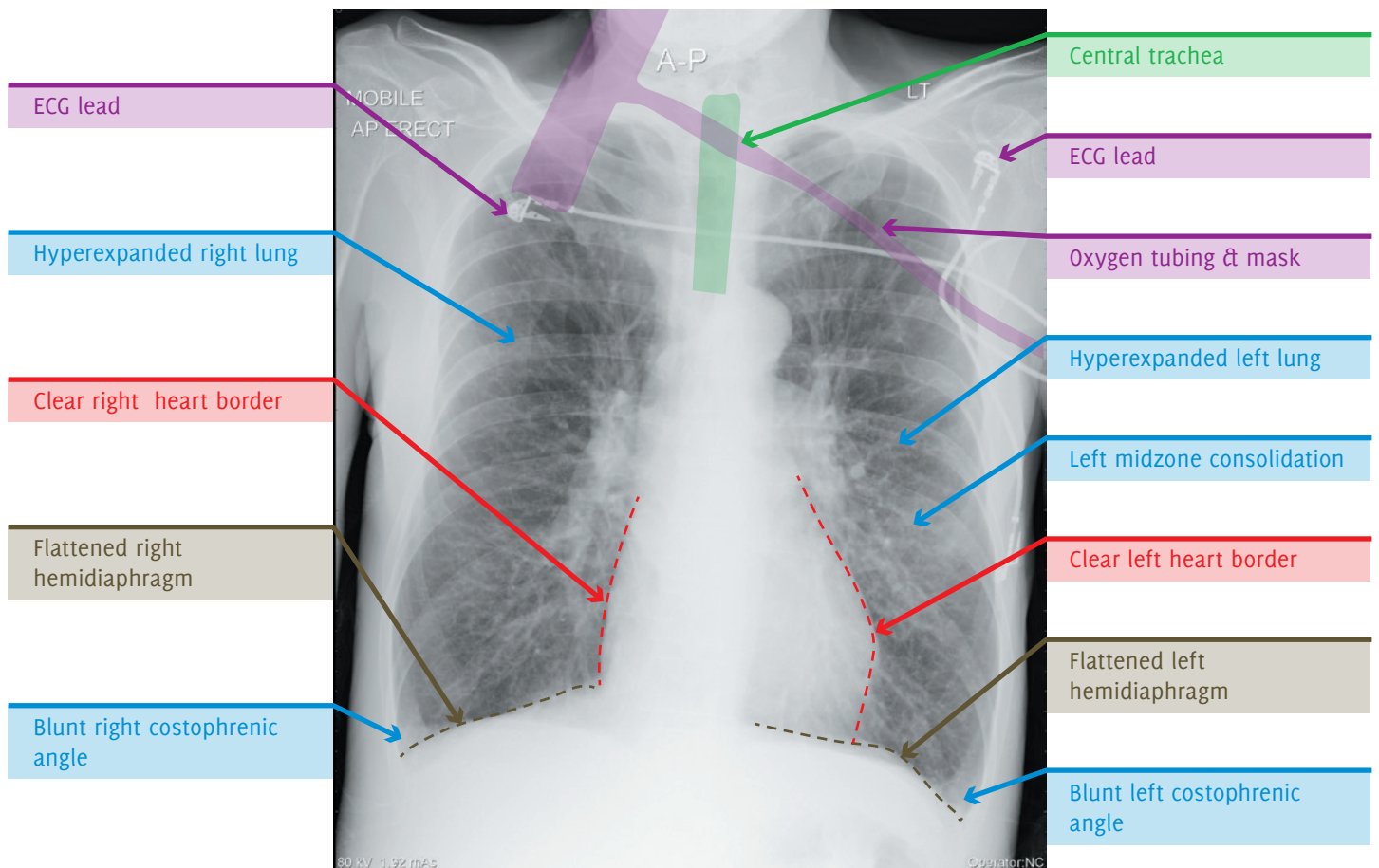
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Bilateral blunting

Below the Diaphragm: Normal



ECG lead

Hyperexpanded right lung

Clear right heart border

Flattened right hemidiaphragm

Blunt right costophrenic angle

Central trachea

ECG lead

Oxygen tubing & mask

Hyperexpanded left lung

Left midzone consolidation

Clear left heart border

Flattened left hemidiaphragm

Blunt left costophrenic angle

SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates generalised increased bronchovascular markings associated with hyperinflated lungs, consistent with COPD. Increased left midzone opacification is in keeping with consolidation. The blunted costophrenic angles may represent small effusions or pleural thickening. This is likely to be an infective exacerbation of COPD.

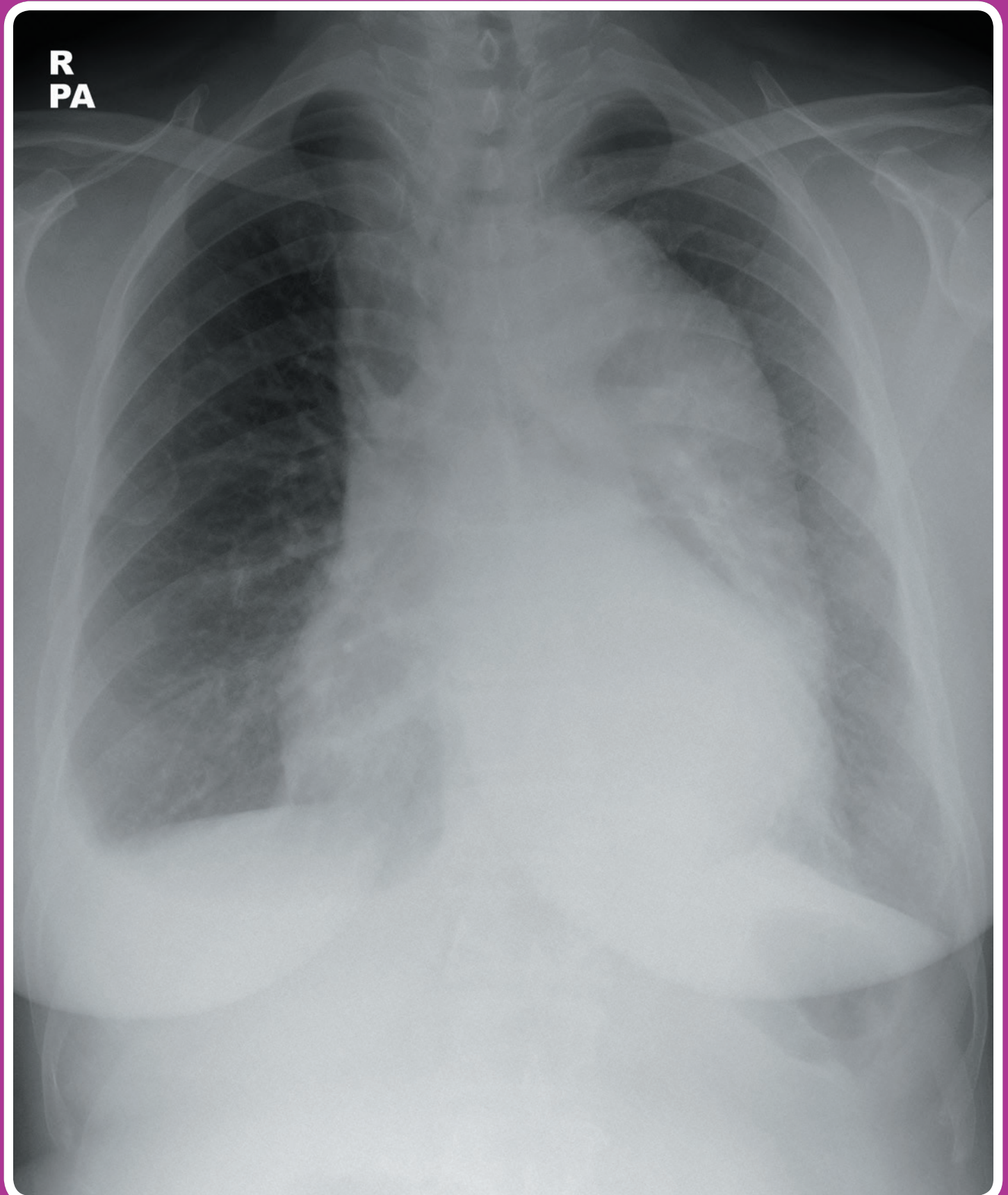
Supplementary oxygen should be titrated according to arterial blood gas results. Initial blood tests may include FBC, U/Es, and CRP. A sputum culture may also be helpful.

Appropriate antibiotics should be commenced and a follow up chest X-ray should be performed in 4-6 weeks to assess for resolution.



CASE 45

A 65 year old female presents to ED with severe chest pain radiating to the back, and shortness of breath. There is no significant past medical history and she is a non-smoker. On examination, she has saturations of 85% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry. A chest X-ray is requested to assess for a possible aortic dissection, pneumonia, or pulmonary oedema.



REPORT – AORTIC DISSECTION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

Superiorly the trachea is central. Inferiorly it is displaced to the right by the aortic arch.

BREATHING

There is increased left retrocardiac opacification, which may represent consolidation. The lungs are otherwise clear.

The lungs are not hyperinflated.

There is blunting of the right costophrenic angle in keeping with a small effusion.

Normal pulmonary vascularity.

CIRCULATION

The heart is enlarged (cardiothoracic ratio 0.6).

The heart borders are clear.

The aorta is widened and has an irregular contour.

The mediastinum is central, but widened (including the right paratracheal stripe), with clear borders.

Both hila are visible through the enlarged mediastinum but are difficult to assess.

DIAPHRAGM + DELICATES

The medial left hemidiaphragm is obscured. Clear right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

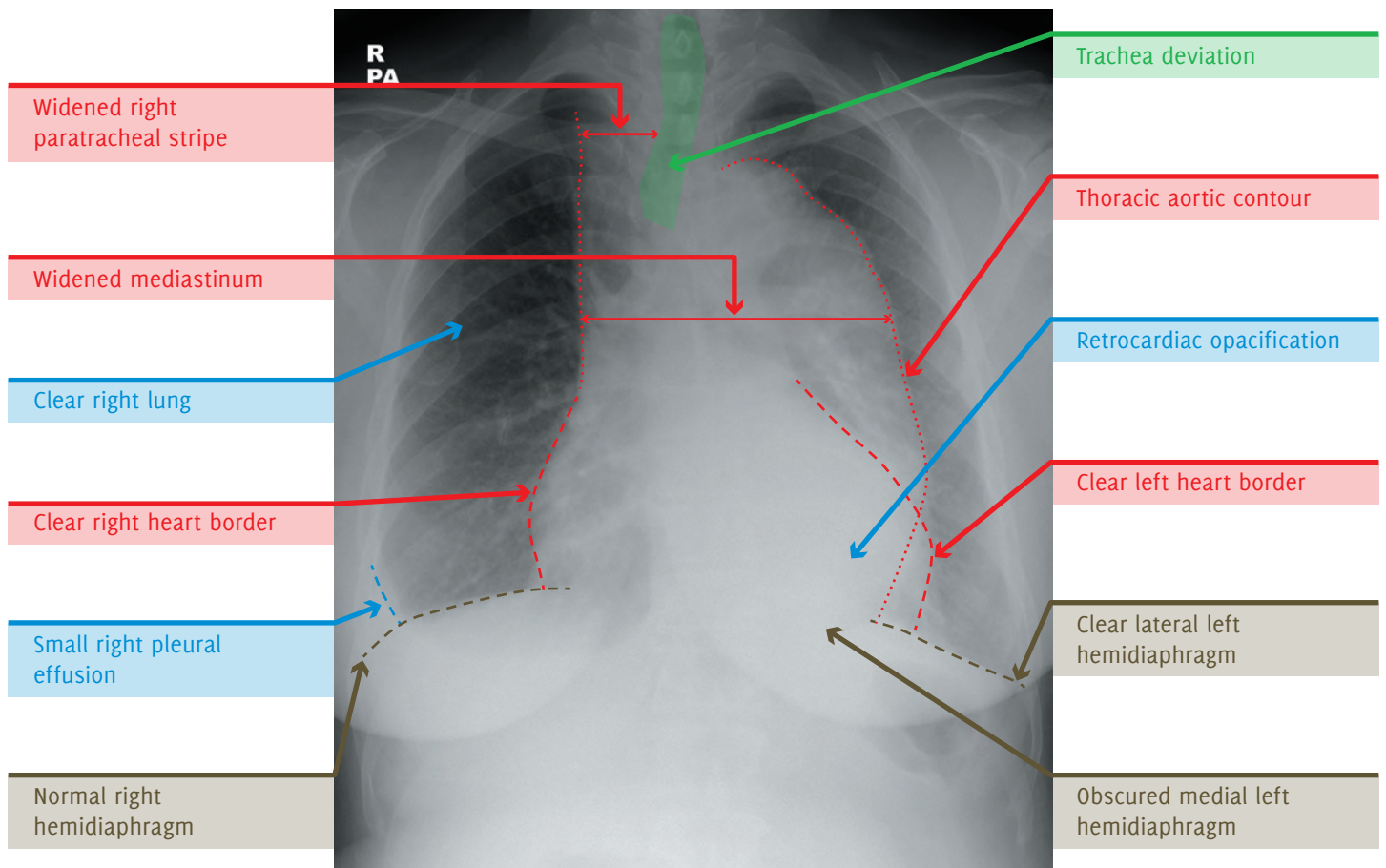
Lung Apices: Normal

Hila: Normal

Behind Heart: Left retrocardiac opacification

Costophrenic Angles: Right blunting in keeping with small effusions

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray shows widening of the mediastinum/thoracic aorta with a small right pleural effusion. Given the history aortic dissection is an important differential. The increased left retrocardiac opacification may be caused by the dissection or possible concomitant consolidation.

The patient requires urgent resuscitation using an ABCDE approach, with oxygen therapy and a fluid bolus given in the first instance.

Any previous imaging needs to be reviewed to assess whether this is a new finding. If it is, a CT of the aorta (non-contrast

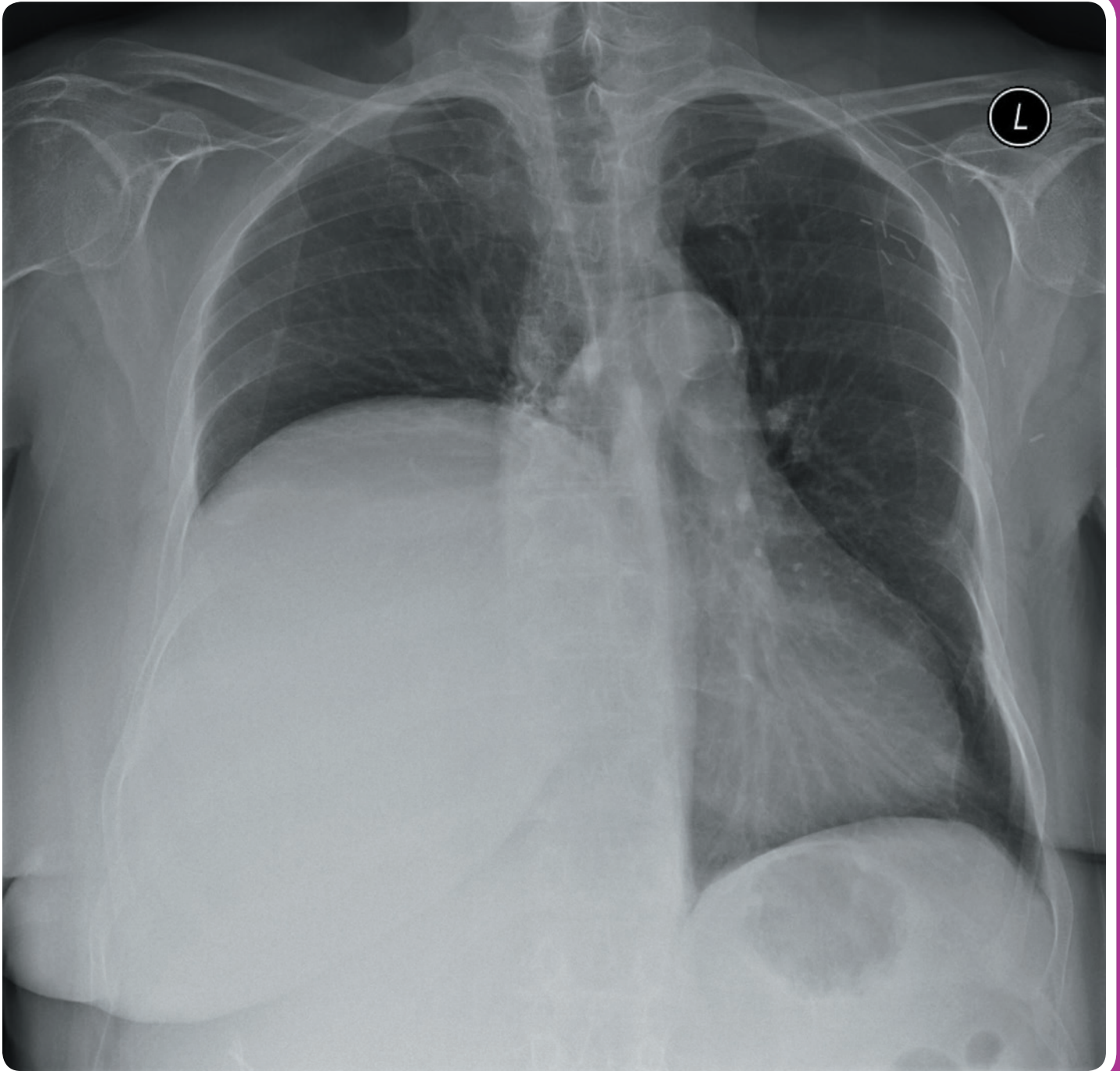
and arterial phases) should be performed to assess for an aortic dissection.

Management depends on the location and extent of dissection. Urgent discussion with cardiothoracic surgery and interventional radiology is required.



CASE 46

A 75 year old female presents to ED with lethargy, shortness of breath and a cough. She has a background of breast cancer, treated with a left-sided mastectomy and axillary node clearance 8 years ago. She is a non-smoker. On examination, she has saturations of 93% in air and is afebrile. Her RR is 20 with a HR of 90 bpm. There is dullness to percussion and reduced air entry in the right middle and lower zones. A chest X-ray is requested to assess for possible pneumonia, an effusion or collapse.



REPORT – ELEVATED RIGHT HEMIDIAPHRAGM

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The upper trachea is central allowing for patient rotation. The lower trachea is displaced to the left.

BREATHING

There is a homogenous opacity projected over the right mid and lower zones. This has a convex superior border and is consistent with elevation of the right hemidiaphragm. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is displaced to the left. The right heart border is difficult to identify but the heart does not appear enlarged. The left heart border is clear.

The aorta appears normal.

The mediastinum is displaced to the left. It is not widened and has clear borders.

The right hilum is obscured. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

The right hemidiaphragm is significantly elevated, causing mediastinal shift to the left. Normal appearance and position of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

There has been a previous left-sided mastectomy. The visible soft tissues are otherwise unremarkable.

EXTRAS + REVIEW AREAS

There are multiple surgical clips projected over the left axilla consistent with previous axillary nodal clearance.

No vascular lines or tubes.

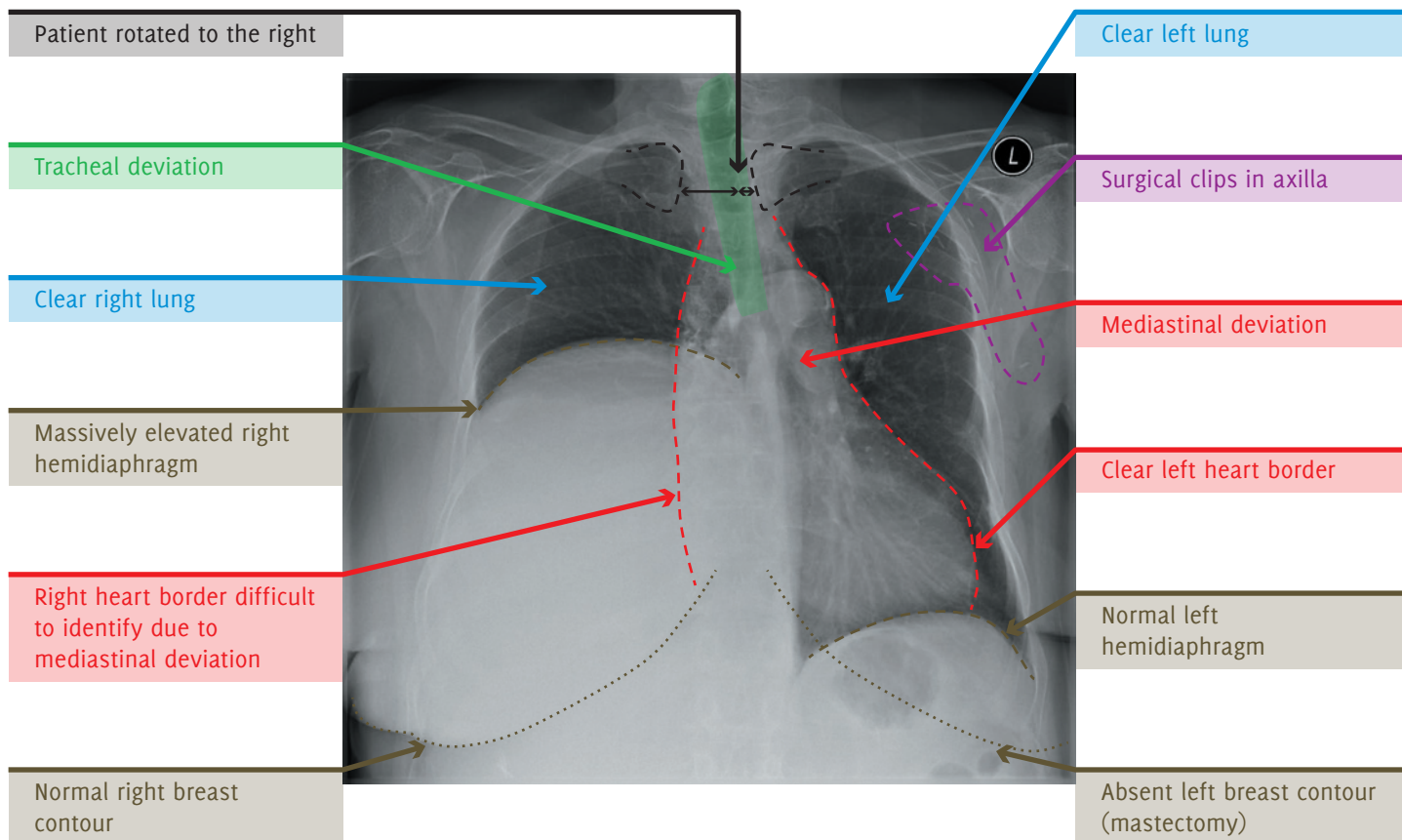
Lung Apices: Normal

Hila: The right hilum is obscured. Normal left hilum.

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Elevated right hemidiaphragm



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a markedly elevated right hemidiaphragm with mass effect on the right lung and mediastinum. This patient has had a previous left mastectomy and left axillary nodal clearance for breast malignancy.

The differential diagnoses for a raised right hemidiaphragm include mediastinal lymph node disease affecting the right phrenic nerve or multiple large liver metastases causing superior displacement of the diaphragm.

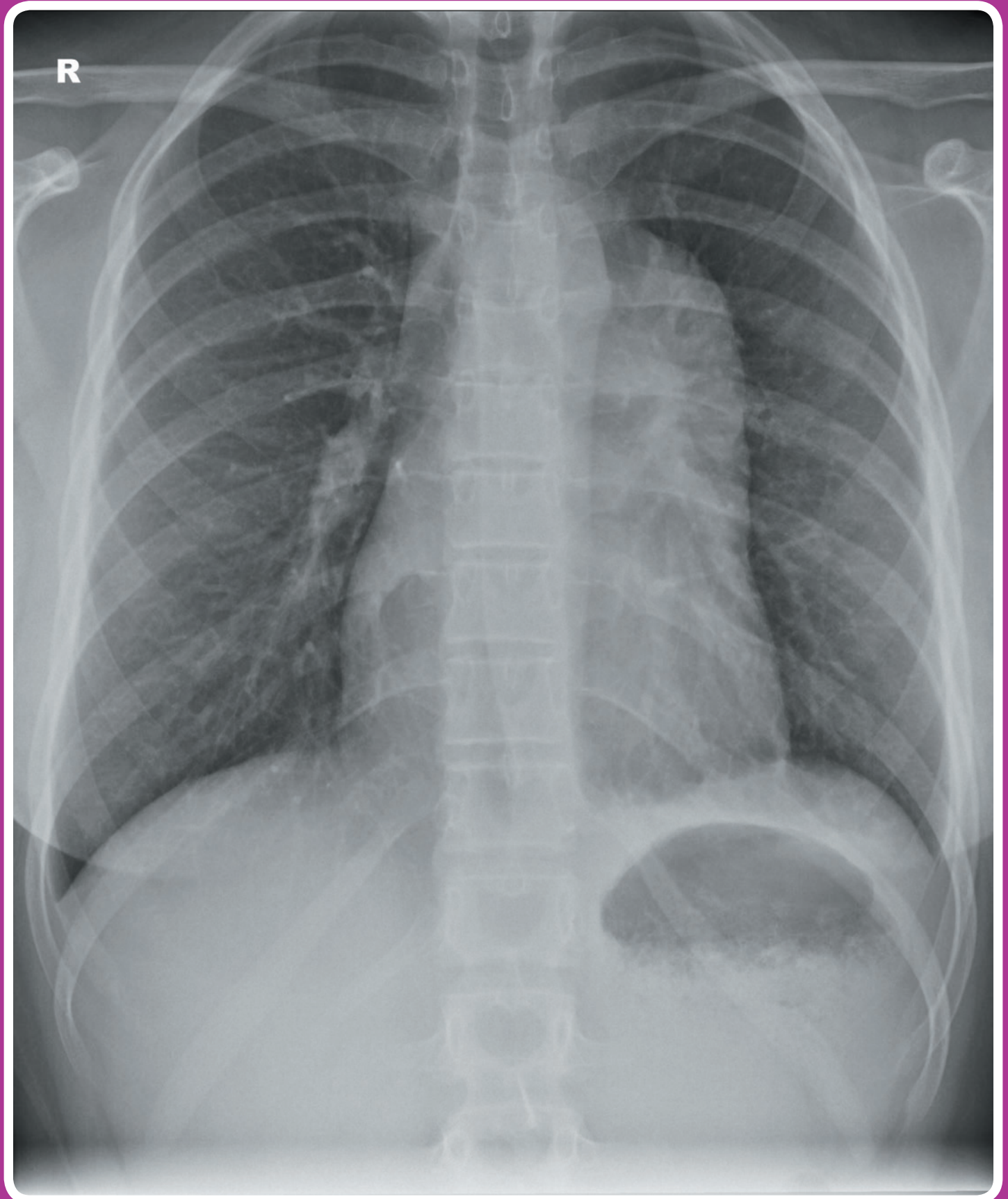
Previous imaging should be reviewed to ensure this is not a longstanding finding. Initial blood tests may include FBC, U/Es, LFTs, and bone profile.

A contrast-enhanced CT of the chest, abdomen and pelvis is required to identify the underlying cause and restage the tumour. The patient should be referred to oncology.



CASE 47

A 25 year old female presents to her GP with worsening shortness of breath. There is no significant past medical history and she is a non-smoker. On examination, she has saturations of 98% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry and occasional wheeze. A chest X-ray is requested to assess for possible pneumonia, collapse, or pleural effusions.



REPORT – ANTERIOR MEDIASTINAL MASS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is slightly deviated to the right.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

There is a left-sided mediastinal mass, which is continuous with the left heart border. The left hilar structures can be seen through the mass (hilum overlay sign), indicating that the mass is not in the middle mediastinum. The aortic knuckle and descending thoracic aorta are also visible through the mass, and thus the mass is not in the posterior mediastinum.

The heart is not enlarged.

The right heart border is clear.

The aorta appears normal.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

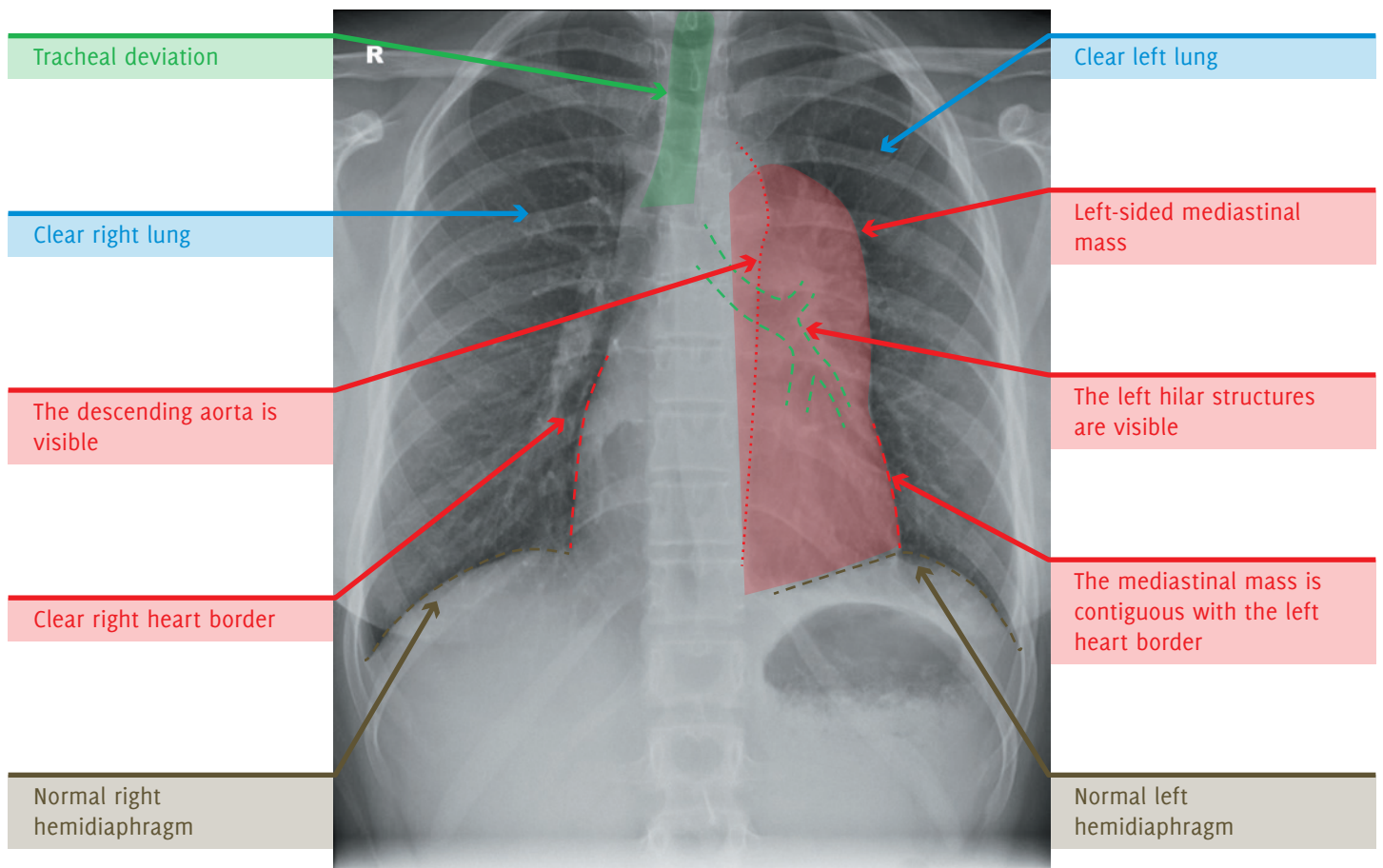
Lung Apices: Normal

Hila: Normal (Left hilum overlay sign)

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a left-sided mediastinal mass. Loss of the left heart border indicates involvement of the anterior mediastinal compartment. The left hilum and descending thoracic aorta are visible separate to the mass, indicating the middle and posterior compartments are spared. The differentials includes lymphoma, thyroid malignancy, thymoma (although usually in older patients), and teratoma.

A full examination to assess for lymph node enlargement should be undertaken. Initial blood tests may include FBC, U/Es, LFTs, bone profile, and TFTs.

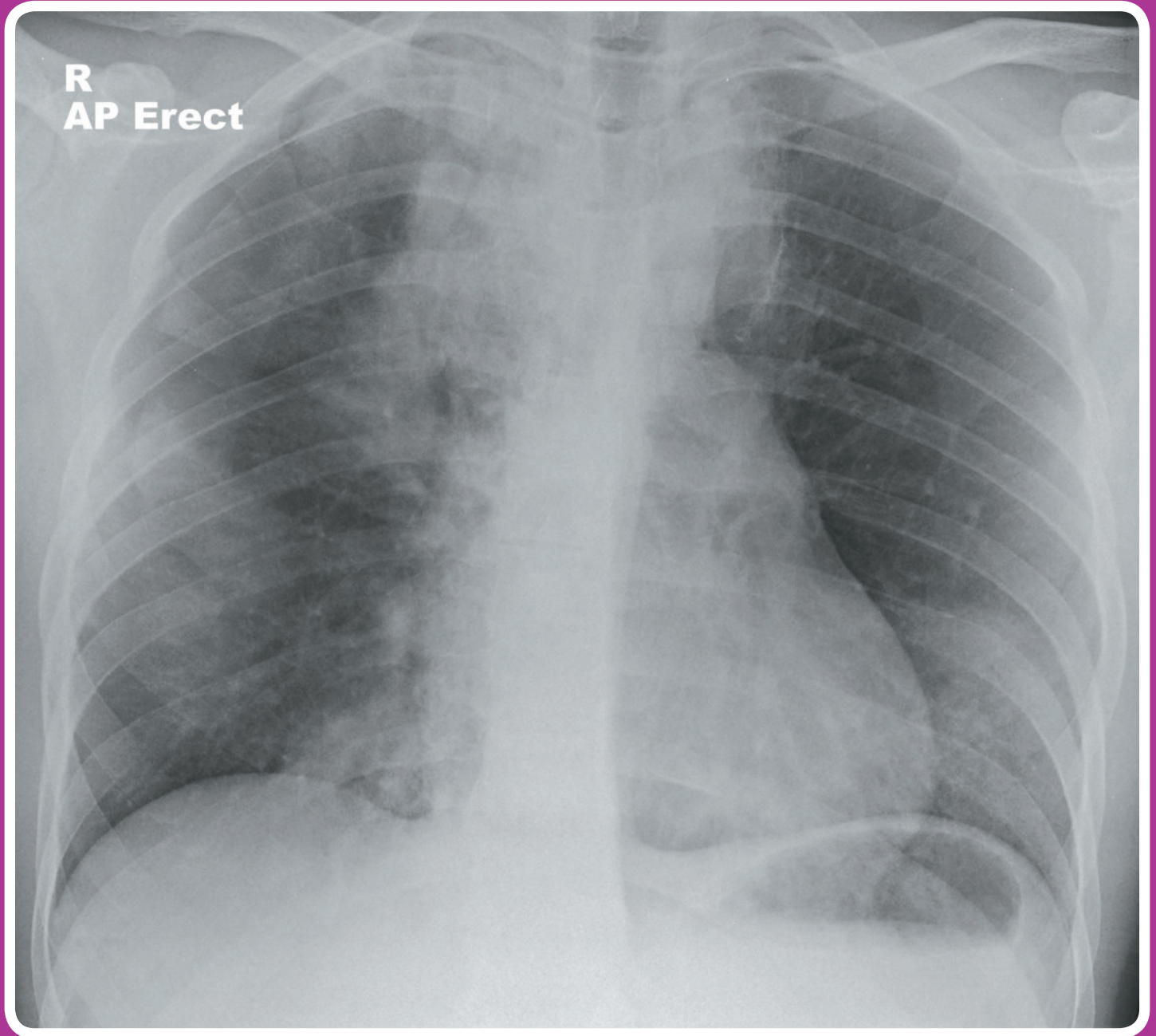
Further imaging in the form of contrast enhanced CT of the chest should be performed. If lymphoma is suspected then the neck, abdomen, and pelvis should also be included in the CT. A CT-guided anterior mediastinal mass biopsy may be required for a histological diagnosis.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 48

A 34 year old male presents to ED after colliding with a truck whilst riding a bike. He has severe chest pain. There is no significant past medical history. He is a non-smoker. On examination, he has saturations of 85% in air and is afebrile. His RR is 25, HR is 100 bpm and BP is 90/60 mmHg. There are crackles in both lungs. A chest X-ray is requested to assess for possible pneumothoraces and any other evidence of thoracic injury.



REPORT – PULMONARY CONTUSIONS PLUS PNEUMOTHORAX

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There are multiple areas of airspace opacification (medially in the right upper and lower zones, peripherally in the right mid zone, and in both lower zones) in keeping with consolidation.

A lung edge is visible in the right upper and mid zones with no lung markings seen beyond it, consistent with a small to moderate pneumothorax. There is a thin lucency projected over the posterior aspect of the 2nd left rib which may represent a

tiny left apical pneumothorax. No pleural effusion/haemothorax.

The lungs are not hyperinflated.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The right heart border is slightly indistinct, while the left heart border is clear.

The aorta is difficult to assess.

The superior mediastinum appears widened, although this is difficult to assess given the projection. There is increased associated density.

The right hilum is partially obscured by consolidation. Normal size, shape, and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

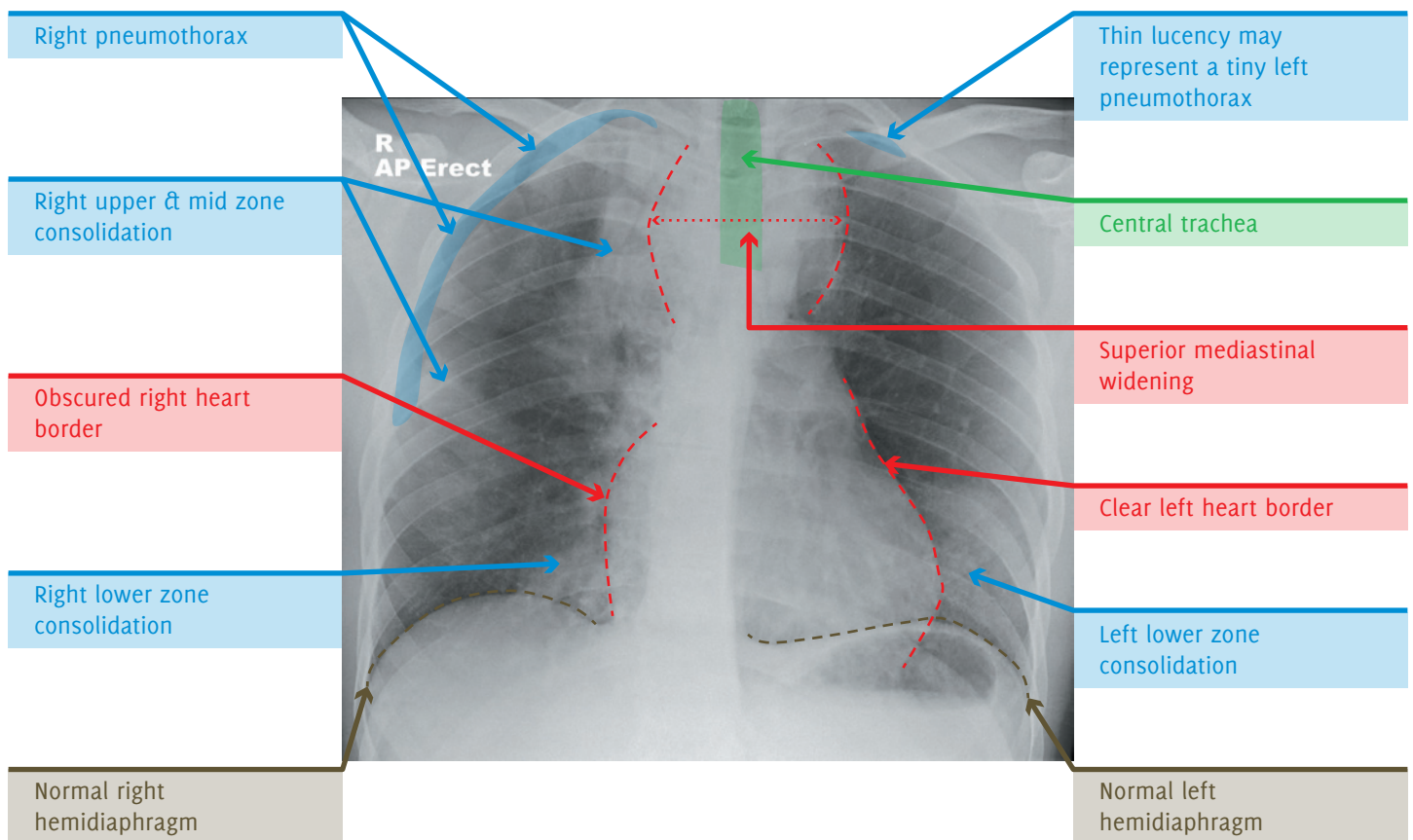
Lung Apices: Right apical pneumothorax and consolidation. Possible tiny left apical pneumothorax.

Hila: Partially obscured right hilum. Normal left hilum.

Behind Heart: Bilateral lower zone consolidation

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates multifocal consolidation, which in the context of trauma is in keeping with pulmonary contusions. There is a small to moderate right apical pneumothorax, and possibly a tiny left apical pneumothorax. The widened mediastinum with possible tracheal deviation is suspicious for mediastinal haematoma.

The patient needs to be assessed and resuscitated using the ATLS algorithm. Initial urgent bloods include FBC, U/Es, and cross match.

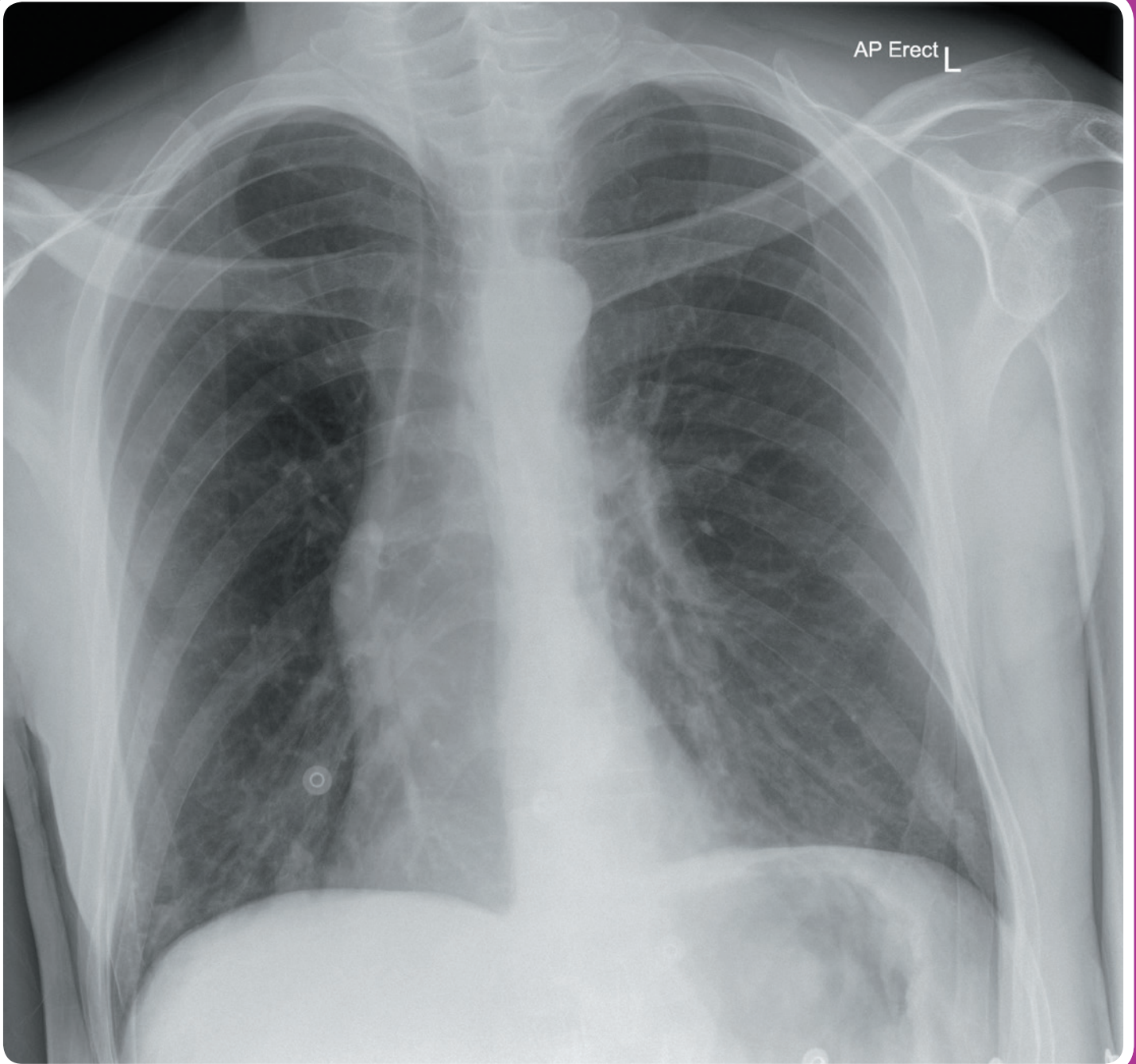
IV fluids and supplementary oxygen should be given. A low threshold for re X-raying of the chest and insertion of an intercostal drain should be applied should there be a deterioration.

Early CT scanning of the chest, plus any other areas of concern (e.g. head, cervical spine, abdomen and/or pelvis) should be considered. The patient should be urgently referred to the cardiothoracic surgeons.



CASE 49

A 43 year old male presents to ED after being found lying on the pavement by a passerby. The patient is confused, has a cough, and has left-sided chest pain. There is no significant past medical history. He is a non-smoker. On examination, he has saturations of 99% in air and is afebrile. His RR is 22 with a HR of 90 bpm. Lungs are resonant throughout with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia.



REPORT – CLAVICLE FRACTURE

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is projected to the right of the midline, which is likely due to patient rotation.

BREATHING

The lungs are clear. The right hemithorax appears radiolucent compared to the left, which is likely due to patient rotation.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is projected to the right of the midline, due to patient rotation. It is not widened and its visible borders are clear.

Normal size, shape and position of both hila, allowing for patient rotation.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

There is a minimally displaced fracture through the lateral third of the left clavicle. The AC joint appears intact, although this is a non-dedicated view. No other fractures or bony changes. The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG electrodes in situ. No vascular lines, tubes, or surgical clips.

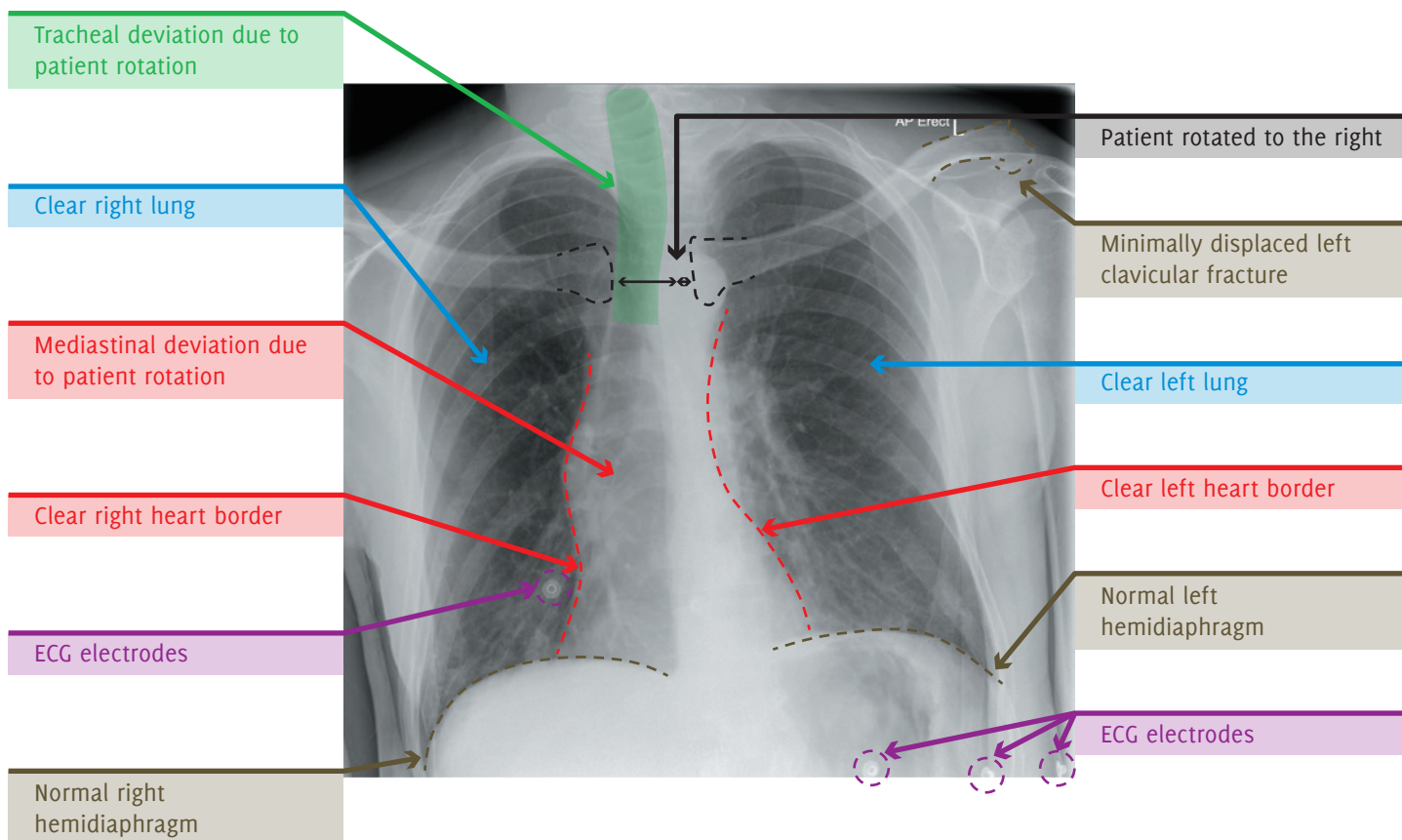
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a minimally displaced fracture of the lateral left clavicle. The patient is significantly rotated to the right. Allowing for this the lungs and mediastinal structures are normal.

Dedicated views of the left AC joint would be useful to ensure no AC joint disruption. A broad arm sling should be applied to manage the clavicular fracture.

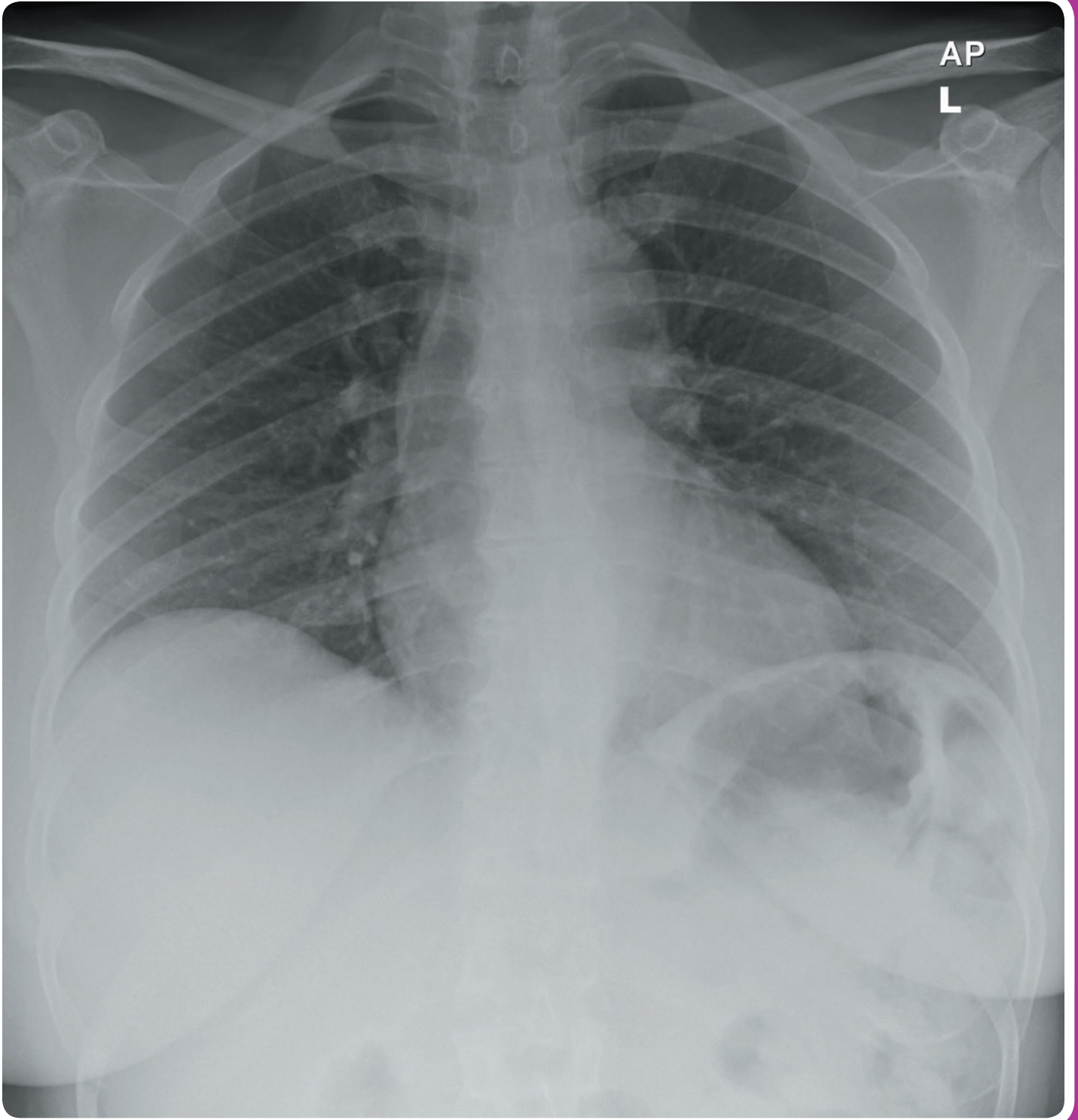
Initial blood tests may include FBC, U/Es, and CRP. A urine dipstick may also be helpful to assess for causes of confusion.

If clinical suspicion remains about a lung pathology, a repeat well-centred chest X-ray should be performed.



CASE 50

A 45 year old female presents to ED with right-sided pleuritic chest pain and breathlessness. She has no significant past medical history and is a non-smoker. On examination, she has saturations of 91% in air and is afebrile. There is increased resonance in the right upper zone, with reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.



REPORT – APICAL PNEUMOTHORAX

Patient ID: Anonymous
Projection: AP
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Limited - 5 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is slightly deviated to the right.

BREATHING

There is a subtle line in the right apex beyond which no lung markings are visible, consistent with a small pneumothorax.

The lungs are clear. The left lung is not hyperinflated.

The left-sided pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

There is minor unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

Thoracic vertebral osteophytes are visible. The imaged skeleton is otherwise intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable. Of note, there is no surgical emphysema.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

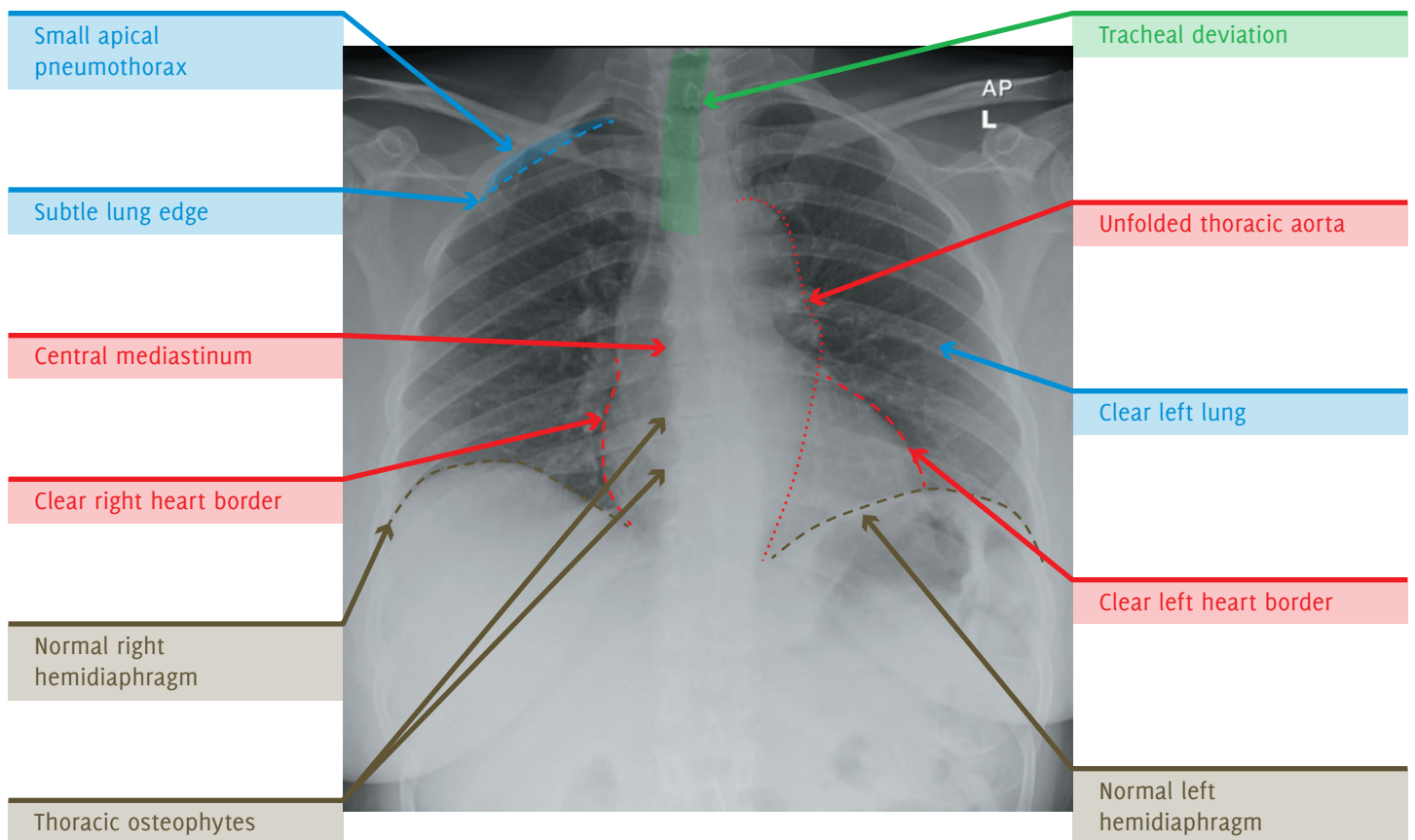
Lung Apices: Small right apical pneumothorax. Normal left apex.

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

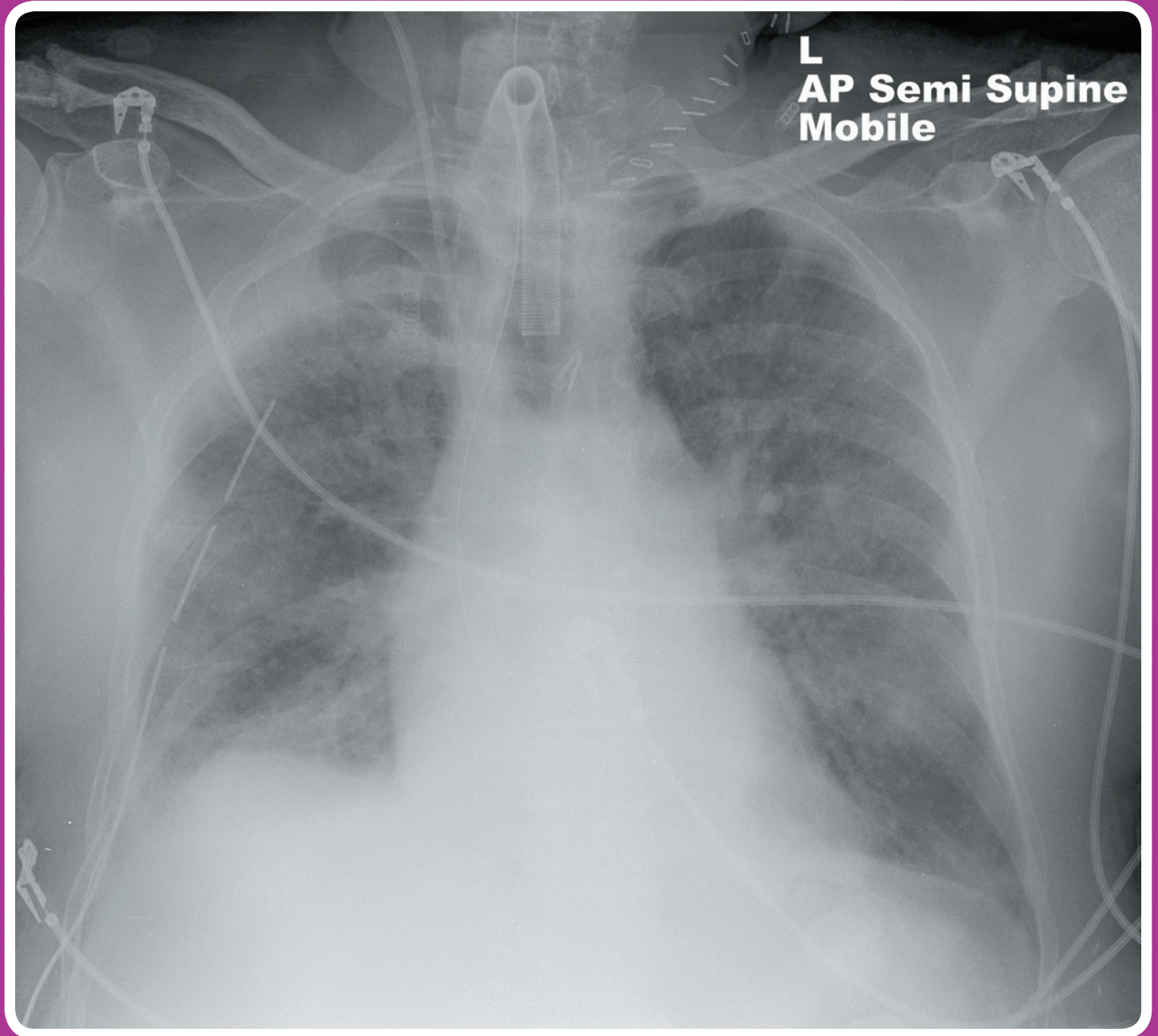
This X-ray demonstrates a small right apical pneumothorax. There is no mediastinal shift or flattening of the right hemidiaphragm to suggest a tension pneumothorax (the tracheal deviation may be related to unfolding of the thoracic aorta). No rib fracture is visible.

Management of a symptomatic small primary pneumothorax involves admission for supplementary oxygen, analgesia, and monitoring. Active intervention is usually not required. It may be possible to discharge them quickly if the oxygen saturations improve. The patient should have a follow up chest X-ray to ensure resolution.



CASE 51

A 50 year old male is in the Intensive Care Unit following an oesophagectomy, for oesophageal cancer. Over the last 24 hours he has become increasingly difficult to ventilate through his tracheostomy. A chest X-ray the previous day to assess line position showed clear lungs. A further chest X-ray is requested to look for possible reasons for this deterioration such as pneumonia or a pneumothorax.



REPORT – ACUTE RESPIRATORY DISTRESS SYNDROME

Patient ID: Anonymous
Projection: Portable AP Semi Supine
Penetration: Slightly underpenetrated – vertebral bodies not visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is diffuse heterogeneous airspace opacification throughout both lungs. Bilateral interstitial opacification is also present.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged, even allowing for the magnification caused by the AP projection.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

The lateral aspect of the right hemidiaphragm is partially obscured by consolidation. Normal appearance and position of the left hemidiaphragm.

No pneumoperitoneum visible, although this is difficult to assess on a semi supine X-ray.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

Tracheostomy in situ, with its tip projected above the carina. An external device, likely

related to the ventilator, is also visible. The tip of the right internal jugular line is projected over the mid SVC level. NG tube in situ, although the position of its tip is difficult to identify. Right intercostal chest drain, the tip of which is projected over the right upper zone.

ECG monitoring leads in situ.

There are surgical clips projected over the mediastinum and extending from the sternoclavicular joint up towards the neck in keeping with the recent surgery.

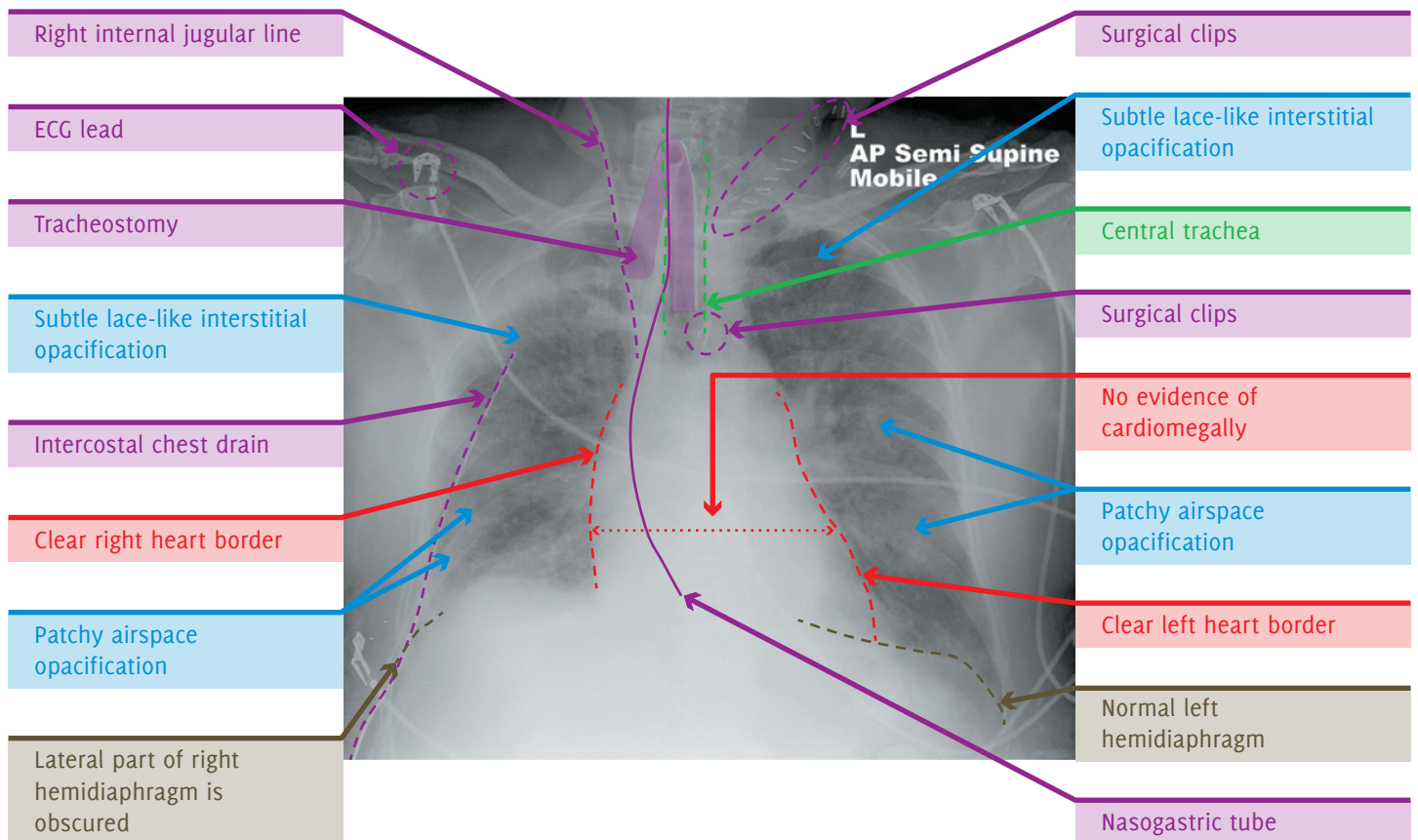
Lung Apices: Interstitial opacification of the lung apices

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Consolidation at right costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

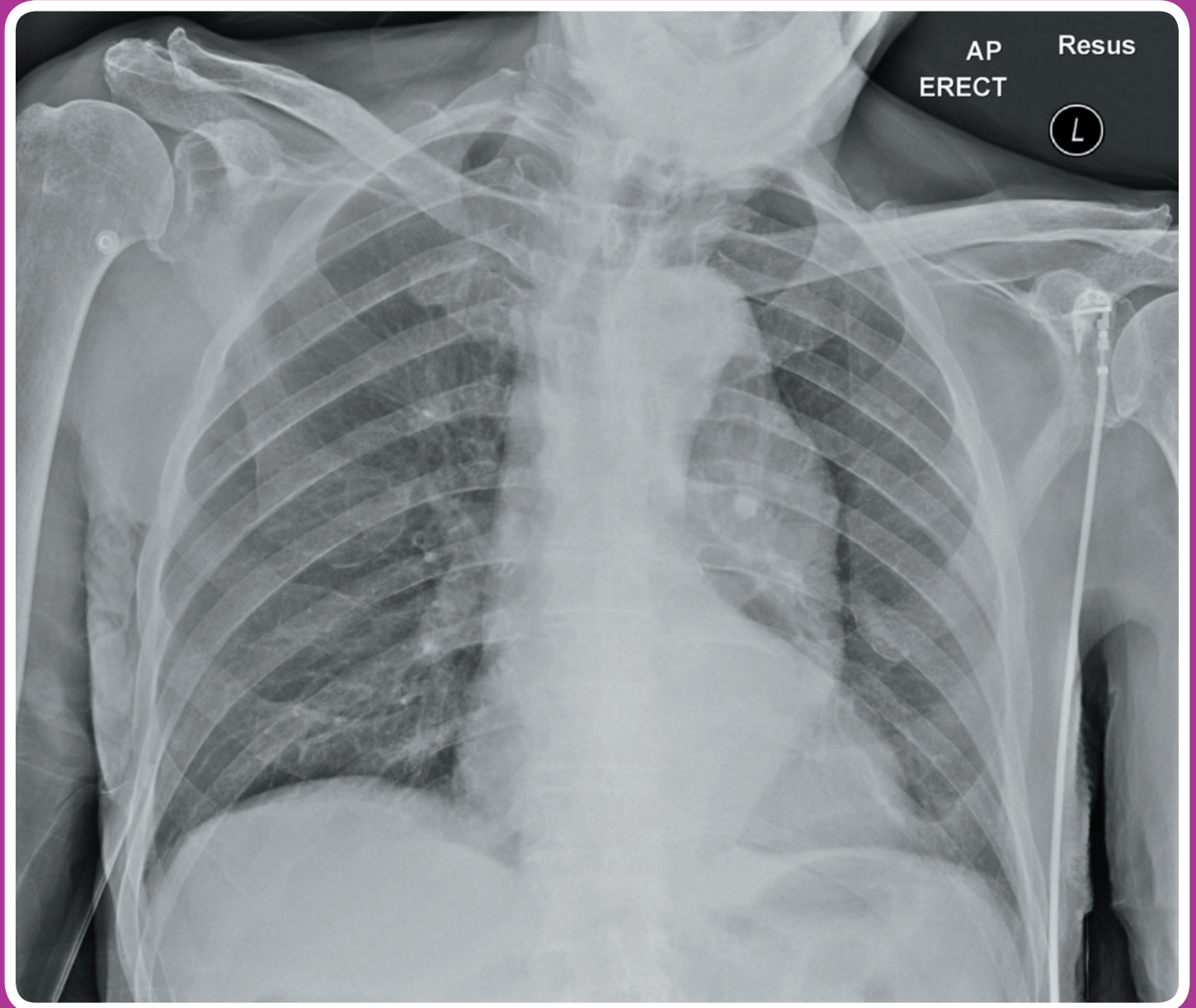
This X-ray demonstrates patchy airspace consolidation and interstitial opacification. The differential diagnosis includes ARDS, pulmonary oedema and atypical/severe pneumonia. Considering the rapid appearance of the changes, the distribution of findings, the recent surgery and the lack of cardiomegaly or pleural effusions, ARDS is the most likely diagnosis.

The patient needs supportive care including ventilator support. The patient's oxygenation and ventilation status should be monitored with regular arterial blood gas sampling. Initial blood tests may include FBC, U/Es, and CRP. Antibiotics should be given if infection is suspected or confirmed. An ECHO may be useful to assess left ventricular function. Serial chest X-rays should be performed to assess response to treatment.



CASE 52

A 50 year old male presents to ED with severe central chest pain and breathlessness. There is no significant past medical history and he is a non-smoker. On examination, he has saturations of 88% in air and is afebrile. Lung fields are resonant throughout with good bilateral air entry. He is hypotensive and has asymmetrical blood pressure recordings in the left and right arms. There is a diastolic murmur. A chest X-ray is requested to assess for possible pulmonary oedema, aortic dissection, pneumonia, collapse, or pleural effusions.



REPORT – AORTIC DISSECTION

Patient ID: Anonymous
Projection: AP erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs seen
Rotation: The patient is rotated to the left

AIRWAY

The upper trachea is central after factoring in patient rotation. The lower trachea is displaced to the right by the aorta.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears widened.

The mediastinum is central, but widened. It has clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fracture or destructive bony lesion visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

Two ECG monitors are visible.

No vascular lines, tubes, or surgical clips.

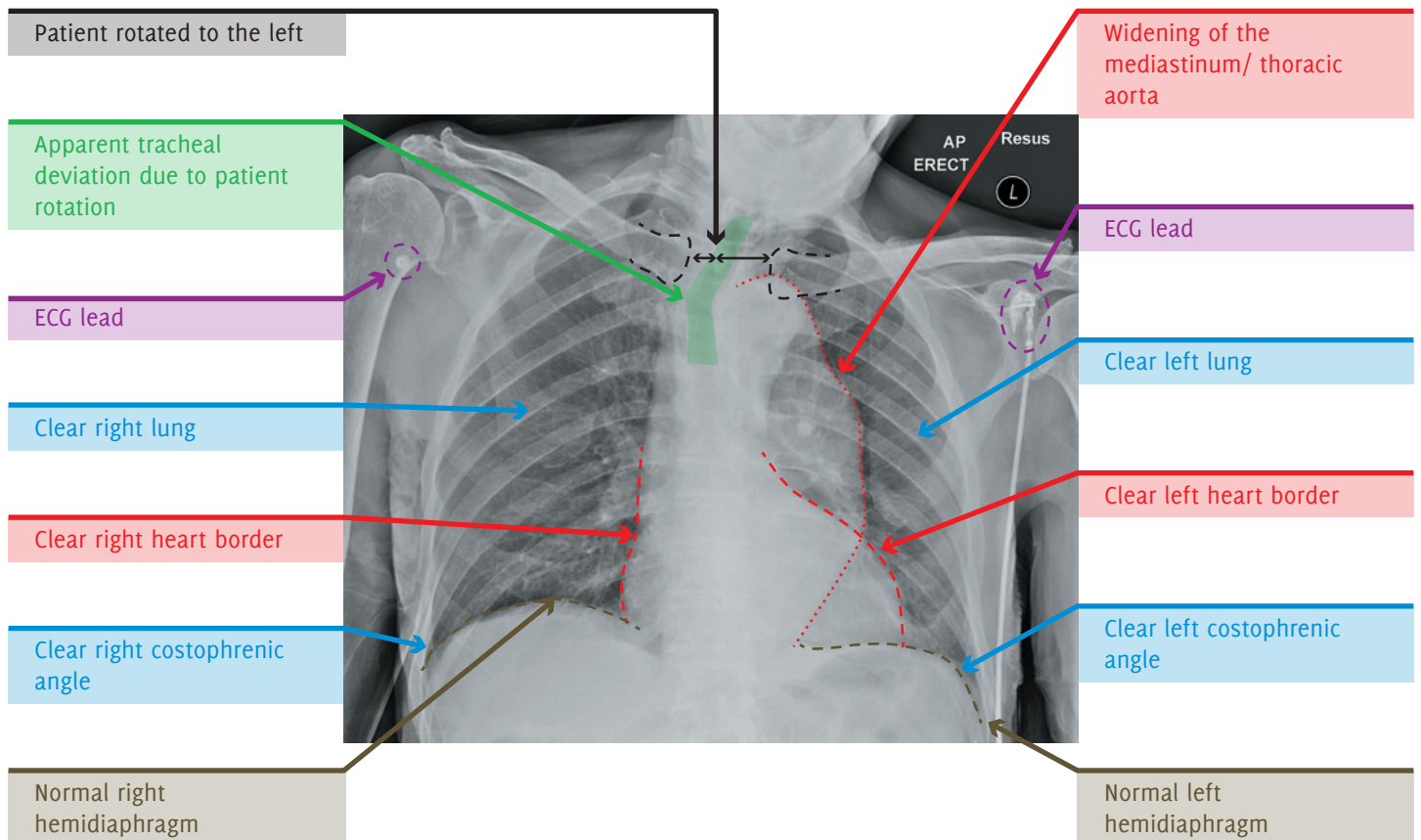
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates apparent widening of the mediastinum/thoracic aorta. This appearance may be related to the AP projection and unfolding of the thoracic aorta, but given the history, there should be a high index of suspicion for an aortic dissection.

The patient requires urgent resuscitation using an ABCDE approach, with oxygen therapy and a fluid bolus given in the first instance.

Any previous imaging needs to be reviewed to assess whether this is a new finding. If it is, a CT of the aorta (non-contrast

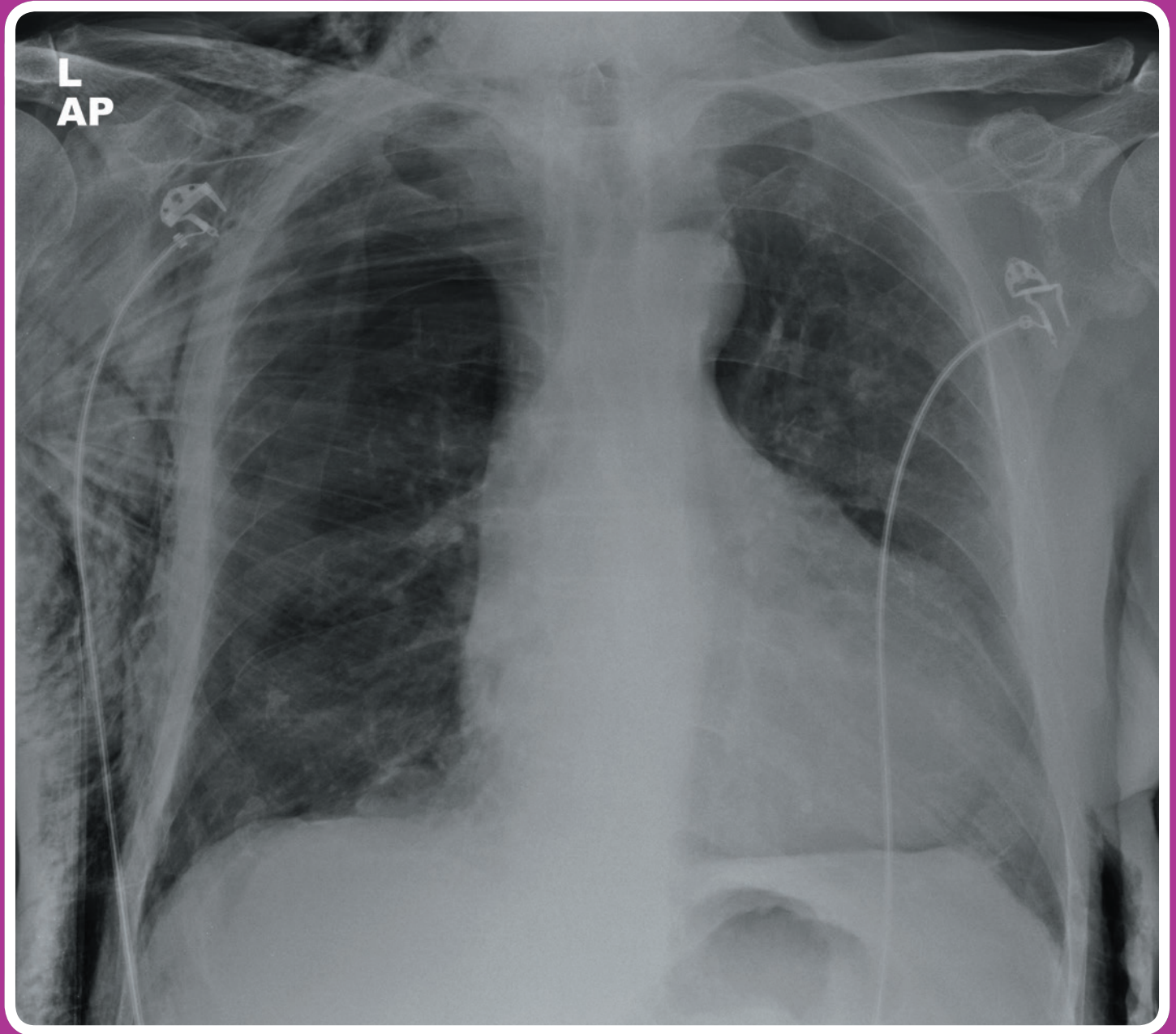
and arterial phases) should be performed to assess for an aortic dissection.

Management depends on the location and extent of dissection. Urgent discussion with cardiothoracic surgery and interventional radiology is required.



CASE 53

A 51 year old male presents to ED after falling down the escalators at the underground station. He is in severe pain and is breathless. He has no significant past medical history. He is a non-smoker. On examination, he has saturations of 86% in air and is haemodynamically stable. There is increased resonance in the right hemithorax and reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.



REPORT – TRAUMATIC PNEUMOTHORACES

Patient ID: Anonymous
Projection: AP
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

A lung edge is visible in the right hemithorax, beyond which no lung markings are seen, consistent with a pneumothorax. In the left apex another curvilinear line is visible, with no lung markers beyond it, representing a second pneumothorax.

The lungs are otherwise clear.

Normal pulmonary vascularity.

CIRCULATION

The heart size cannot be accurately assessed due to the AP projection. The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

There are extensive streaky, linear lucencies projected over the right axilla, chest wall and neck, consistent with surgical emphysema.

EXTRAS + REVIEW AREAS

ECG monitoring leads in situ. No vascular lines, tubes, or surgical clips.

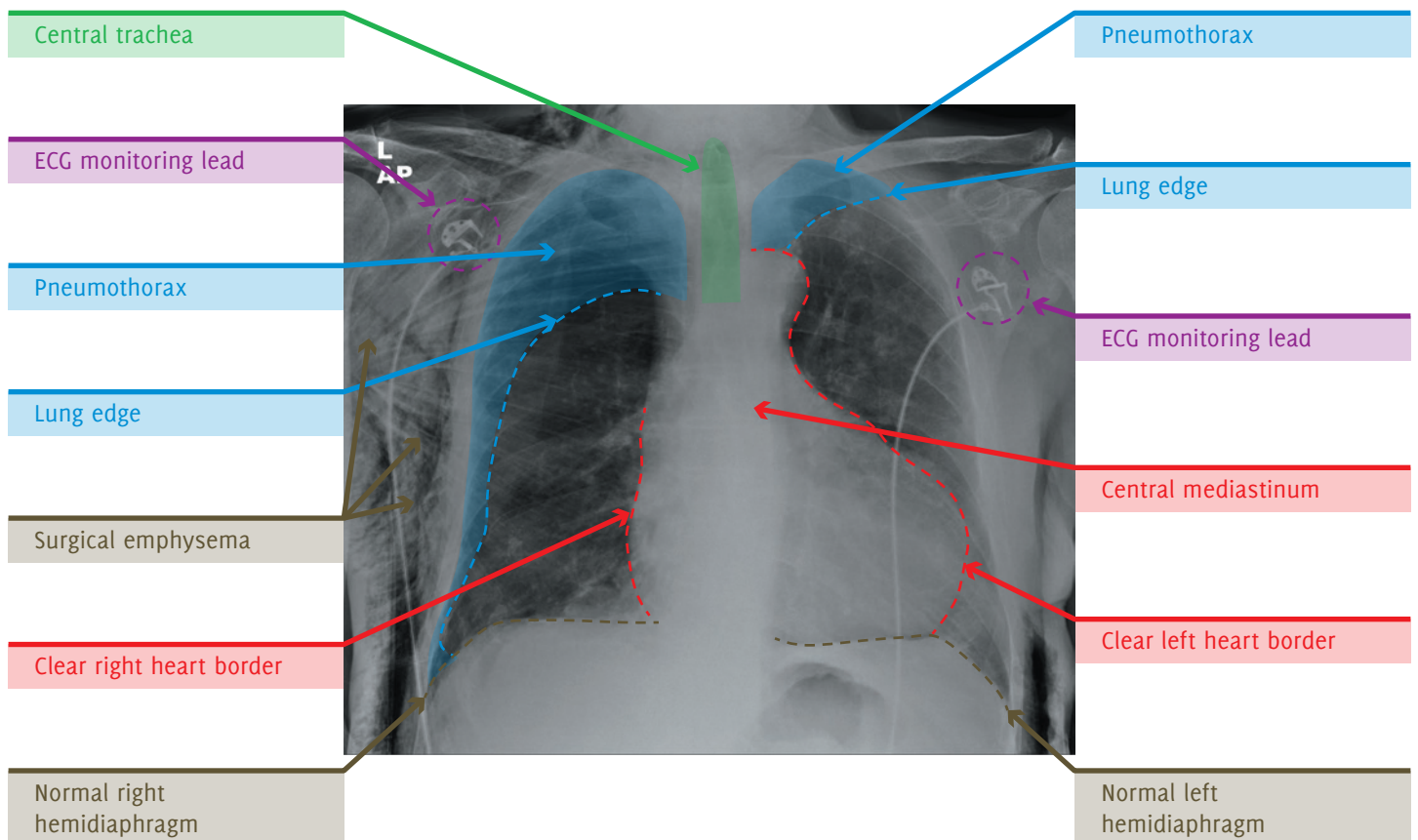
Lung Apices: Bilateral apical lucencies consistent with pneumothoraces

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large, traumatic, right-sided pneumothorax associated with extensive right-sided surgical emphysema. There should be a high suspicion for an underlying rib fracture even though none are visible on the chest X-ray. There is no evidence of associated haemothorax.

A smaller left apical pneumothorax is also visible.

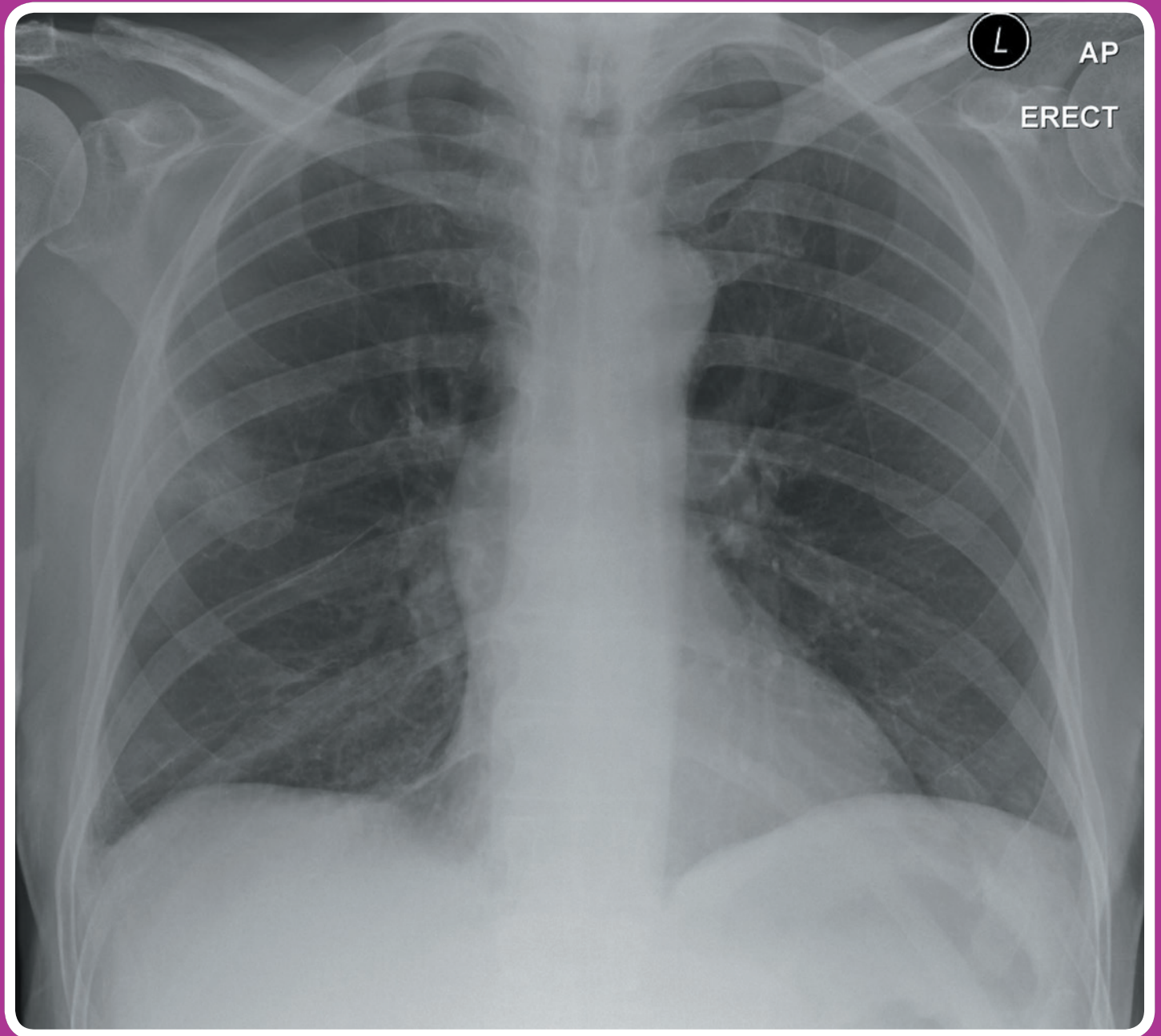
The patient needs to be assessed and resuscitated using the ATLS algorithm. Cardiothoracic surgery should be involved and bilateral chest drains will be required.

Imaging with contrast-enhanced CT will provide more accurate assessment of the thoracic injuries (pneumothoraces, surgical emphysema, rib fractures and lung parenchymal/mediastinal injuries). Other parts of the body (head, cervical spine, abdomen or pelvis) can also be imaged with CT depending on the clinical assessment.



CASE 54

A 54 year old male presents to his GP with weight loss, worsening shortness of breath, and a chronic cough. He has COPD and a 60 pack year smoking history. On examination, he has saturations of 94% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry. A chest X-ray is requested to assess for worsening COPD changes or malignancy.



REPORT – LUNG MASS

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is a peripheral area of ill-defined opacification in the right mid zone. There is a small subtle nodule at the right costophrenic angle. A further small nodule is present at the left costophrenic angle.

The lungs are otherwise clear.

The lungs are not hyperinflated.

There is minor blunting of the costophrenic angles bilaterally, in keeping with small effusions.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders. There is a well-defined mediastinal bulge to the right side at the level of the right hilum, which is probably vascular in origin.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The anterior aspect of the right 4th rib is difficult to identify. There are osteophytes visible in the thoracic spine. The imaged skeleton is otherwise intact with no fractures or other destructive bony lesions visible. The soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

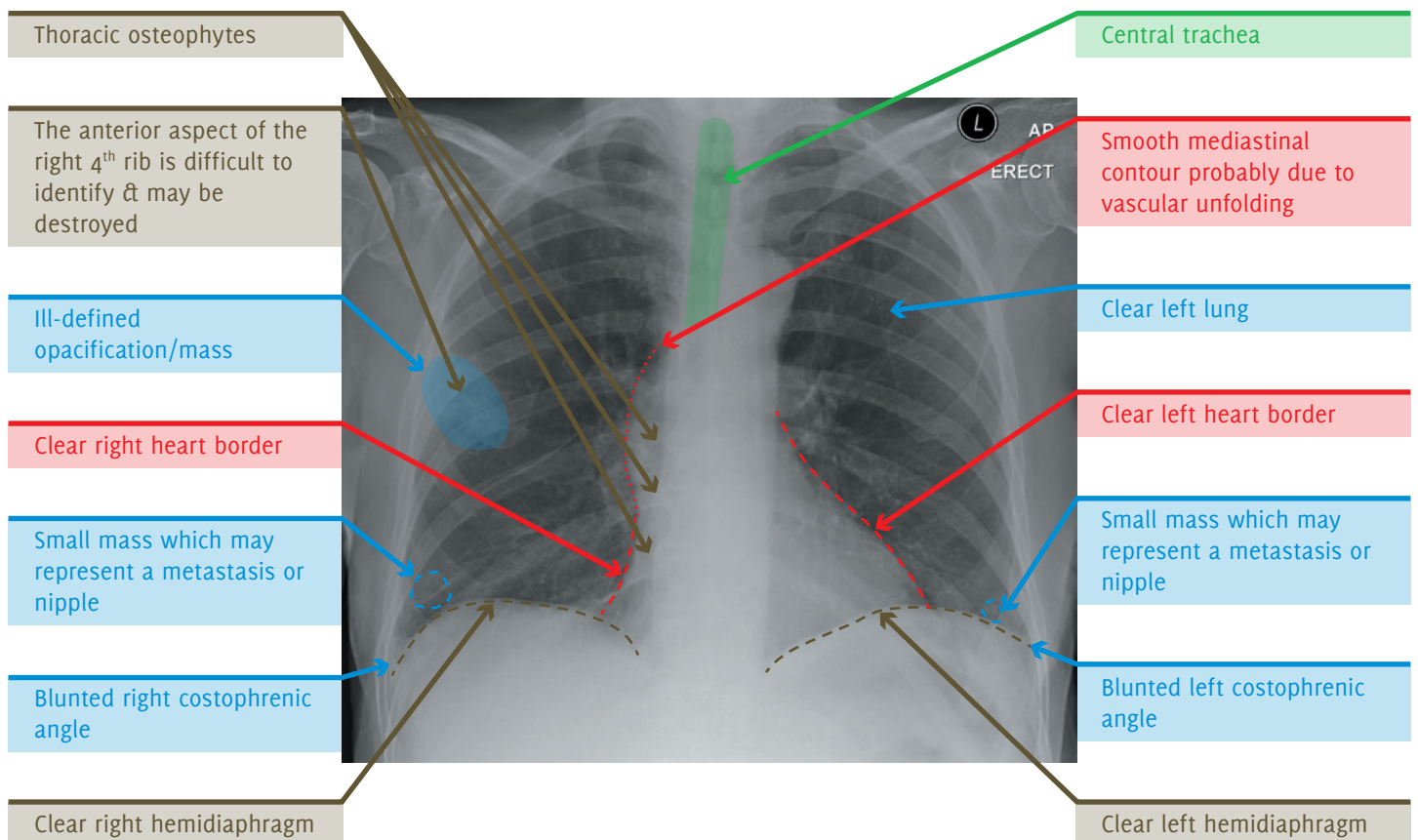
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Bilateral blunting

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates an area of peripheral ill-defined opacification, which may represent consolidation, although given the history of weight loss and a chronic cough in a smoker, a malignant pulmonary mass is an important concern. The overlying right 4th rib is difficult to identify and maybe destroyed. The small masses at the costophrenic angles could represent metastases or nipple shadows. There are small pleural effusions.

Initial blood tests may include FBC, U/Es, CRP, LFTs, & bone profile.

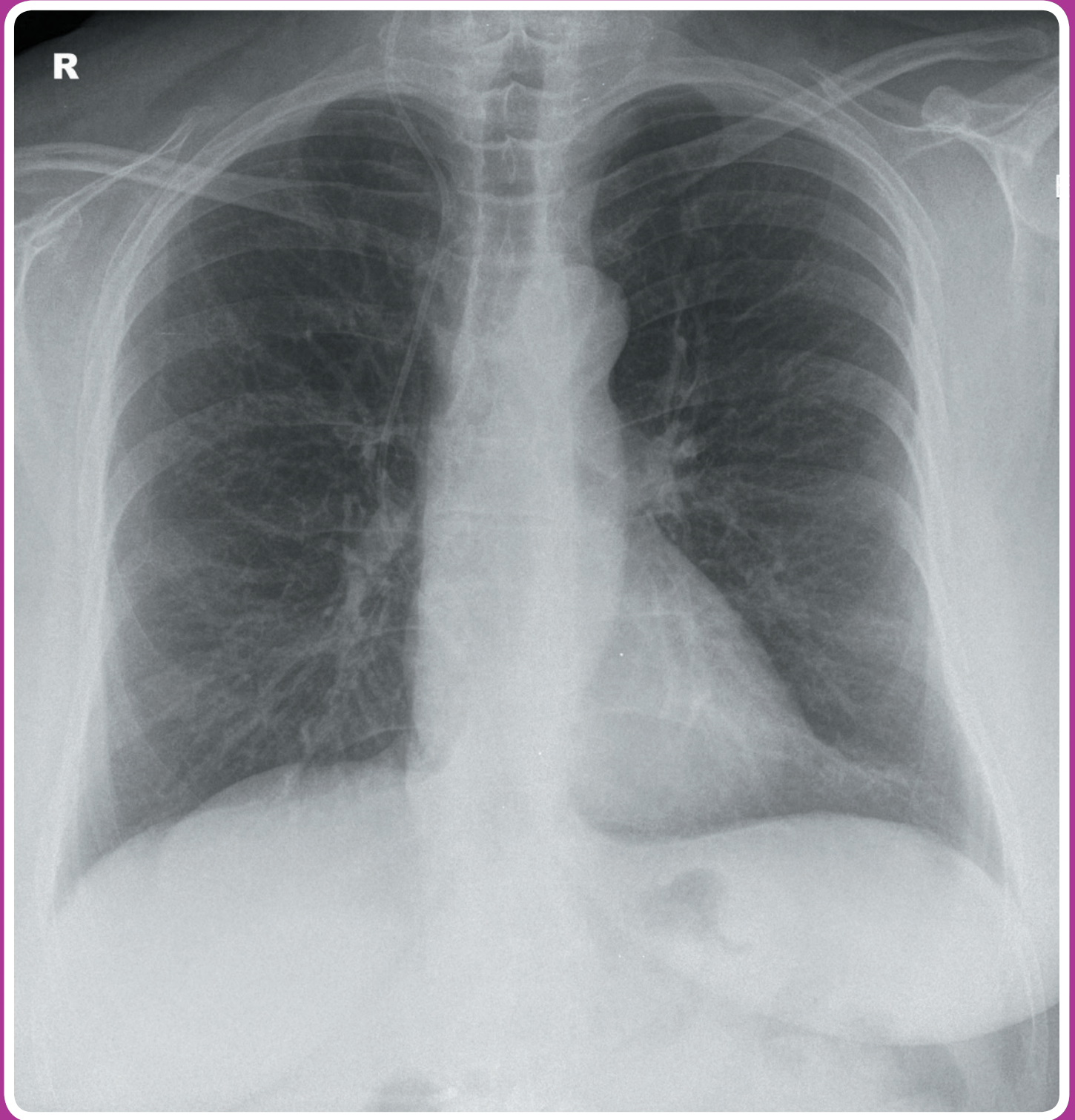
A staging CT chest and abdomen with IV contrast should be performed.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 55

A 55 year old female presents to ED generally unwell with worsening headaches. She has a long history of hydrocephalus. She is a non-smoker. On examination, she has saturations of 90% in air and is afebrile. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia.



REPORT – VENTRICULO-ATRIAL SHUNT

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the diaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There is a line that is projected over the right hemithorax. It runs caudally from the right side of the neck. The distal end of the line appears to be over the right atrium. The line appears intact with no apparent defects.

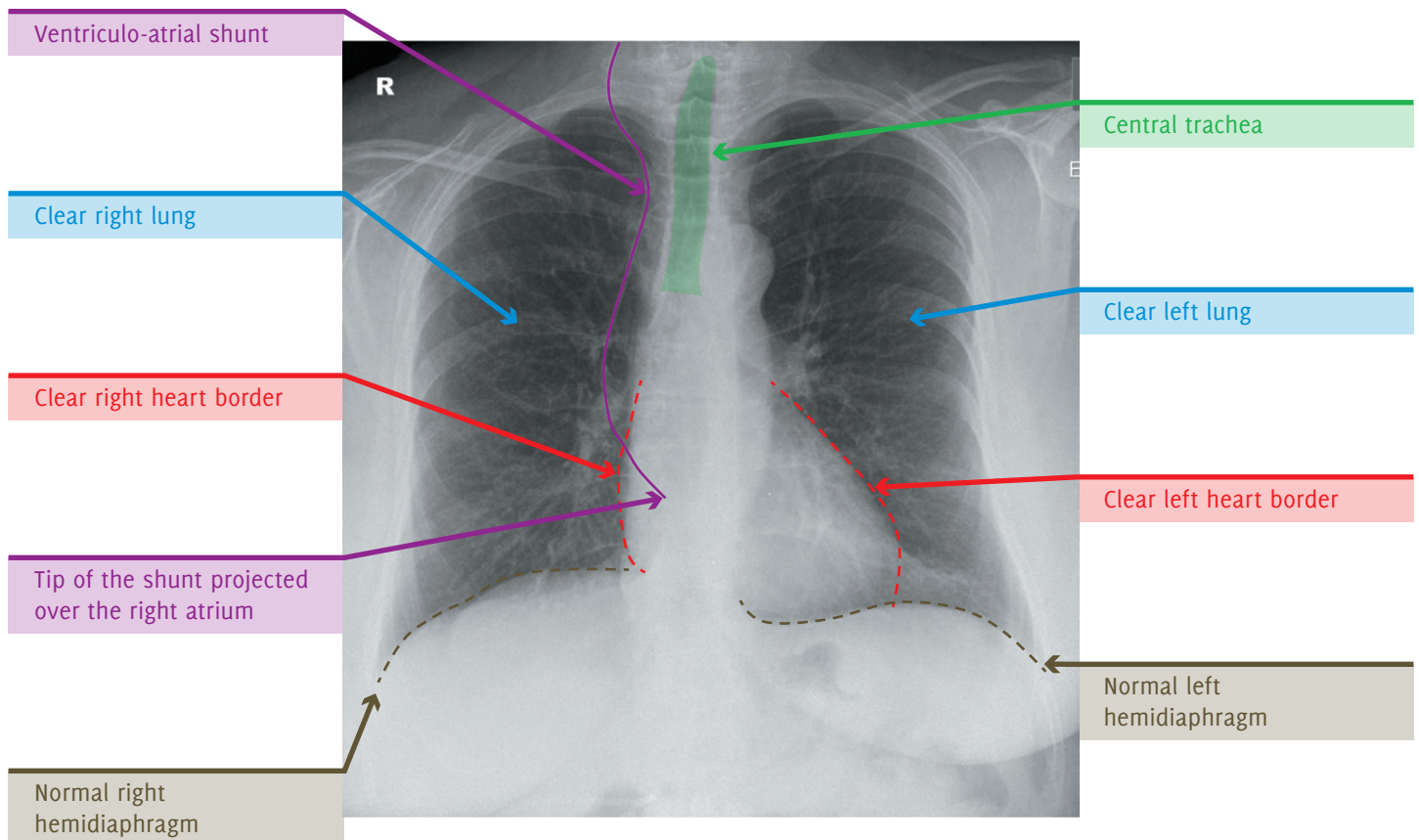
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

In the context of the history, and given the position and course of this line, it is consistent with a ventriculoatrial shunt. The thoracic component appears intact. These lines are usually tunnelled subcutaneously and allow the excess cerebrospinal fluid to drain into the right atrium (as in this case) or peritoneal cavity (ventriculoperitoneal shunt).

Supplementary oxygen should be given.

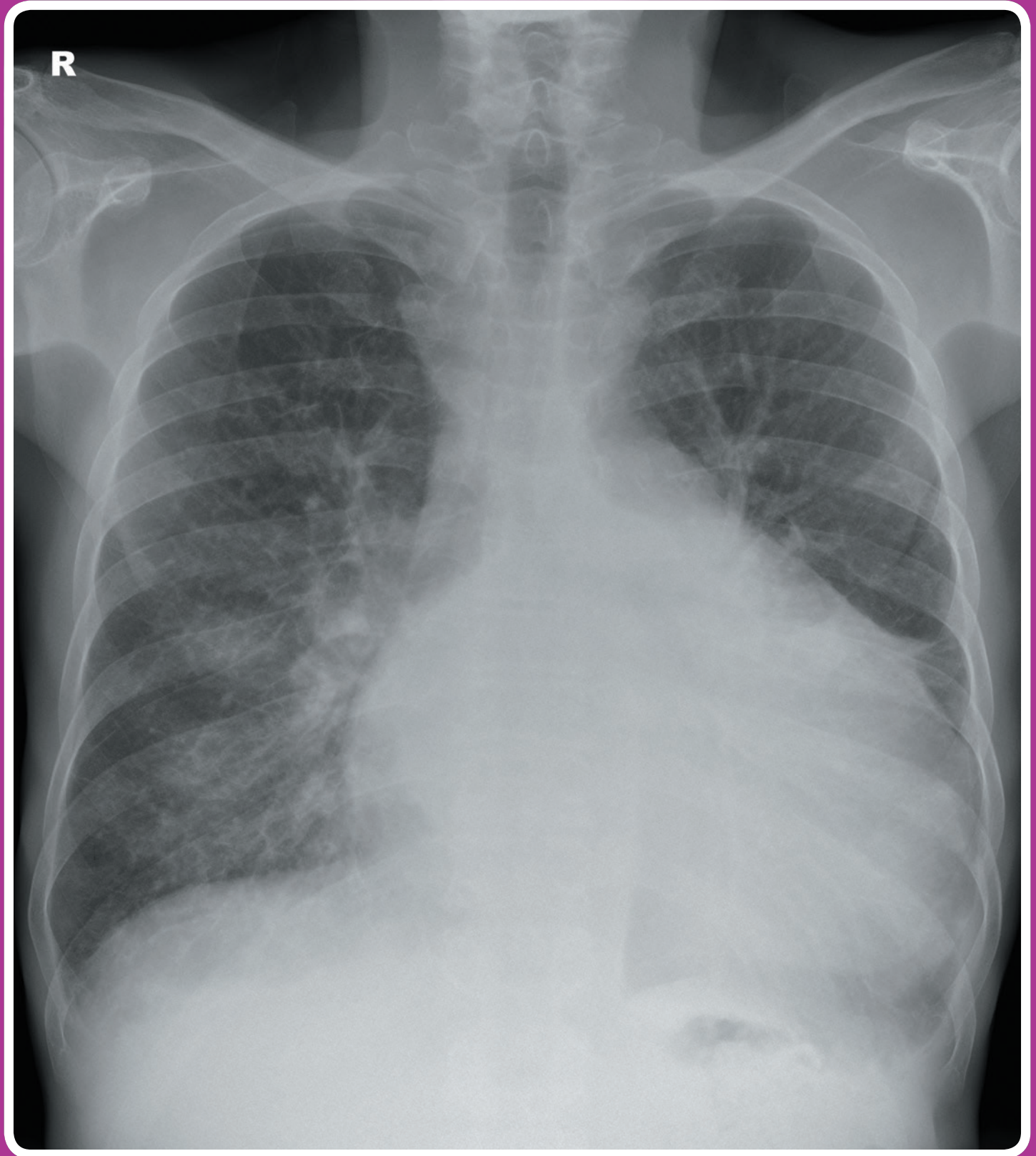
Initial blood tests may include FBC, U/Es, CRP and blood cultures.

The patient should be referred to neurosurgery for further assessment. The shunt reservoir/valve can be compressed to see if it empties or worsens the headache. The remainder of the shunt needs to be imaged to check it is not fractured or kinked – this will require X-rays of the skull and neck. A CT head may be performed to assess for changes in the degree of hydrocephalus.



CASE 56

A 55 year old male is admitted via ED to the coronary care unit after an acute presentation of shortness of breath. He has a history of dilated cardiomyopathy. Initial chest X-ray showed evidence of heart failure, and he is therefore being treated with oxygen and diuretics. A repeat chest X-ray is requested following 2 days of treatment to assess for any radiological response to treatment.



REPORT – PULMONARY OEDEMA

Patient ID: Anonymous
Projection: PA
Penetration: Adequate- vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is interstitial opacification in both lungs and perihilar opacification around the right hilum. A couple of peripheral septal lines are visible in the right lower zone, in keeping with Kerley B lines. Prominent pulmonary vessels within the upper lobes are in keeping with upper lobe venous diversion. There is minor

blunting of the costophrenic angles, suggestive of small pleural effusions.

The lungs are not hyperinflated.

CIRCULATION

The heart is enlarged with a cardiothoracic ratio of 0.69.

The heart borders are clear.

The aorta is difficult to clearly identify.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of the right hilum. The left hilum is obscured by the heart.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

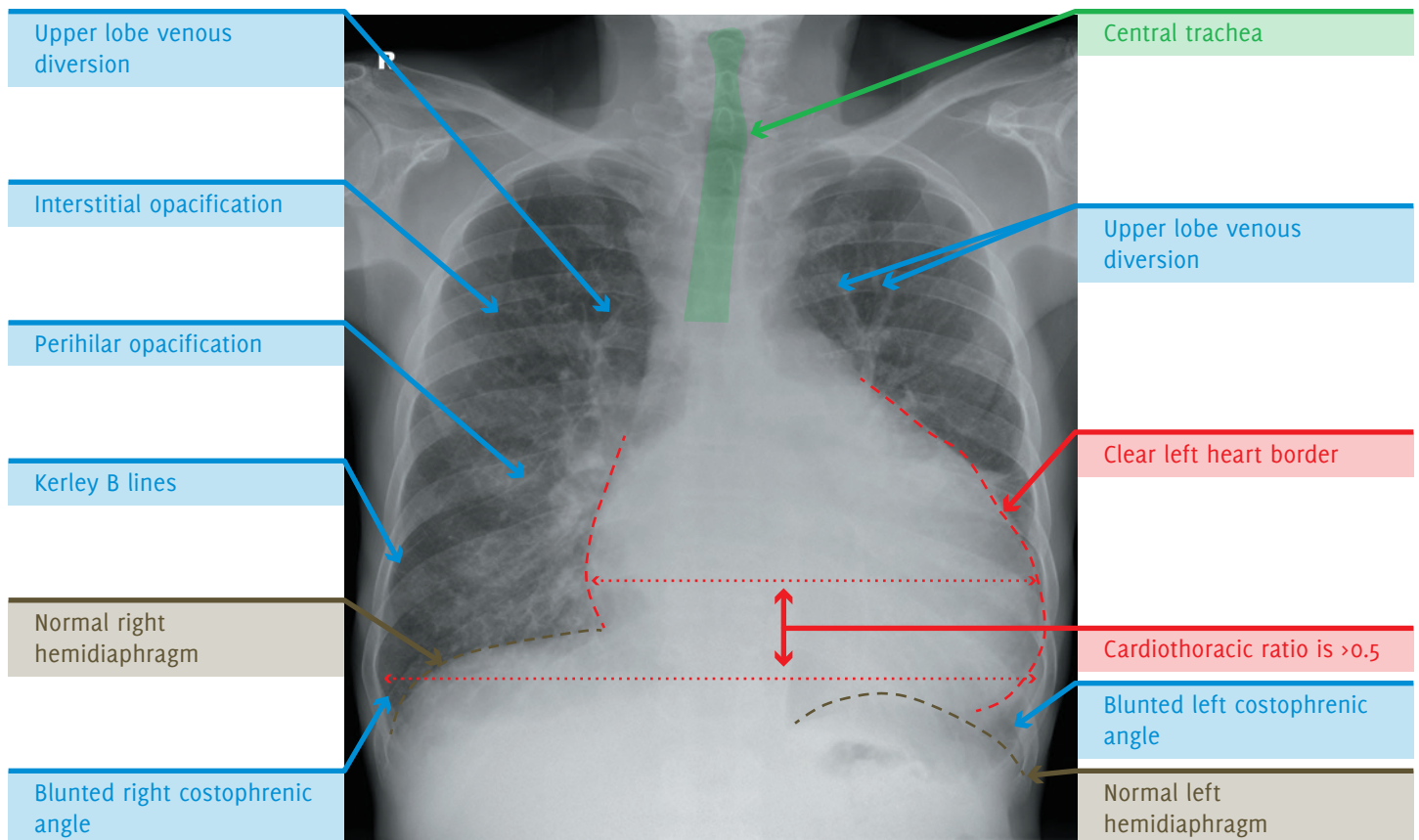
Lung Apices: Upper lobe venous diversion

Hila: Normal right hilum, the left is obscured.

Behind Heart: Normal

Costophrenic Angles: Blunting consistent with small effusions

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

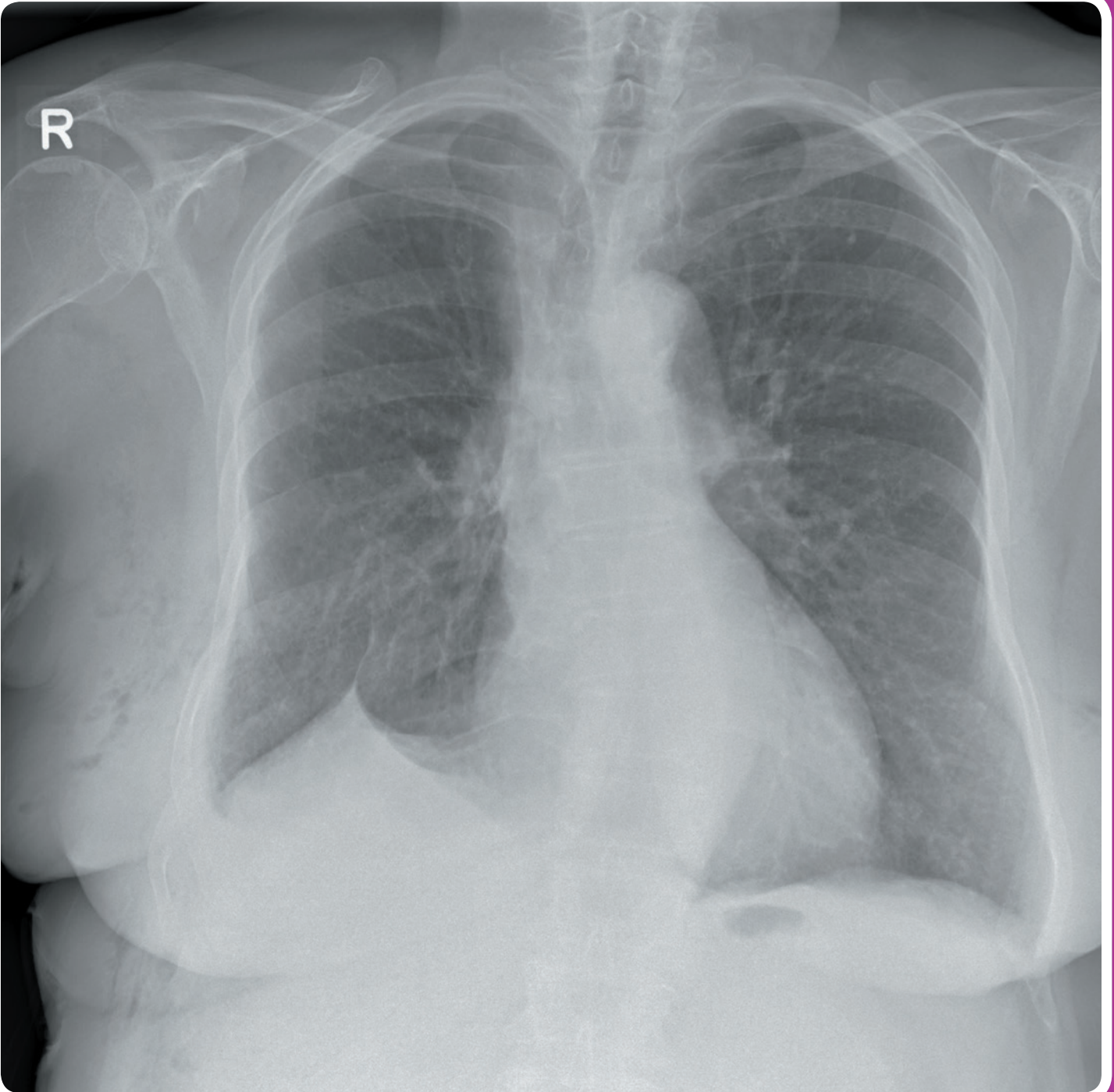
This X-ray demonstrates cardiomegaly in keeping with the known history of dilated cardiomyopathy. The upper lobe venous blood diversion, interstitial markings and small pleural effusions are in keeping with pulmonary oedema.

The X-ray needs to be compared with the previous imaging to assess for interval change to treatment. This should be correlated with the clinical assessment as well as an ECHO. His cardiac medication, including diuretic therapy, may need to be adjusted if the pulmonary oedema is worsening.



CASE 57

A 60 year old female presents to ED after being stabbed in the right lateral chest wall. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 99% in air, is haemodynamically stable and afebrile. The lungs are resonant throughout, with good bilateral air entry. The base of the stab wound is not visible. A chest X-ray is requested to assess for underlying thoracic injuries such as a pneumothorax.



REPORT – SURGICAL EMPHYSEMA

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The upper trachea is central. The lower trachea is displaced slightly to the right.

BREATHING

There is a tiny dense opacity in the left upper zone projected between the anterior ends of the 1st and 2nd ribs, consistent with a calcified granuloma. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.
 Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.
 The heart borders are clear.
 There is mild unfolding of the thoracic aorta.
 The mediastinum is central, not widened with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

There is tenting of the right hemidiaphragm, consistent with incidental eventration of the hemidiaphragm. Normal

appearance and position of the left hemidiaphragm.

No pneumoperitoneum.

A mid and lower thoracic scoliosis is present. The imaged skeleton is otherwise intact with no fractures or destructive bony lesions visible.

There is surgical emphysema within the soft tissues of the right axilla/ lateral chest wall.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

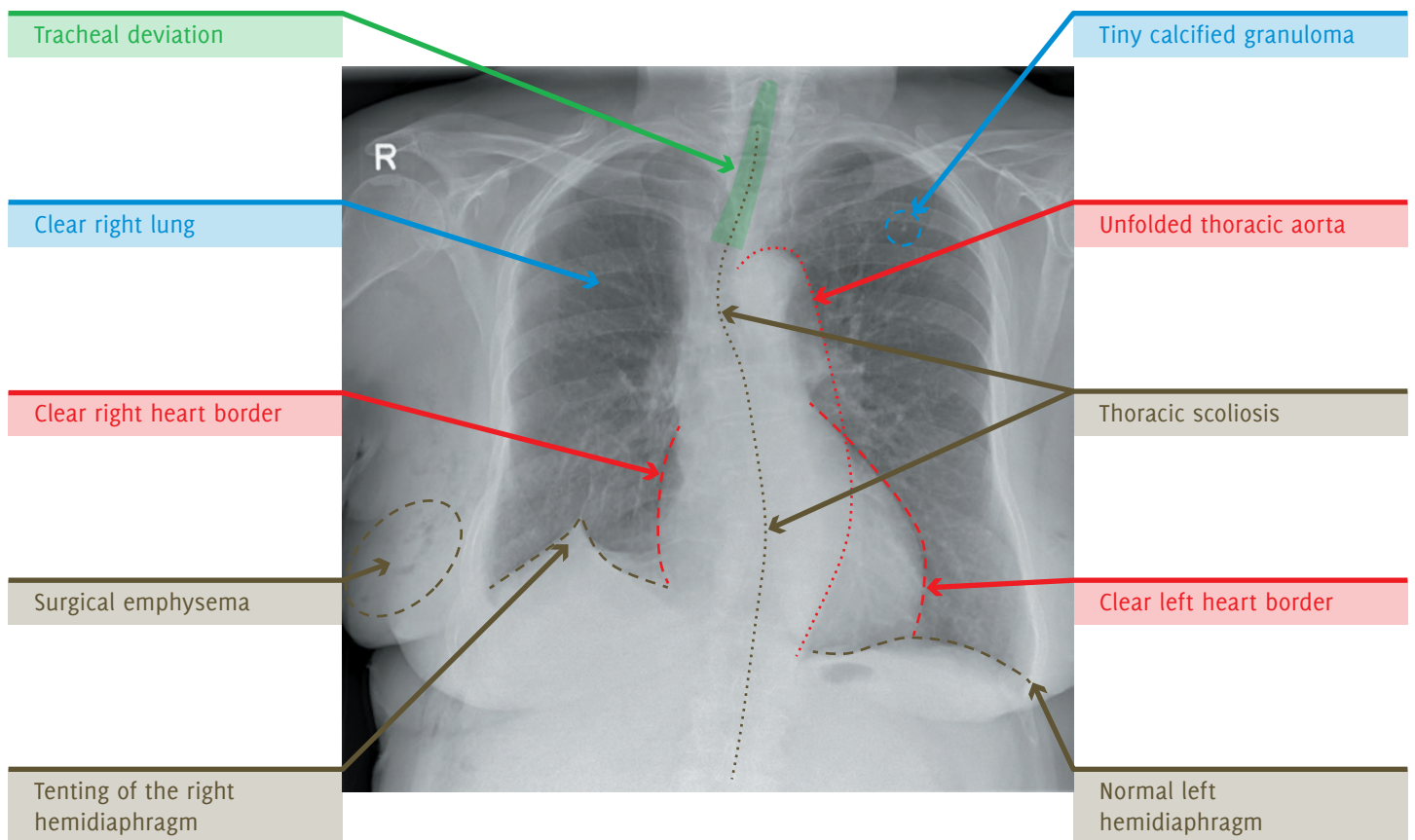
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates surgical emphysema in the right lateral chest wall/axilla. This presumably corresponds with the stab wound. There is no evidence of intrathoracic injury in the form of a pneumothorax, haemothorax or rib fracture. The displacement of the lower trachea is likely related to the thoracic scoliosis.

The patient should be assessed for other injuries using the ATLS algorithm.

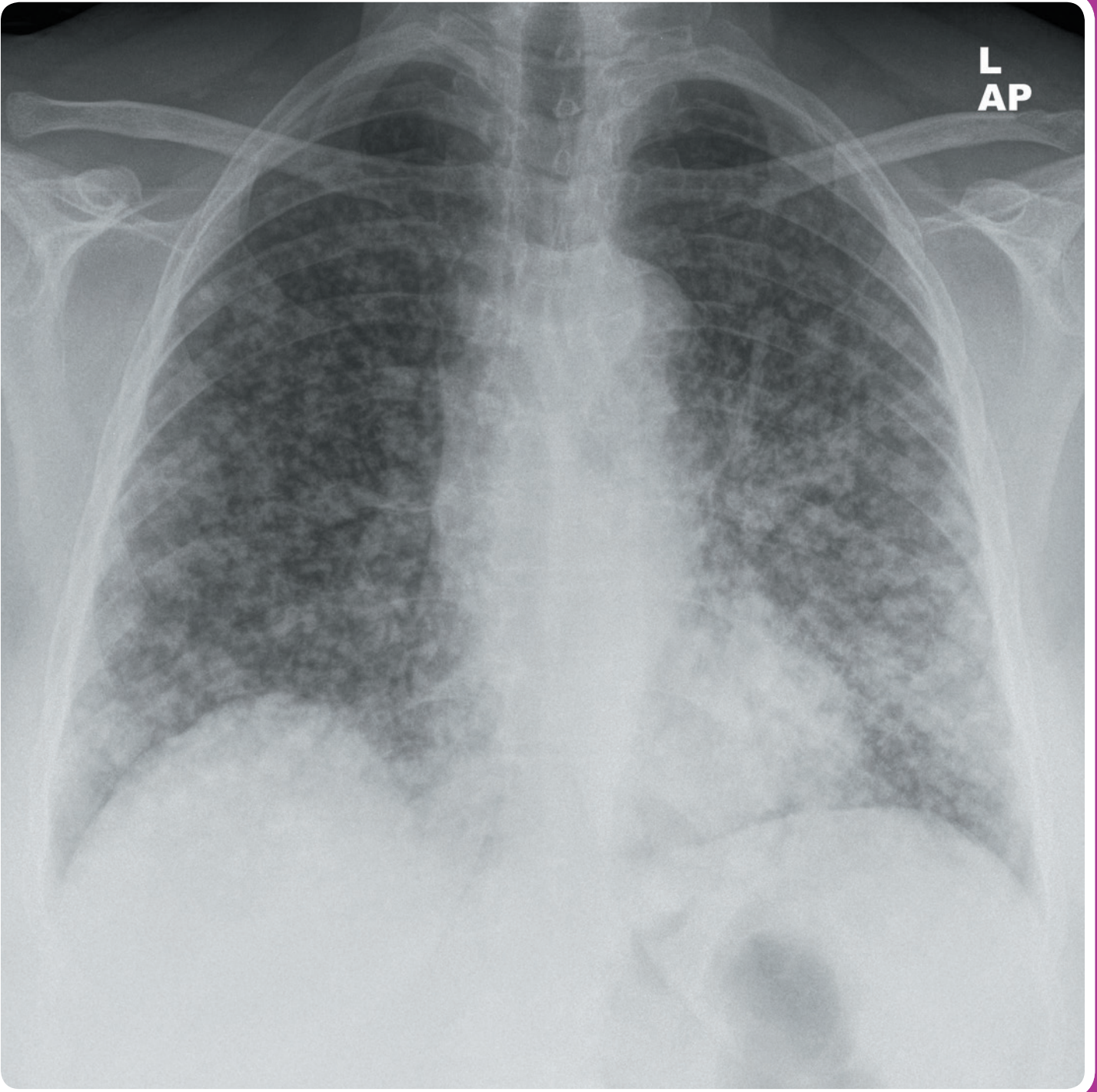
The stab wound needs to be thoroughly assessed and managed based on clinical appearance. This may include a wash out

and suturing. It will also be important to look for any other associated injuries.



CASE 58

A 60 year old female presents to ED with general fatigue, fevers and a productive cough. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 85% in air and is febrile with a temperature of 39.5°C. There are scattered crackles throughout the lungs. A chest X-ray is requested to assess for possible pneumonia.



REPORT – MILIARY NODULES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There are diffuse nodular opacities spread throughout the lungs. The nodules are small (1-2mm) and non-calcified. There is no evidence of cavitation.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

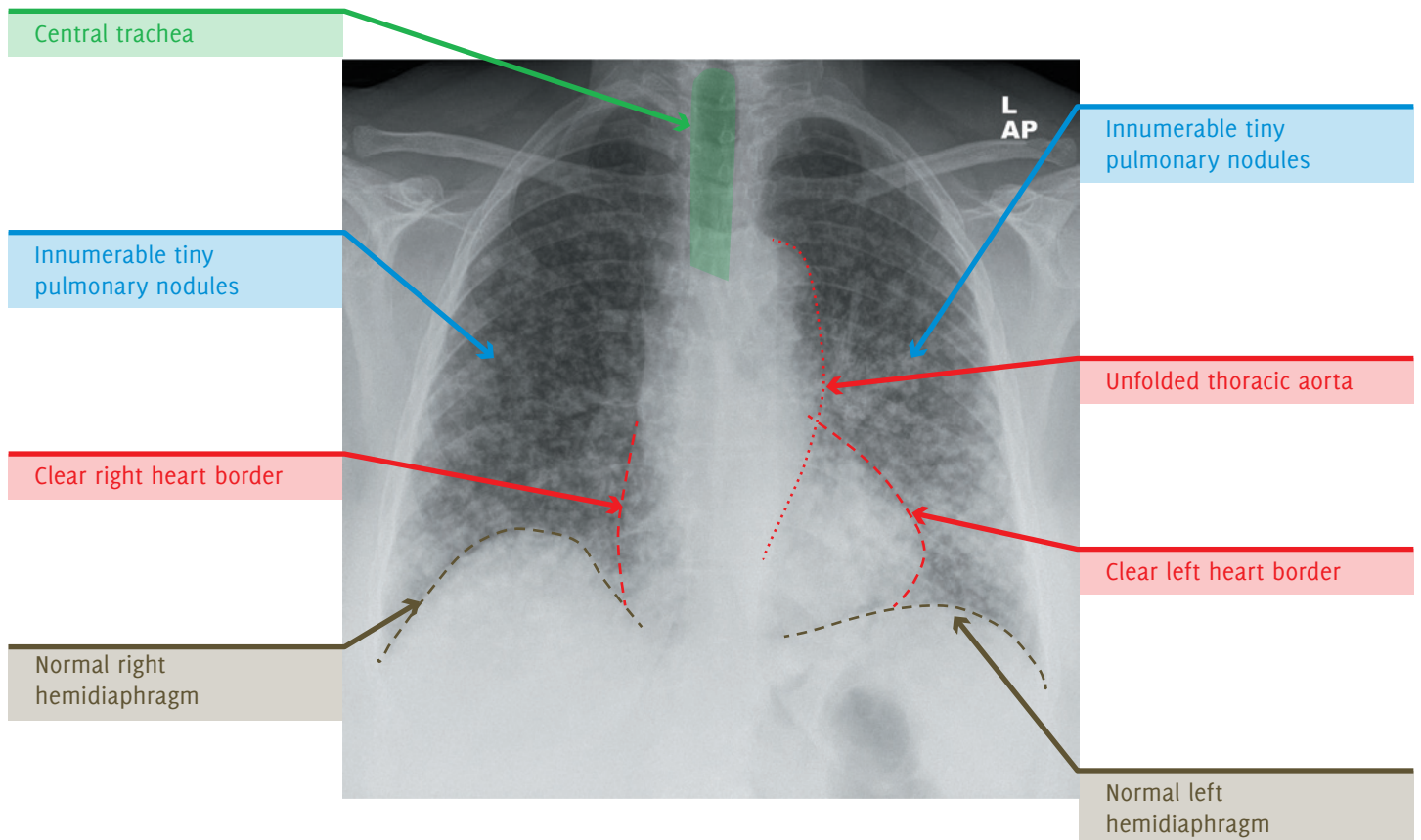
Lung Apices: Multiple small pulmonary nodules

Hila: Normal

Behind Heart: Multiple small pulmonary nodules

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates innumerable small non-calcified pulmonary (miliary) nodules throughout both lungs. The patient is unwell making metastases or infection, such as TB (miliary TB) or fungal infections, most likely. If the patient was well the differential would include sarcoidosis and silicosis.

Supplementary oxygen should be given. Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, ESR, TFTs, HIV, and blood/mycobacterial cultures. Sputum culture and a Tuberculin skin prick test may also be helpful.

The patient should be considered to have active TB until proven otherwise and nursed appropriately in a single room. Anti-TB

medication should be commenced (e.g. rifampicin, isoniazid, pyrazinamide, and ethambutol).

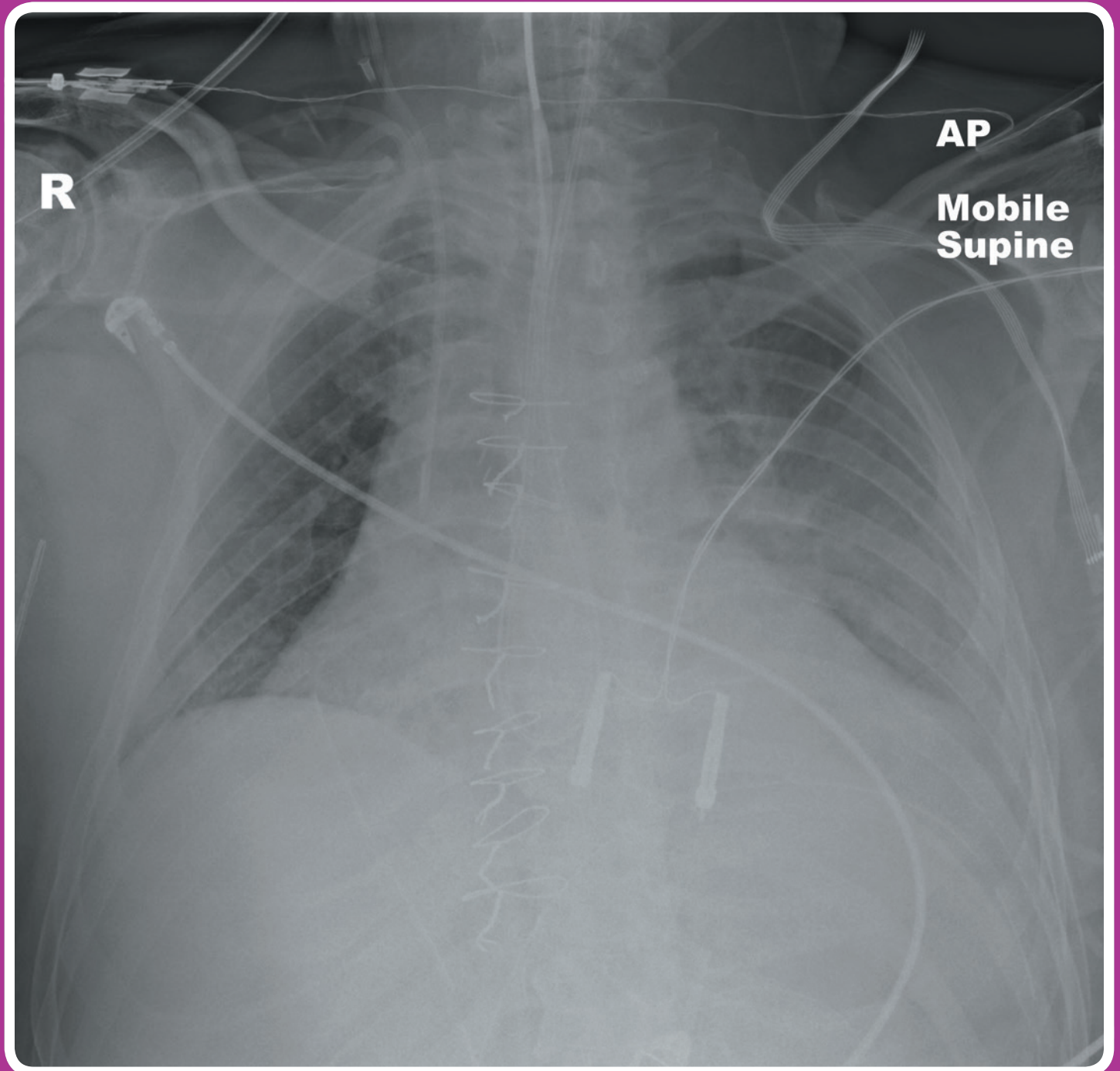
A contrast-enhanced CT of the chest, abdomen and pelvis should be performed to assess for evidence of malignancy.

Specialist input may be required from respiratory, infectious disease, and/or oncology.



CASE 59

A 65 year old male has just had an NG tube inserted. He is currently in ITU post laparotomy for a perforated duodenal ulcer. He has previously had a CABG. On examination, he has saturations of 98% in 5L of facemask oxygen and is afebrile. Lungs are resonant throughout with good bilateral air entry. A chest X-ray is requested to assess the position of the NG tube.



REPORT – NASOGASTRIC TUBE (MALPOSITIONED)

Patient ID: Anonymous
Projection: Portable supine AP
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Inadequate – 4 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is heterogeneous airspace opacification in the left lower zone, consistent with consolidation or atelectasis.

The lungs are otherwise clear. They are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The cardiac size cannot be accurately assessed given the projection and limited inspiratory achievement.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The hila are difficult to identify but no hilar mass is visible.

DIAPHRAGM + DELICATES

Normal appearance and position of the right hemidiaphragm. The left is difficult to identify and partially obscured.

No pneumoperitoneum visible, although this is difficult to assess on a supine X-ray.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

The NG tube is looped within the oesophagus, with its tip coiled back up into the pharynx.

There is a central venous catheter in the right internal jugular vein with its tip projected over the lower superior vena cava.

Midline sternotomy wires are visible. There are two lines projected over the upper abdomen in keeping with surgical drains.

External lead monitoring wires are also noted.

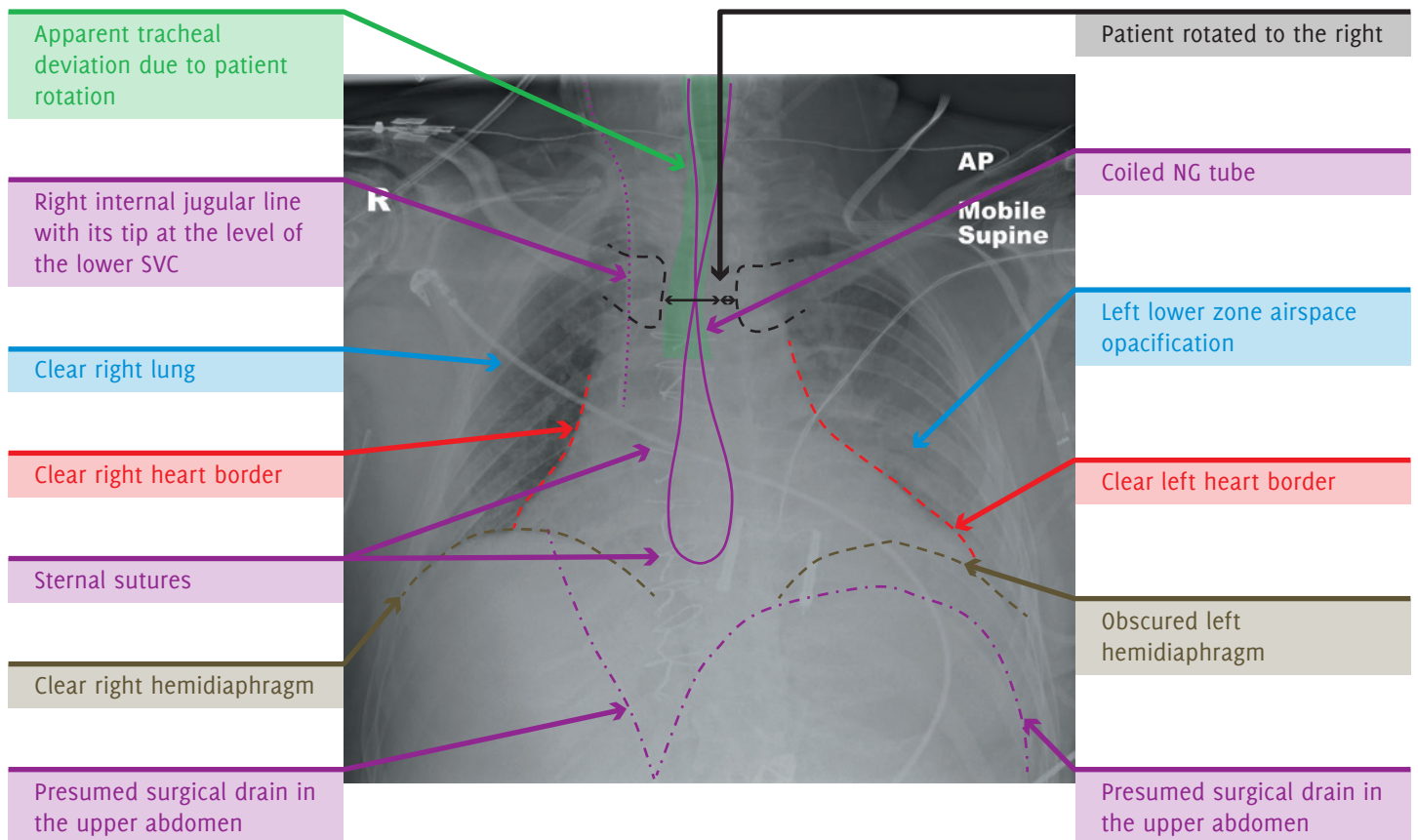
Lung Apices: Normal

Hila: Difficult to identify

Behind Heart: Increased left retrocardiac opacification

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates an NG tube coiled within the oesophagus, with its tip looped back up into the pharynx. The other lines and drains are appropriately sited. Left lower zone changes are consistent with consolidation or atelectasis.

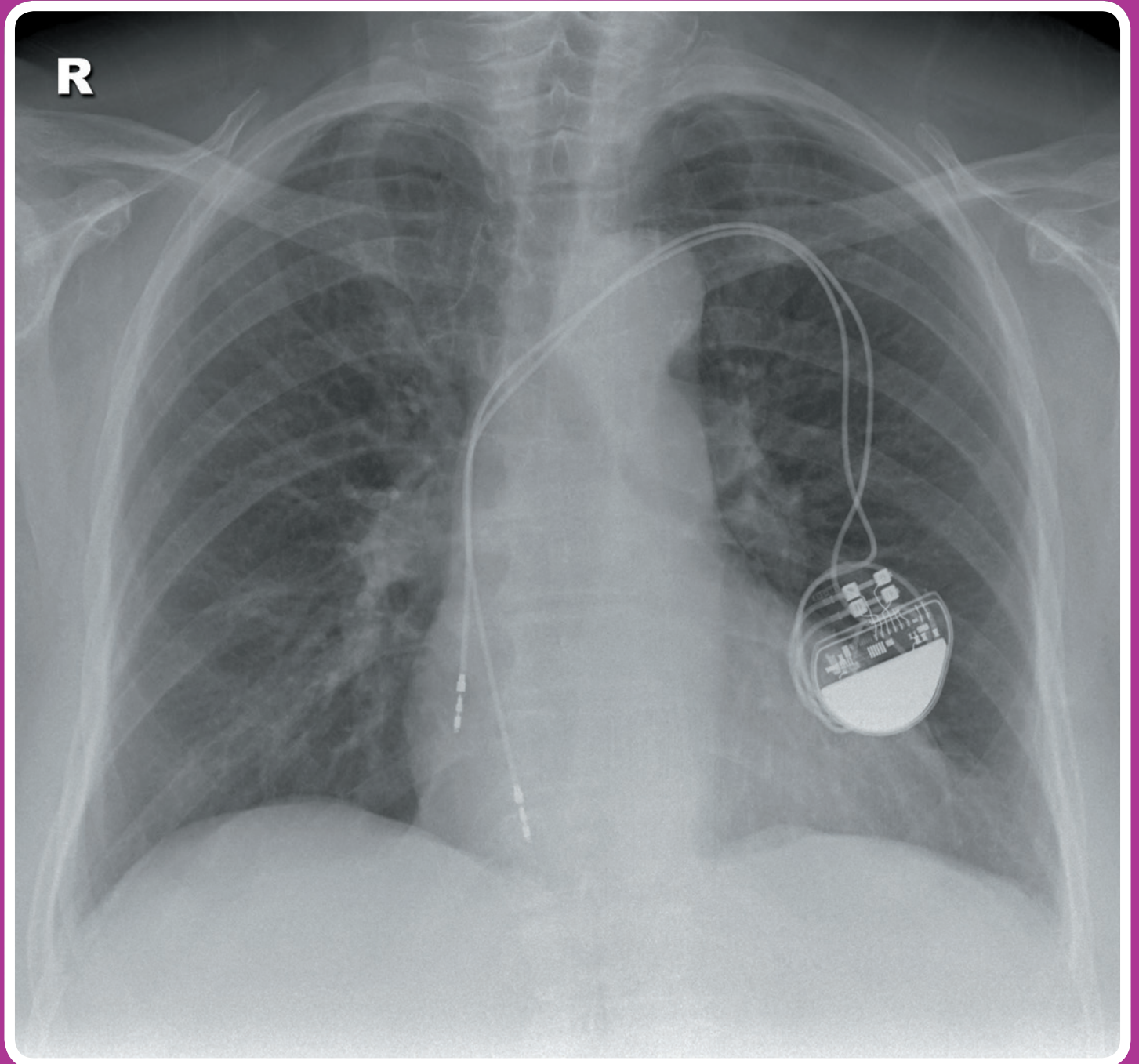
The NG tube needs to be removed and re-inserted. A repeat X-ray will be required to confirm its position prior to feeding. Ideally this X-ray would be an erect X-ray, with good inspiratory

effort, as this would permit better assessment of the left lower zone. The patient is likely to be on antibiotics already, but if there is a strong clinical suspicion of pneumonia it would be reasonable to repeat bloods, particularly FBC and CRP, send sputum/blood cultures, and start treatment for a post-operative pneumonia.



CASE 60

A 65 year old male presents to ED with palpitations. He has recently had a pacemaker inserted for atrioventricular block. He is a non-smoker. On examination, he has saturations of 98% in air, is tachycardic (regular, good-volume pulse at 130 bpm), and is afebrile. Lungs are resonant throughout with good air entry bilaterally. A chest X-ray is requested to assess lead position and exclude a pneumothorax.



REPORT – PACEMAKER LEAD (MALPOSITIONED)

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear. They are not hyperinflated.

The pleural spaces are clear. No pneumothorax.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the diaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There is a dual-chamber pacemaker in situ. Both electrode tips are projected over the right atrium. Only one should be projecting over in the right atrium, the other over the right ventricular apex. No fracture/break of the electrodes is visible.

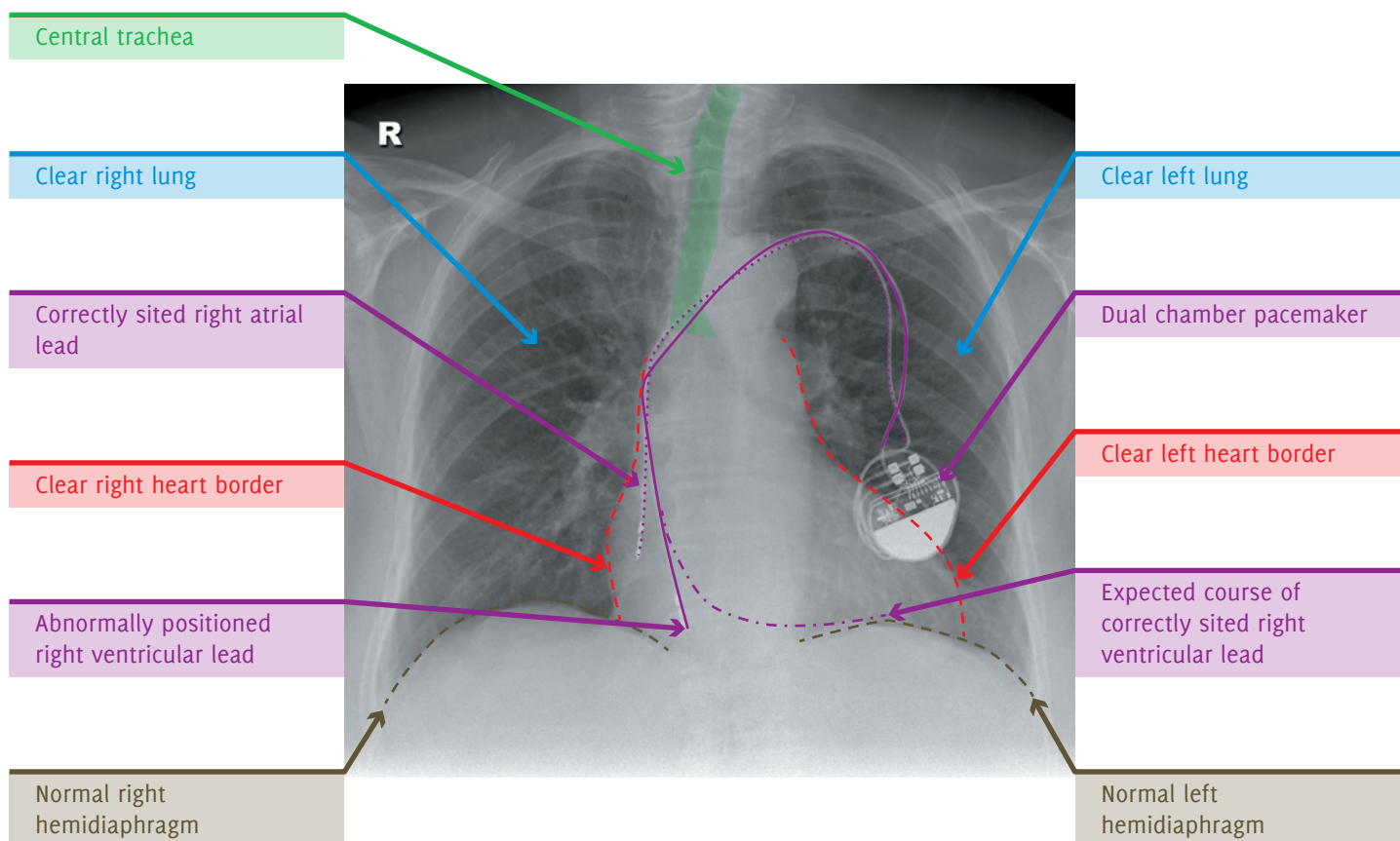
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

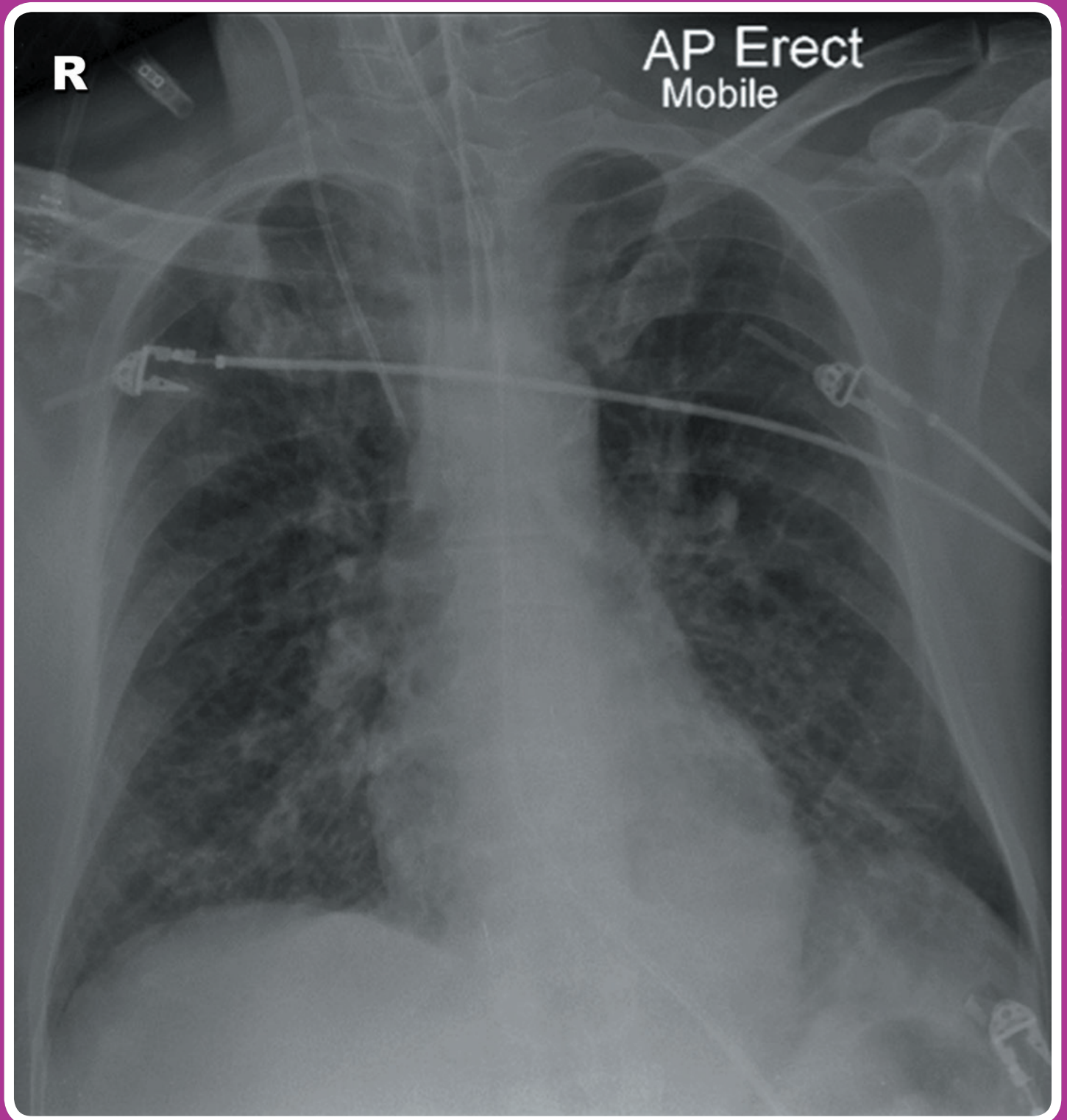
This X-ray demonstrates an unsatisfactory positioning of the right ventricular pacemaker lead. There is no pneumothorax.

An ECG should be performed. The patient should be referred to cardiology for management of any acute arrhythmias and for pacemaker testing. Re-positioning of the pacemaker is likely to be required.



CASE 61

A 65 year old male presents to ED with worsening shortness of breath. He has a 60 pack year smoking history. An initial chest X-ray showed bronchiectasis, and after acutely deteriorating he was admitted to intensive care, intubated and had a central venous catheter inserted. Broad spectrum antibiotics have already been commenced and the respiratory team are on route to review. On examination, he has saturations of 100% in 40% oxygen with minimal ventilator support. He is afebrile. Lungs are resonant throughout, with coarse crackles bilaterally throughout the lung fields. A chest X-ray is performed to assess the position of the ET tube and the central venous line.



REPORT – ENDOTRACHEAL TUBE, INTERNAL JUGULAR LINE AND NASOGASTRIC TUBE

Patient ID: Anonymous
Projection: AP Erect Mobile
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central allowing for the patient rotation.

BREATHING

There are bilateral coarse bronchovascular lung markings seen, particularly in the lower zones. Some ring shadows are also present. No focal consolidation is visible.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

The ET tube tip is appropriately sited, with its tip a few centimetres above the carina.

There is a central venous catheter in the right internal jugular vein with its tip projected over the upper superior vena cava.

The NG tube is appropriately sited, with its tip below the level of the diaphragm on the left.

There are ECG monitoring leads in situ.

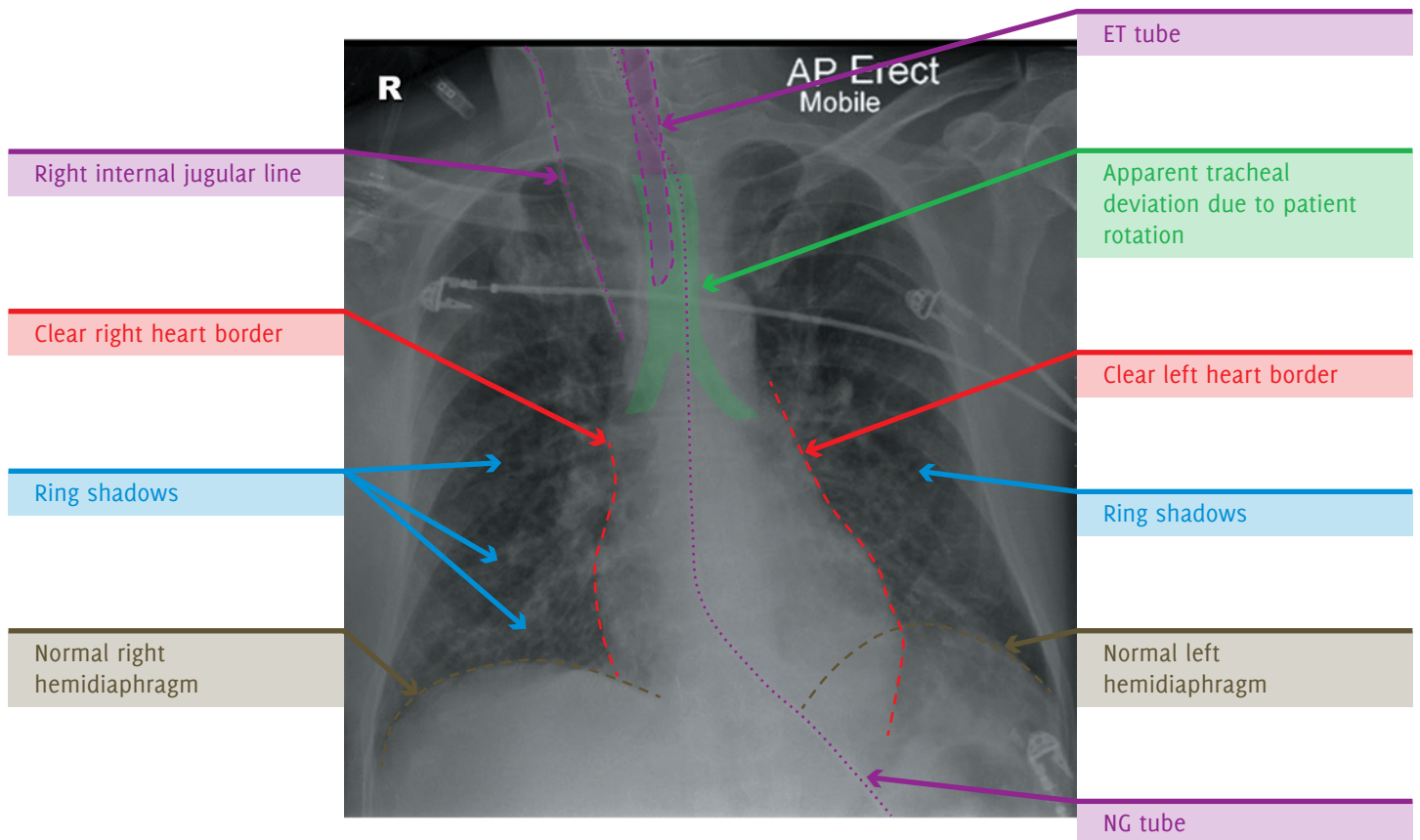
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a correctly sited ET tube, NG tube, and right internal jugular line. Background changes are in keeping with bronchiectasis.

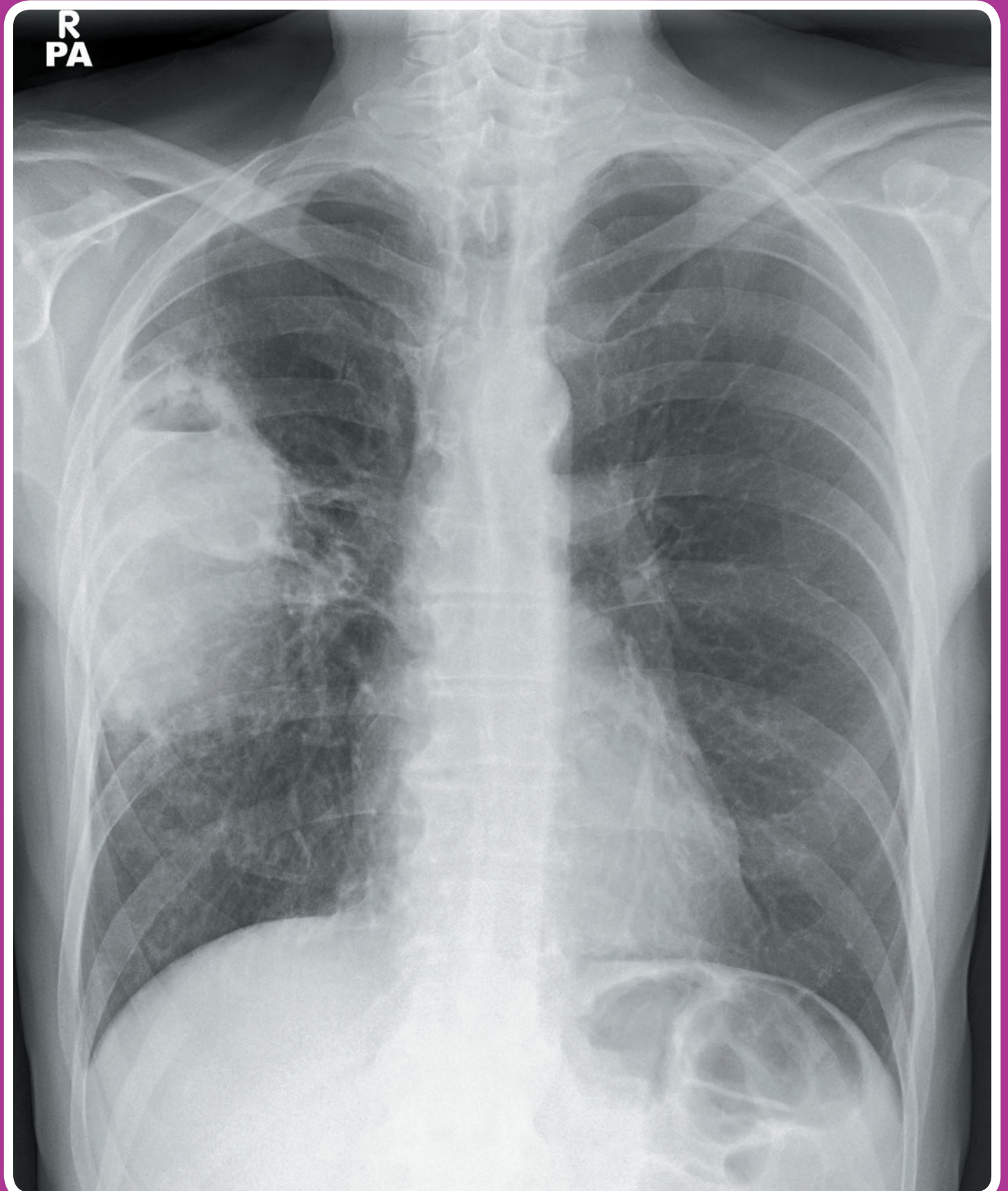
The right internal jugular line is safe to use.

Previous imaging should be reviewed to determine if the bronchiectasis is new or progressive. A chest CT could better assess the bronchiectasis if considered necessary.



CASE 62

A 67 year old male presents to ED with a productive cough, on a background of 2 weeks of nausea and vomiting. He has a history of dysphagia following a previous stroke. He is a non-smoker. On examination, he has saturations of 85% in air, has a HR of 100 bpm, and is febrile with a temperature of 39.5°C. There is dullness to percussion and coarse crackles in the right upper and mid zones. A chest X-ray is performed to assess for possible pneumonia or collapse.



REPORT – LUNG ABSCESS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is dense airspace opacification peripherally in the right upper and mid zones consistent with consolidation. An air-fluid level is visible superiorly in this region, suggesting a fluid collection. The

lungs are otherwise clear. The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal position and appearance of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips.

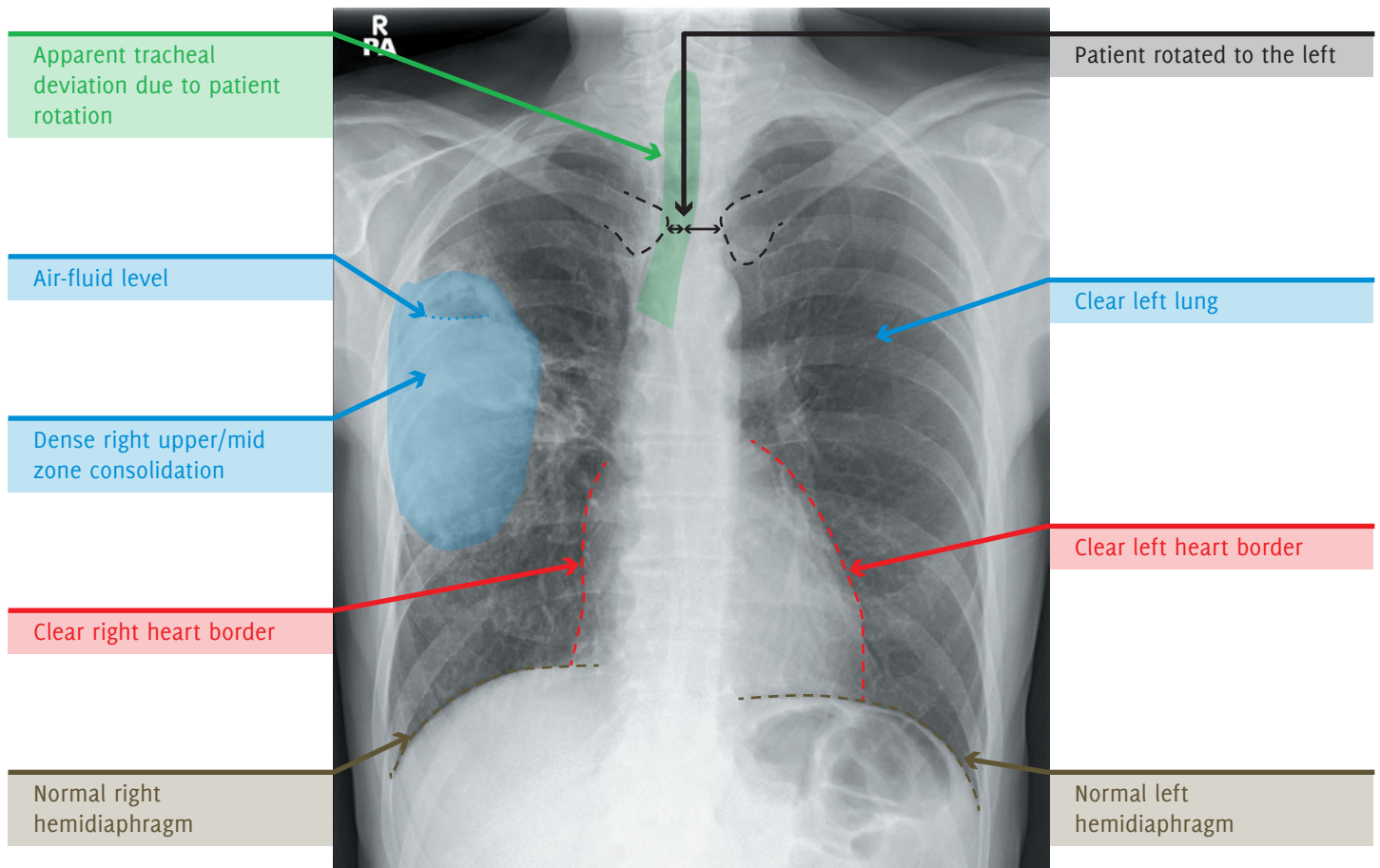
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates consolidation in the right upper and mid zone consistent with pneumonia. The air-fluid level is most likely in keeping with an abscess. Infection of a pre-existing cavity is a possibility but is less likely.

The appearance is probably the result of aspiration pneumonia given the location of the pneumonia combined with the presence of an abscess and the clinical history of dysphagia. TB is in the differential diagnosis.

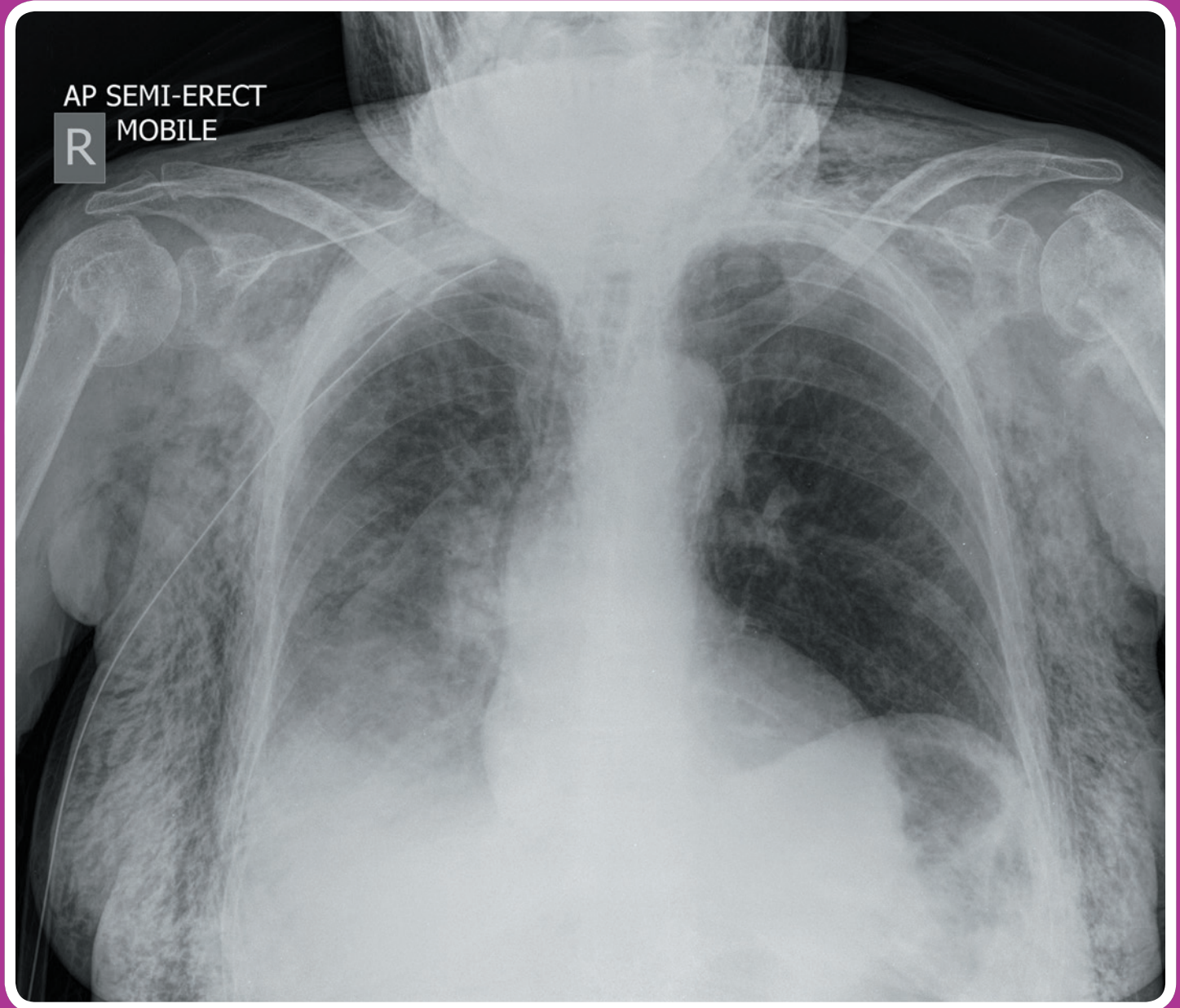
The patient should be barrier nursed. Initial blood tests may include FBC, U/E/s, LFTs, bone profile, CRP, and blood cultures. Sputum cultures and TB testing should also be performed.

The patient should be kept nil by mouth until a swallow assessment is performed. Broad spectrum intravenous antibiotics should be started, with consideration of cover for tuberculosis and discussion with microbiology. A follow-up chest X-ray should be performed to ensure resolution of the pneumonia and abscess. If there is persisting abnormality a contrast-enhanced CT of the chest would be appropriate.



CASE 63

A 70 year old female presents to ED acutely breathless after a mechanical fall. She has no significant past medical history. She is a non-smoker. On examination, she has saturations of 88% in air, HR 95 bpm and BP 90/50 mmHg. There is increased resonance in the right hemithorax and reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.



REPORT – TRAUMATIC PNEUMOTHORAX

Patient ID: Anonymous
Projection: AP Semi-erect Mobile
Penetration: Adequate– vertebral bodies just visible behind heart
Inspiration: Limited – 5 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

A lung edge is visible in the right hemithorax, beyond which no lung markings are seen, consistent with a pneumothorax. There is increased opacification medially in the right lower zone, which may reflect contusions or be the result from the partially collapsed lung. The left lung is clear, and is not hyper-expanded.

The right costophrenic angle is difficult to see and this may represent a small pleural effusion (most likely blood). The left pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

There is a thin lucency along the right side of the mediastinum suggestive of pneumomediastinum. The mediastinum is central, not widened, with clear borders.

The hila are difficult to identify.

DIAPHRAGM + DELICATES

Normal appearance and position of left hemidiaphragm. The right hemidiaphragm is obscured. This may be due to a basal effusion/haemothorax or as a result of basal lung consolidation secondary to lung contusions.

No pneumoperitoneum.

There are right-sided rib fractures – it is difficult to accurately count the ribs but they appear to involve the right 4th, 6th, and 7th ribs. Comminuted fracture of the left humeral head. Fracture of the right humeral neck.

There are extensive lucencies projected over the chest, axillae and neck, consistent with surgical emphysema.

EXTRAS + REVIEW AREAS

Right-sided chest drain in situ, with the tip projected over the right lung apex. No vascular lines or surgical clips.

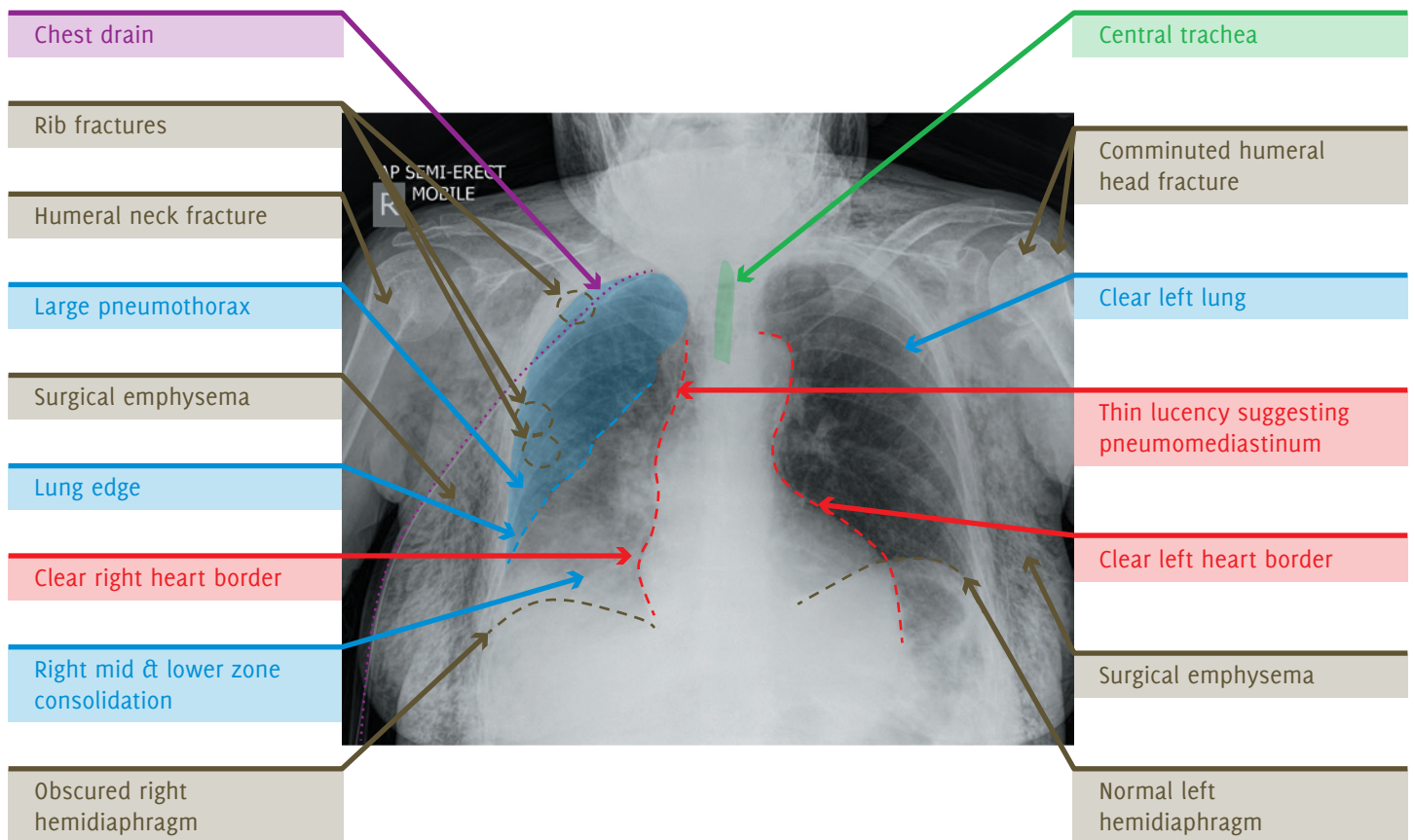
Lung Apices: Right-sided pneumothorax. Left apex is clear.

Hila: Difficult to assess

Behind Heart: Increased right retrocardiac opacification

Costophrenic Angles: Blunted right costophrenic angle. Normal on left.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a traumatic right-sided pneumothorax with extensive subcutaneous emphysema secondary to right posterior rib fractures. Consolidation in the right lower lobe is consistent with lung contusions. There is a probable small right-sided haemothorax and small volume pneumomediastinum. Additionally there are fractures of the left humeral head and right humeral neck.

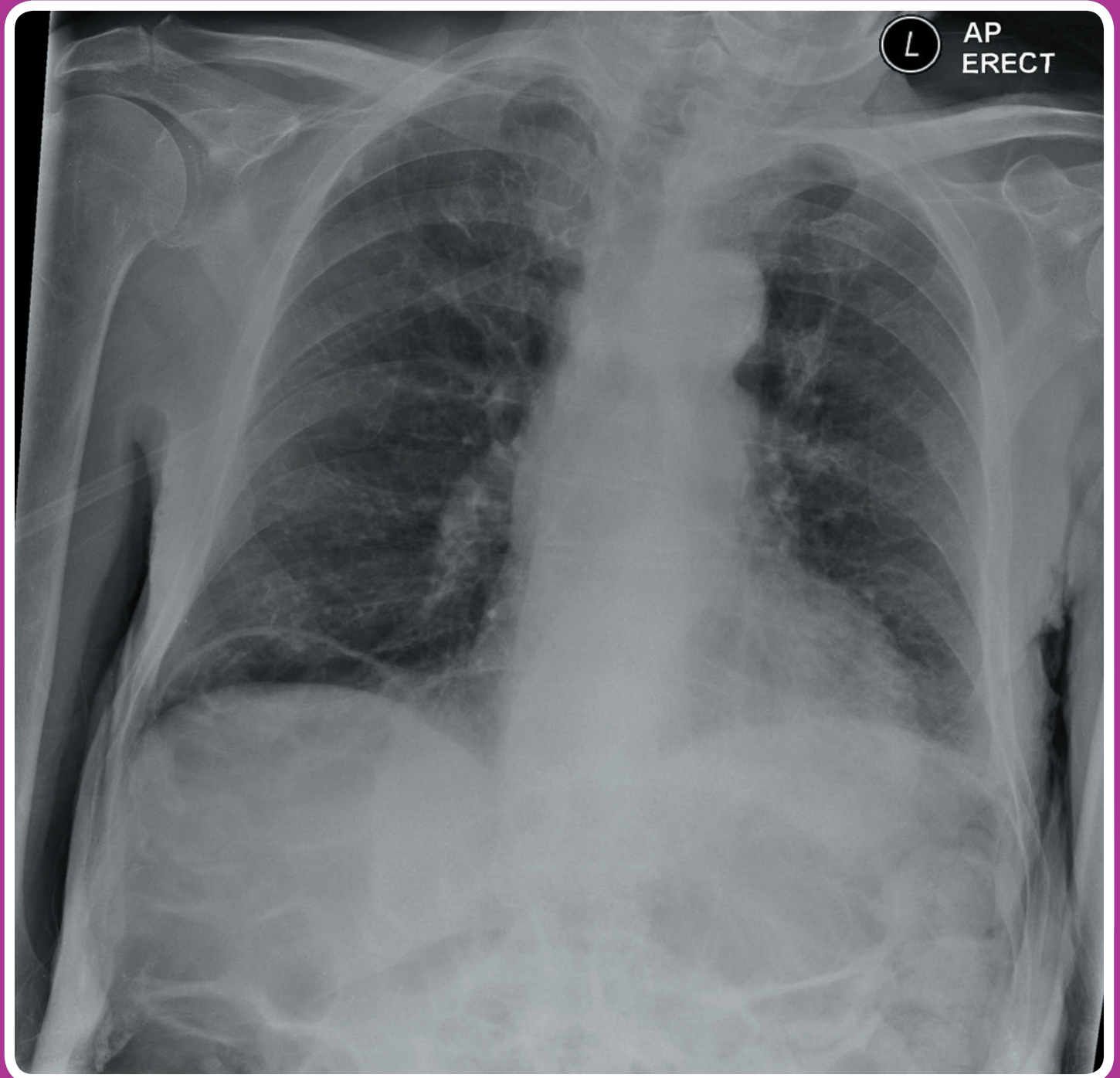
The patient needs to be assessed and resuscitated using the ATLS algorithm. An intercostal chest drain will need to be inserted. Cardiothoracic surgery should be involved.

Imaging with contrast-enhanced CT will provide more accurate assessment of the thoracic injuries. Other parts of the body (head, cervical spine, abdomen or pelvis) can also be imaged with CT depending on the clinical assessment. X-rays of both shoulders and any other possible fracture sites should be performed as part of the secondary survey, once the patient is stable.



CASE 64

A 75 year old male presents to ED with confusion. There is no significant past medical history. He is a non-smoker. On examination, he has saturations of 91% in air, and is febrile with a temperature of 38.2°C. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia.



REPORT – CHILADITI'S SIGN

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is minor increased airspace opacification at the left base, which is in keeping with consolidation.

The lungs are otherwise clear. They are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of both hemidiaphragms. There is increased lucency below the right hemidiaphragm. On closer inspection some bowel markings

are visible at this site and there is a loop of large bowel in this region. No clear evidence of pneumoperitoneum.

There is an old left 6th rib fracture. The imaged skeleton is otherwise intact with no acute fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There is oxygen tubing projected across the chest. No vascular lines, or surgical clips.

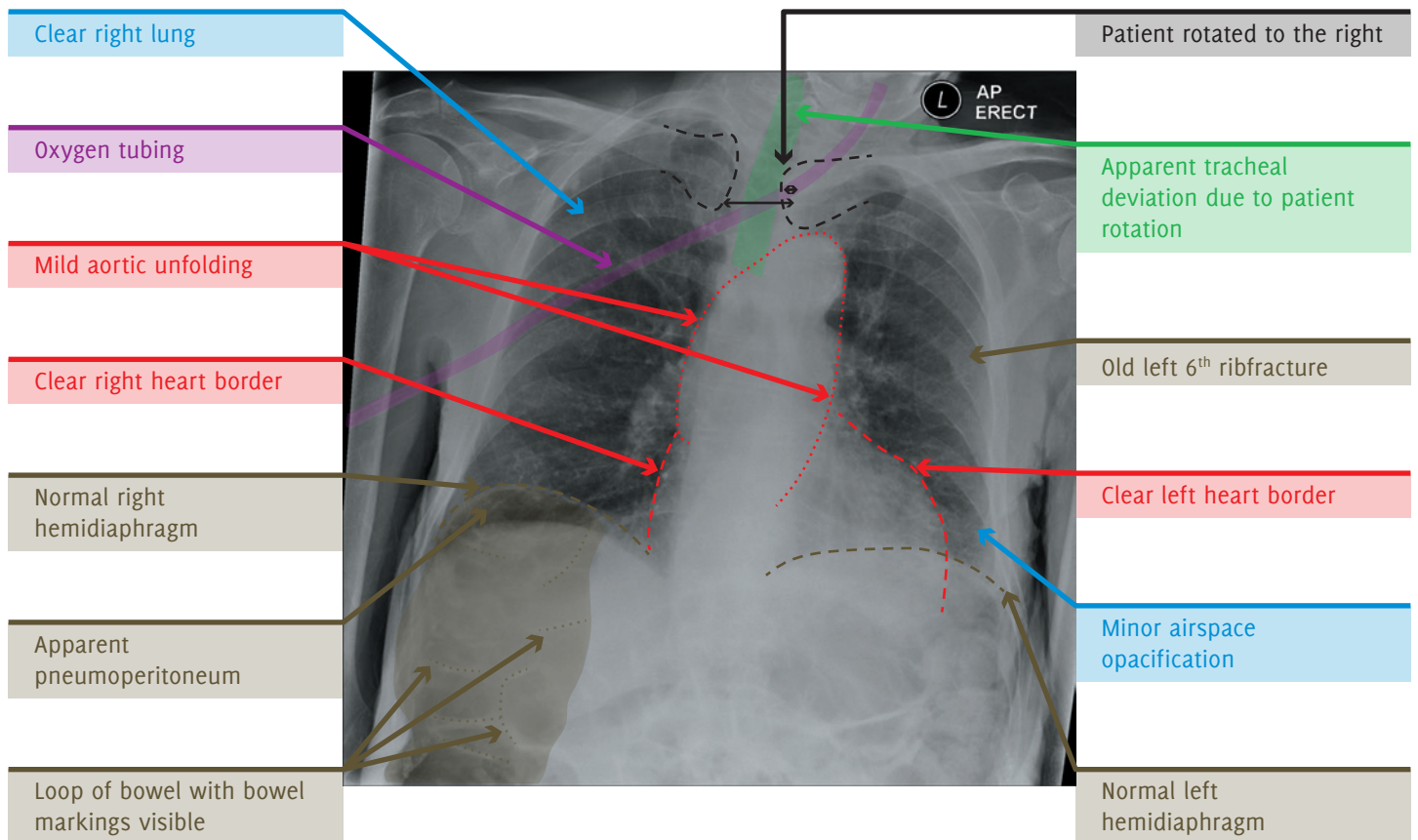
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Increased airspace opacification at the left costophrenic angle

Below the Diaphragm: Lucency beneath right hemidiaphragm



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates left lower zone consolidation, consistent with pneumonia.

The lucency beneath the right hemidiaphragm is likely to represent a loop of colon interposed between the liver and diaphragm as bowel markings are visible (Chilaiditi's sign).

The patient requires supplementary oxygen. Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, ESR and TFTs. Sputum, urine and blood cultures may also be sent. He should be treated with appropriate antibiotics for community-

acquired pneumonia and a follow up chest x-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

A review of any previous chest X-rays for similar appearances below the right hemidiaphragm would reassure that this is interposed bowel around the right hemidiaphragm rather than free gas. The patient's abdomen should be re-examined for any evidence of perforation, and if there is any clinical concern, a surgical opinion should be requested.

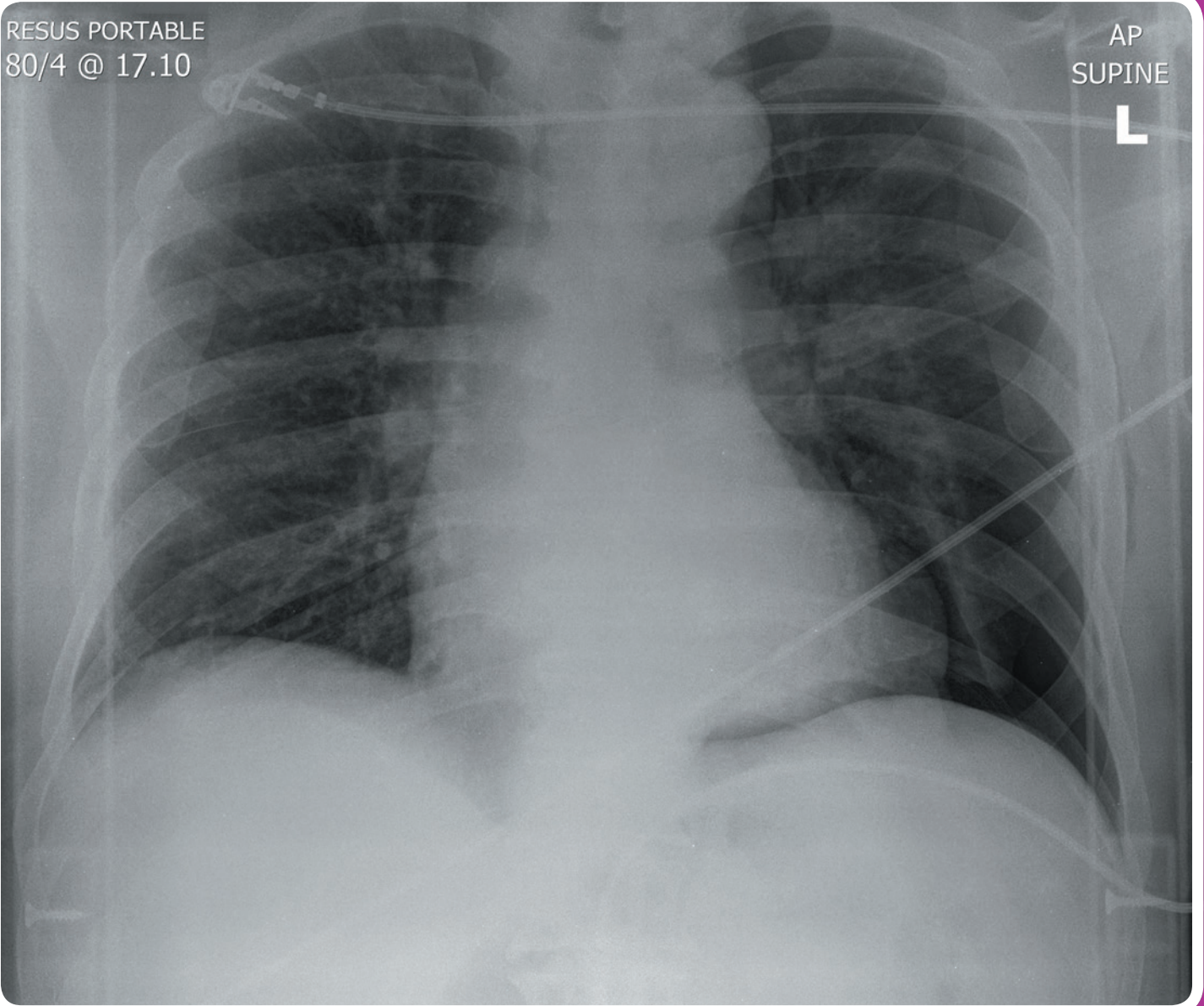


CASE 65

A 70 year old male presents to ED with left-sided pleuritic chest pain and breathlessness following a 10 foot fall. There is no evidence of head injury, and no loss of consciousness. He has no significant past medical history. He is a non-smoker. On examination, he has saturations of 92% in air and is haemodynamically stable. There is increased resonance in the left hemithorax, and reduced air entry. A chest X-ray is requested to assess for a possible pneumothorax.

RESUS PORTABLE
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AP
SUPINE
L



REPORT – TRAUMATIC PNEUMOTHORAX

Patient ID: Anonymous
Projection: AP Supine (Portable)
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is deviated slightly to the right.

BREATHING

A lung edge is visible in the left hemithorax, beyond which no lung markings are seen. There is also a deep left costophrenic angle with a sharply demarcated left heart border. All these features are consistent with a moderate/large left-sided pneumothorax.

The right lung is clear, and is not hyper-expanded.

The right pleural spaces are clear and there is normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

There is a sharply demarcated left heart border secondary to the left-sided pneumothorax. The heart borders are clear.

The aorta appears normal.

The mediastinum is central with clear borders. Its size cannot be accurately assessed given the projection although it does not appear widened.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum, although this is difficult to assess for on a supine film.

There are fractures of the left 5th and 6th ribs.

The visible soft tissues are unremarkable. Of note, there is no surgical emphysema.

EXTRAS + REVIEW AREAS

ECG monitoring leads in situ. No vascular lines, tubes, or surgical clips.

Two screws projected laterally over the lower part of the X-ray are presumably related to the spinal board the patient is lying on.

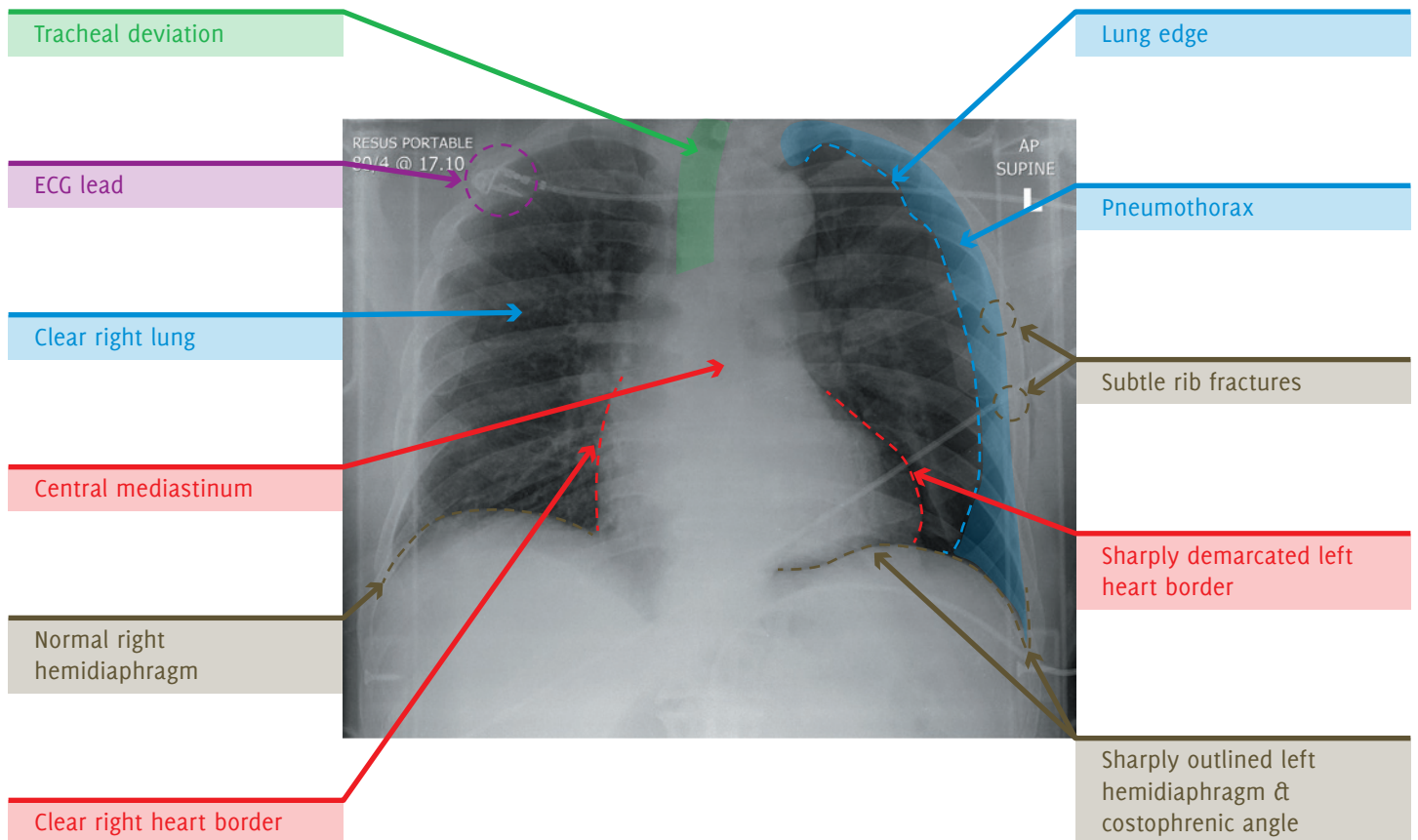
Lung Apices: Left pneumothorax. Normal right apex.

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Left pneumothorax

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a moderate/large left-sided pneumothorax associated with fractures of the left 5th and 6th ribs. The trachea is deviated slightly to the right. However, there is no lower mediastinal shift or flattening of the left hemidiaphragm. In addition, as the patient is haemodynamically stable, a tension pneumothorax is less likely.

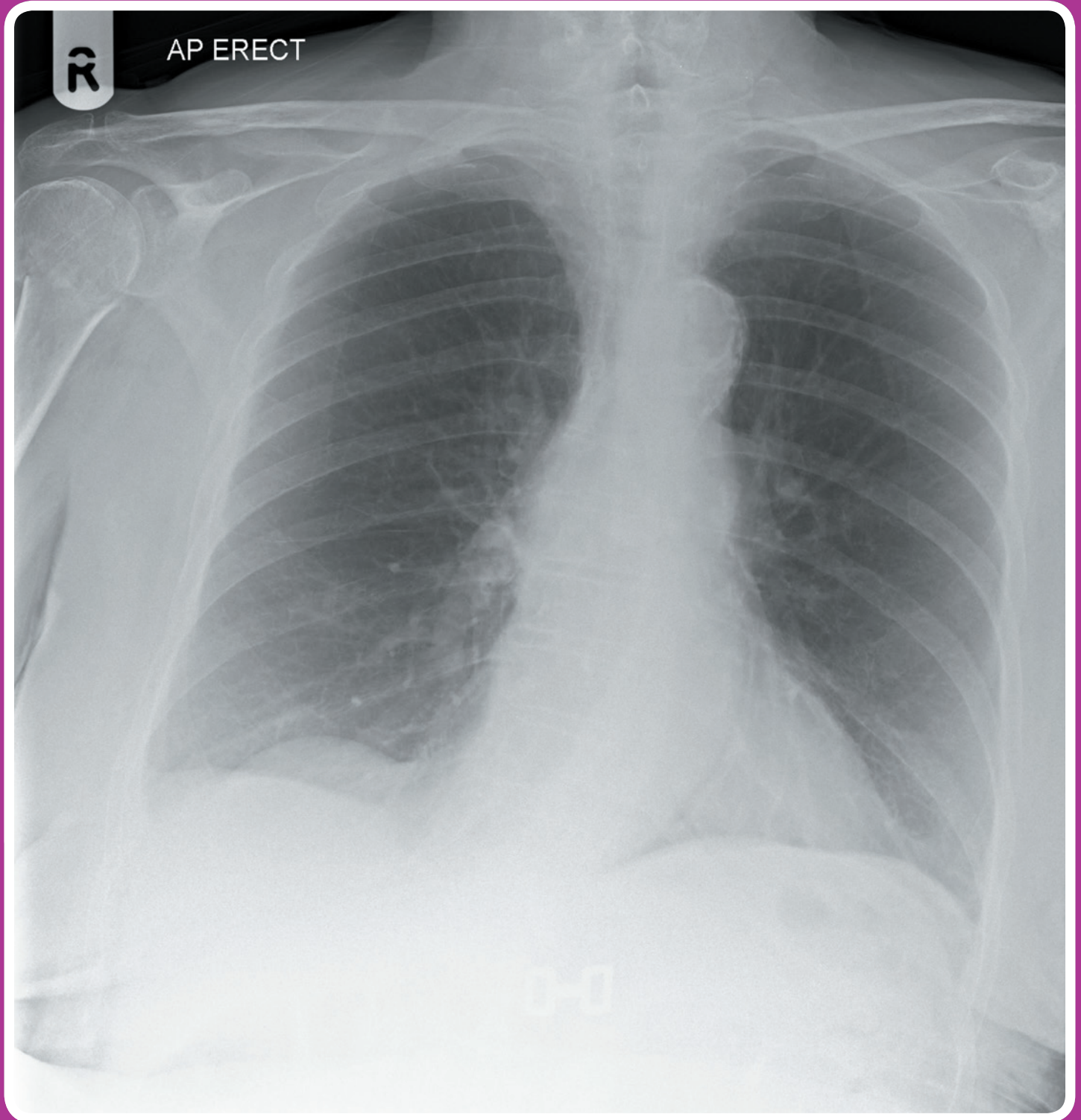
The patient needs to be assessed and resuscitated using the ATLS algorithm. A left-sided intercostal chest drain will be required.

Imaging with contrast-enhanced CT will provide more accurate assessment of the thoracic injuries. Other parts of the body (head, cervical spine, abdomen or pelvis) can also be imaged with CT depending on the clinical assessment.



CASE 66

A 76 year old female presents to ED with chest and shoulder discomfort following a mechanical fall. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Her RR is 16 with a HR of 82 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible rib fractures or a pneumothorax.



REPORT – HUMERUS FRACTURE

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

There is eventration of the right hemidiaphragm. Otherwise normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

There is a minimally displaced transverse fracture through the surgical neck of the right humerus. No other fractures or bony lesions.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

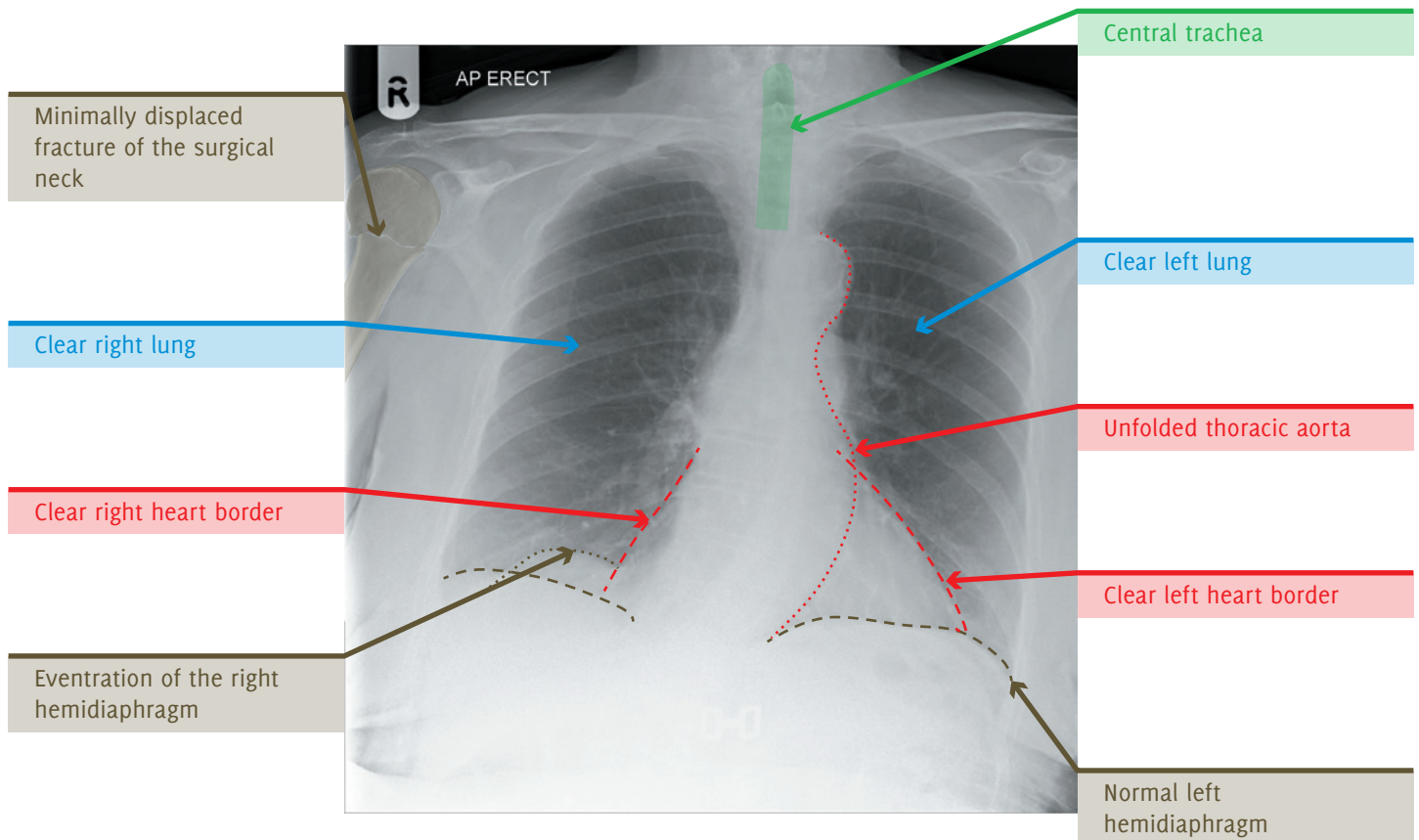
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

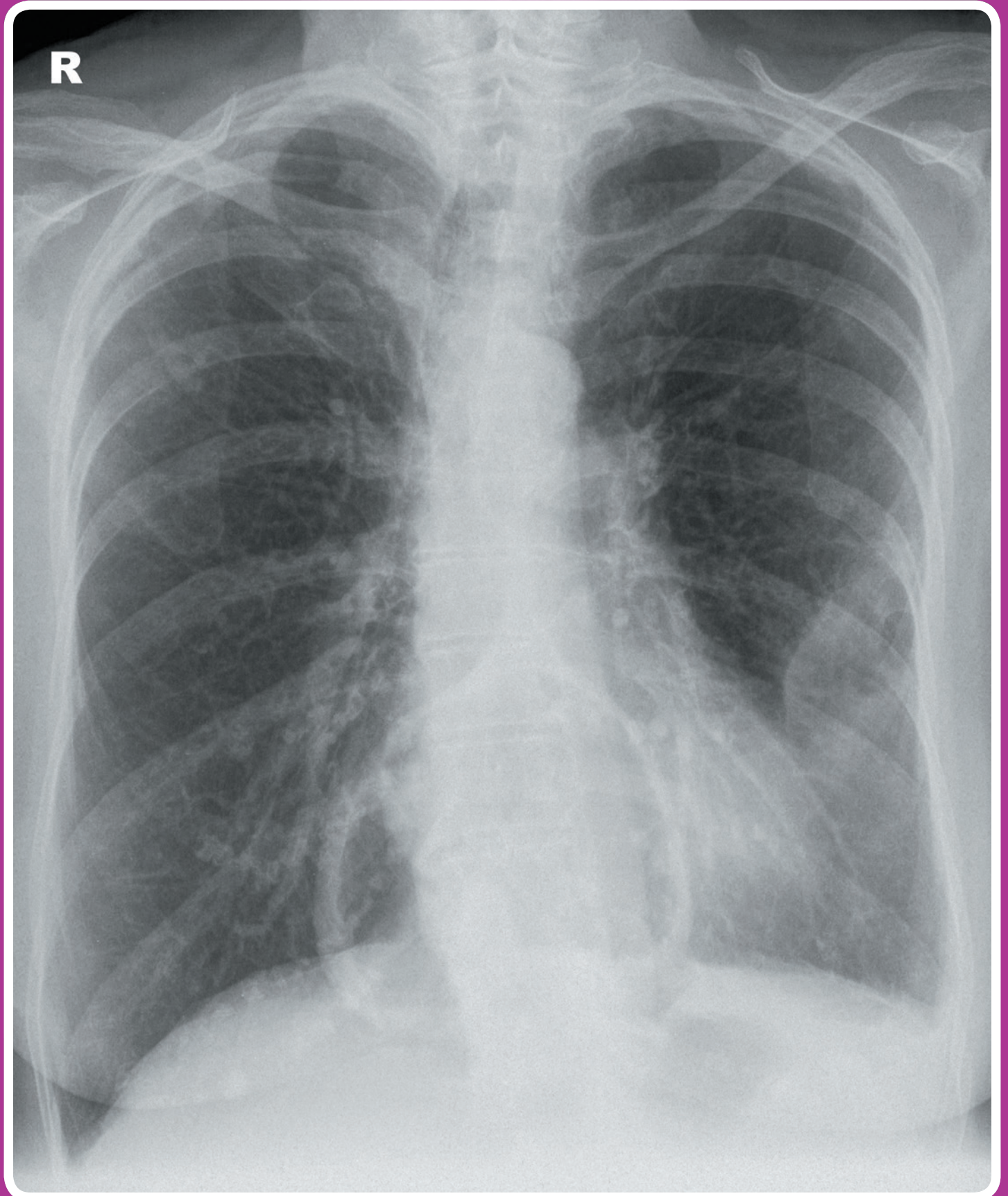
This X-ray demonstrates a right-sided humeral neck fracture. No pneumothorax or rib fracture.

Dedicated X-rays of the right upper limb should be obtained. The patient should be referred to orthopaedics for further management, which will probably involve a sling and a follow up X-ray.



CASE 67

An 80 year old female presents to ED feeling unwell, with pyrexia and a productive cough. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 93% in air and is febrile with a temperature of 38.2°C. There is dullness to percussion, reduced air entry, and crackles in the left mid zone. A chest X-ray is requested to assess for possible pneumonia.



REPORT – HIATUS HERNIA

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is left lower zone airspace opacification, with loss of clarity of the left heart border. The lungs are otherwise clear.

The lungs are not hyperinflated.

There is biapical pleural thickening and blunting of the left costophrenic angle in keeping with a small effusion.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The left heart border is indistinct. The right heart border is clear.

There is a retrocardiac mass which has the density of gas.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

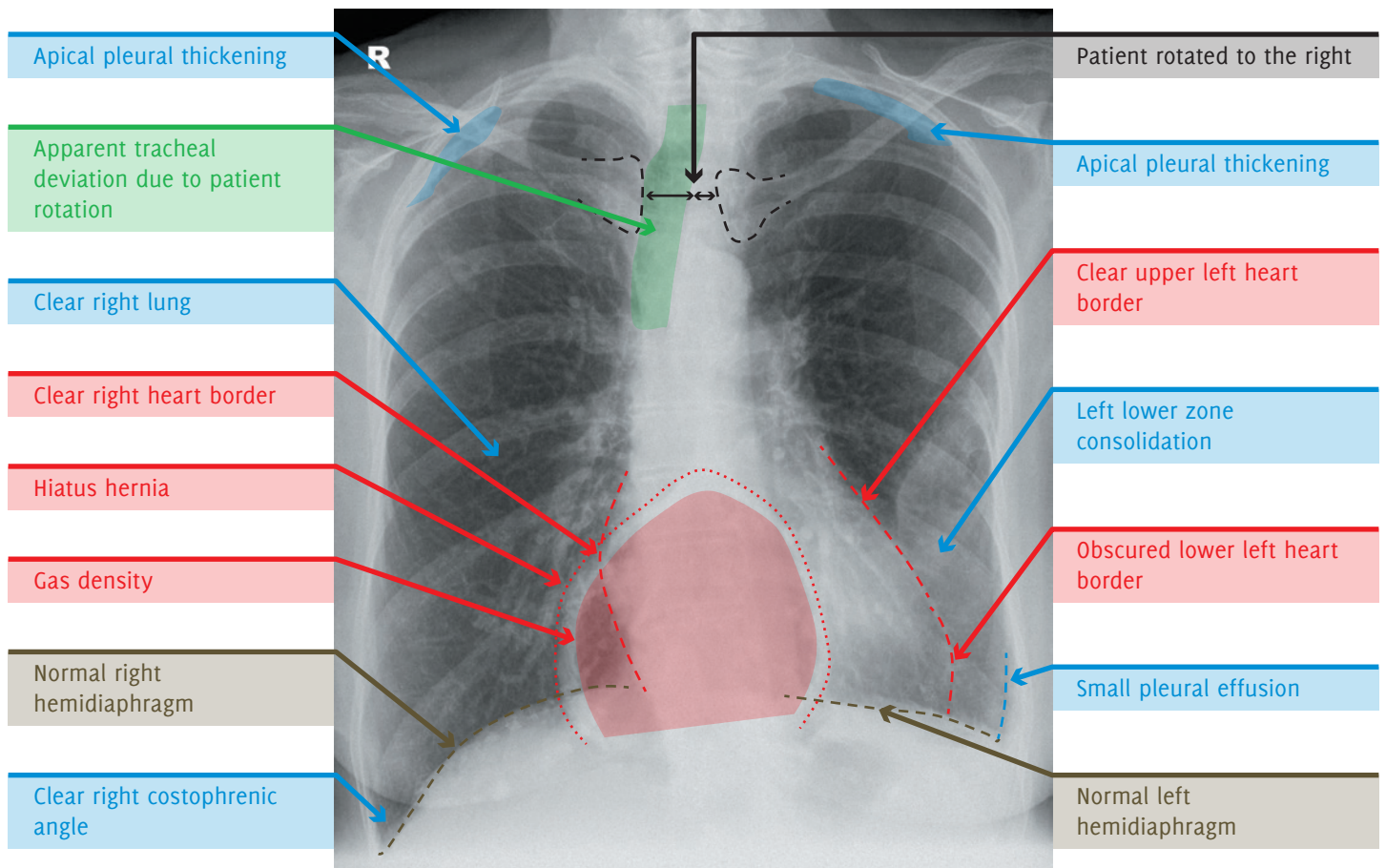
Lung Apices: Biapical pleural thickening

Hila: Normal

Behind Heart: Retrocardiac gas-filled opacity

Costophrenic Angles: Blunted left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates left lower zone consolidation causing loss of clarity of the left heart border in keeping with a lingular pneumonia. There is a small effusion. The retrocardiac opacity is in keeping with an incidental hiatus hernia.

Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken.

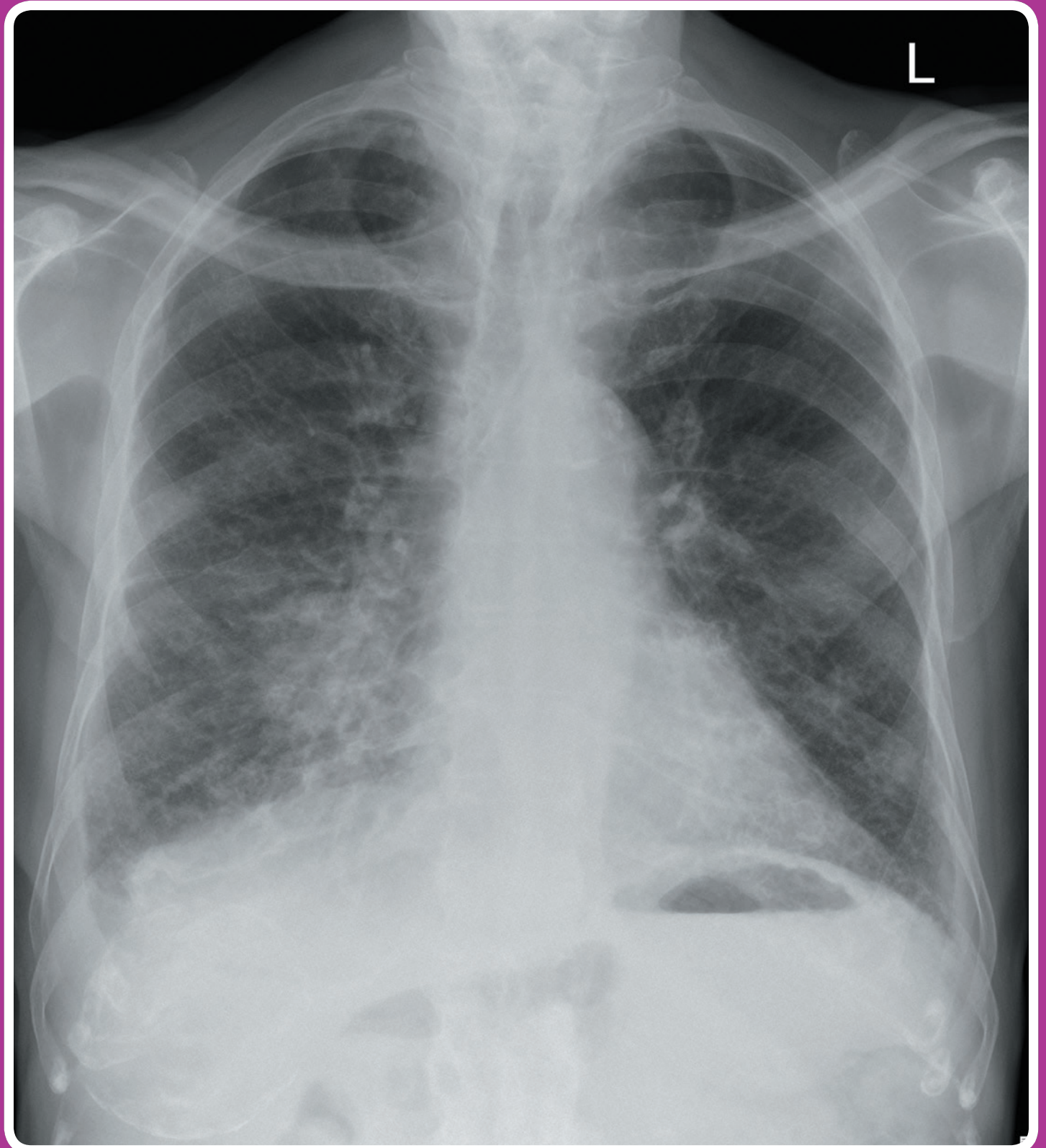
The patient should be treated with appropriate antibiotics for community-acquired pneumonia and a follow-up chest X-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

The hiatus hernia and apical pleural thickening are incidental findings which do not require active management.



CASE 68

An 80 year old male presents to ED with a 2 week history of a productive cough. There is no significant past medical history. He is a non-smoker. On examination, he has saturations of 92% in air, and is febrile with a temperature of 38°C. There is dullness to percussion and reduced air entry at the right lung base. A chest X-ray is requested to assess for possible pneumonia, effusion, or collapse.



REPORT – RIGHT MIDDLE LOBE CONSOLIDATION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is heterogeneous air space opacification in the medial aspect of the right lower zone in keeping with consolidation. The rest of the lungs are clear. The lungs are not hyperinflated.

The right costophrenic angle is blunt, consistent with a small pleural effusion. There is minor blunting of the left costophrenic angle, which may represent

pleural thickening or a small pleural effusion.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The right heart border is indistinct. The left heart border is clear.

The mediastinum is central, not widened, with clear borders.

The aorta appears normal.

The right hilum is obscured by the consolidation. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of the left diaphragm. The right hemidiaphragm appears less distinct but is still visible.

No pneumoperitoneum.

The imaged skeleton is intact with no fracture or destructive bony lesion visible.

There is a well-defined, rounded, calcified lesion projected over the liver in the right upper quadrant. The soft tissues are otherwise unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

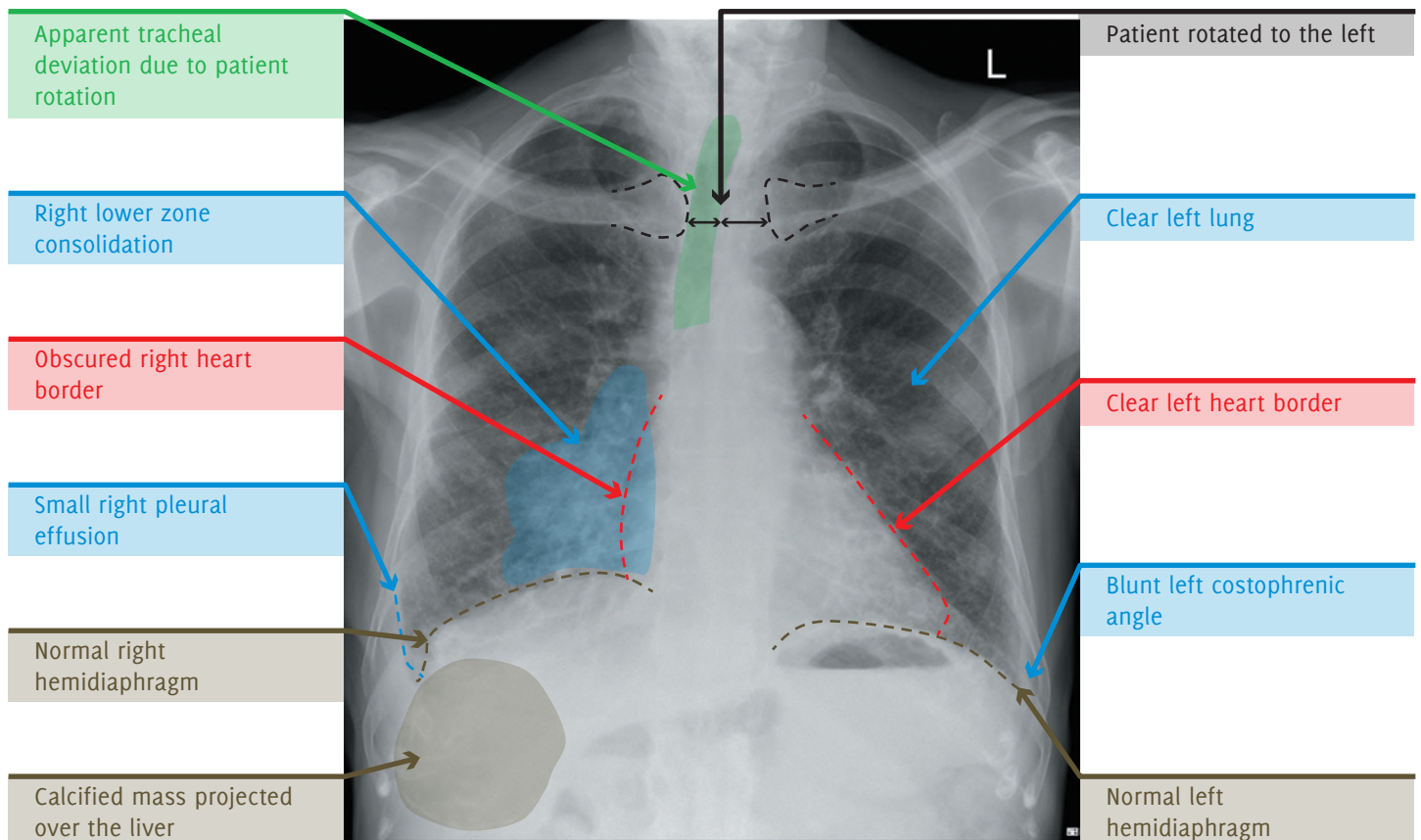
Lung Apices: Normal

Hila: The right hilar region is not clear due to consolidation. The left hilum is normal

Behind Heart: Normal

Costophrenic Angles: Small right pleural effusion

Below the Diaphragm: There is a calcified mass projected over the liver



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates right lower zone consolidation, which given the clinical details is consistent with pneumonia. The right heart border is difficult to identify suggesting right middle lobe pneumonia. There is a large, peripherally calcified mass projected over the liver. This is typical for a hydatid (Echinococcal) cyst.

Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, and blood cultures. Sputum culture can also be checked.

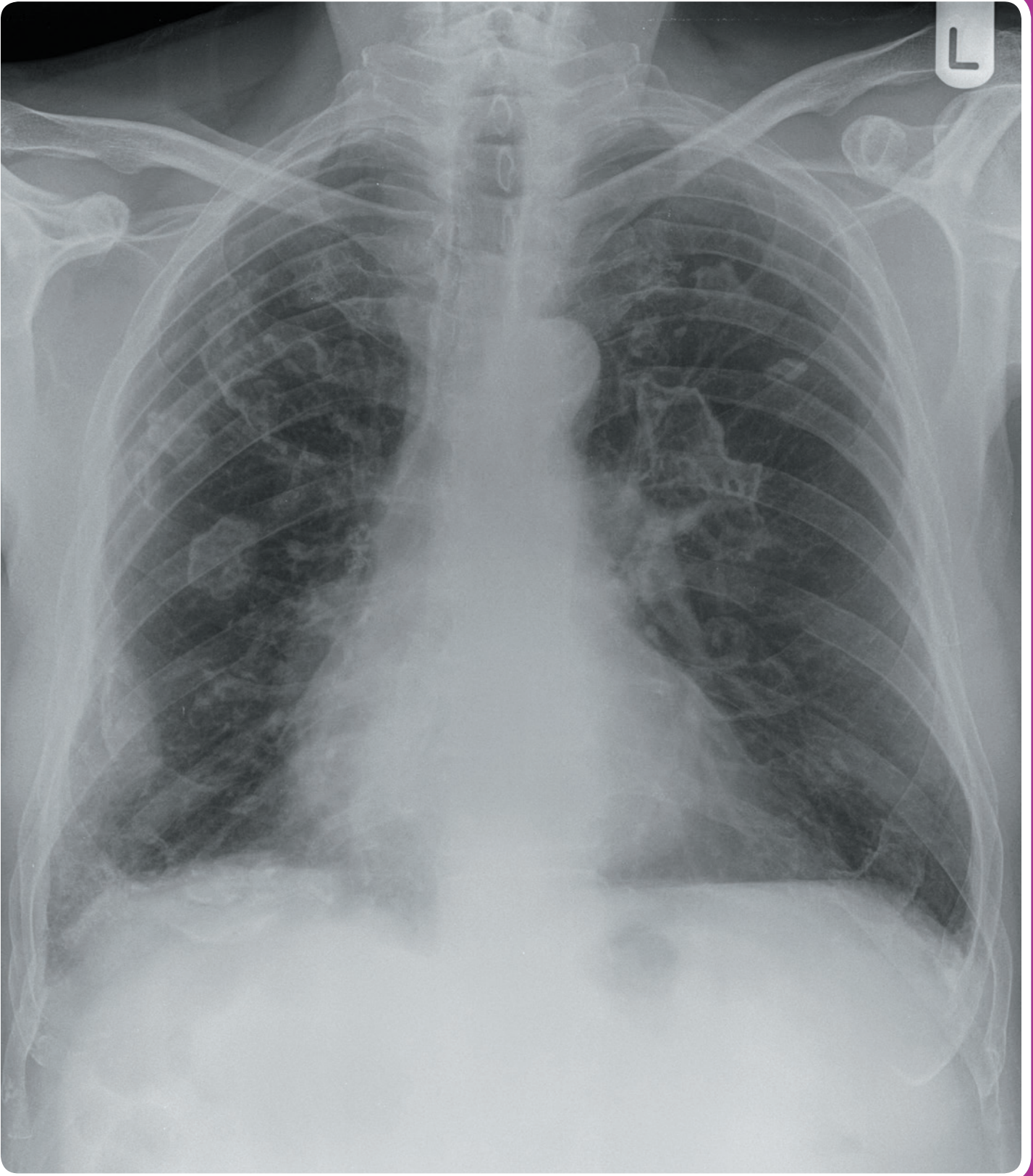
Appropriate antibiotics should be given to treat a community-acquired pneumonia, which may be oral or intravenous depending on the severity of pneumonia (CURB-65), with a follow up chest X-ray to ensure resolution.

The calcification over the liver requires further evaluation, for example via ultrasound or CT scan. If it is a hydatid cyst, this may be managed surgically or medically (e.g. albendazole), and should be discussed with the infectious diseases team.



CASE 69

An 80 year old male presents to ED with progressively worsening breathlessness. He used to work in the shipyards. He has a 60 pack year smoking history. On examination, he has saturations of 92% in air and is febrile with a temperature of 38.2°C. His RR is 25 with a HR of 80 bpm. There are crackles and dullness to percussion at the right lung base. There is also finger clubbing. A chest X-ray is requested to assess for possible pneumonia or malignancy.



REPORT – CALCIFIED PLEURAL PLAQUES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is mildly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is heterogeneous airspace opacification in the right lower zone in keeping with consolidation. The lungs are otherwise clear.

The lungs are not hyperinflated.

There are multiple irregular densities projected over the hemithoraces, consistent with calcified pleural plaques.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear. A left-sided epicardial fat pad is visible.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

There is calcification present overlying the right hemidiaphragm in keeping

with a pleural plaque. Otherwise normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

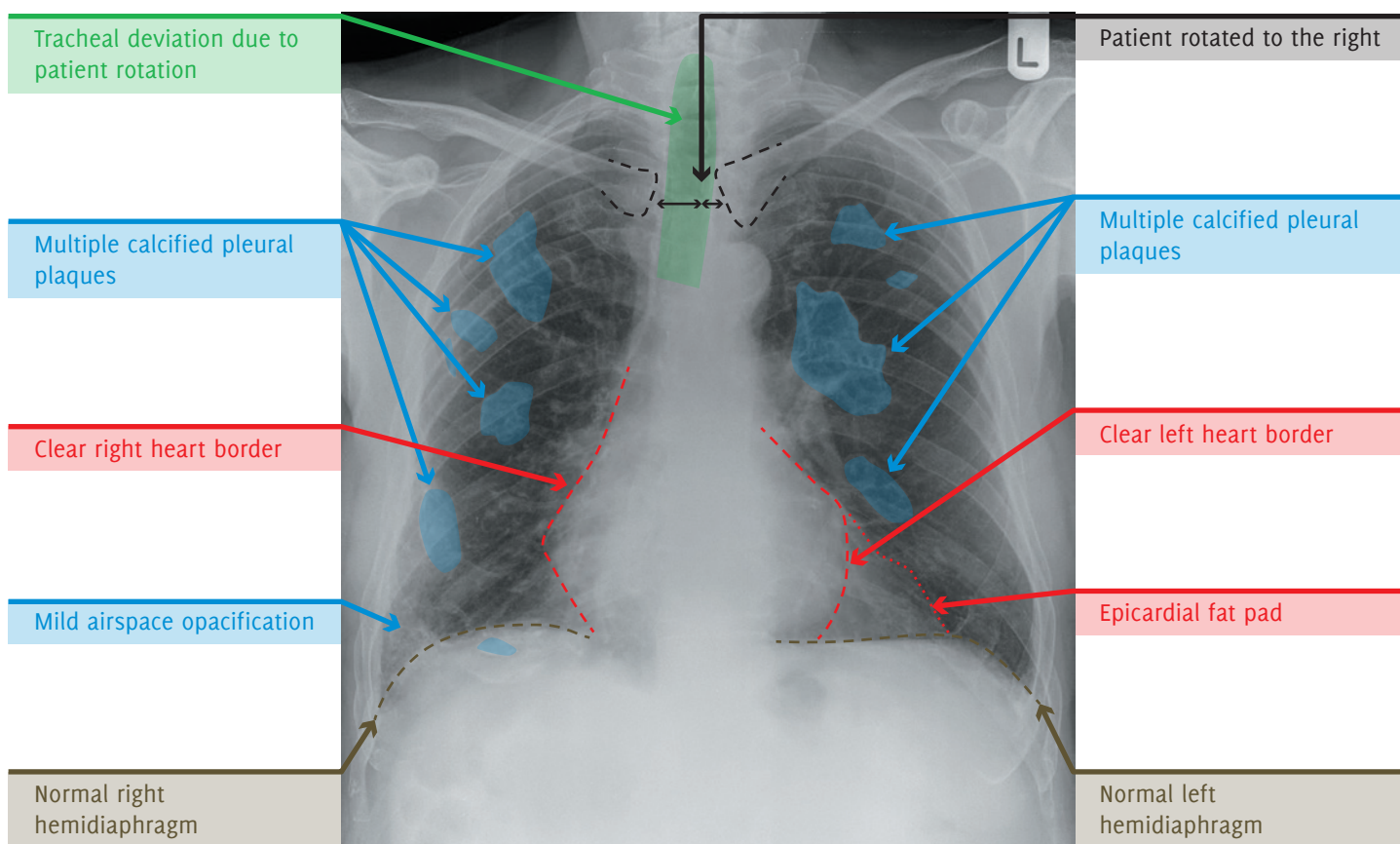
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Consolidation at the right costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates multiple irregularly shaped densities throughout both hemithoraces. These are consistent with calcified pleural plaques and indicate past asbestos exposure. Focal consolidation at the right costophrenic angle is in keeping with pneumonia.

Initial blood tests may include FBC, U/Es and CRP. Sputum and blood cultures may also be helpful. A follow up chest X-ray 4-6 weeks after appropriate antibiotics should be performed to ensure resolution of the pneumonia.

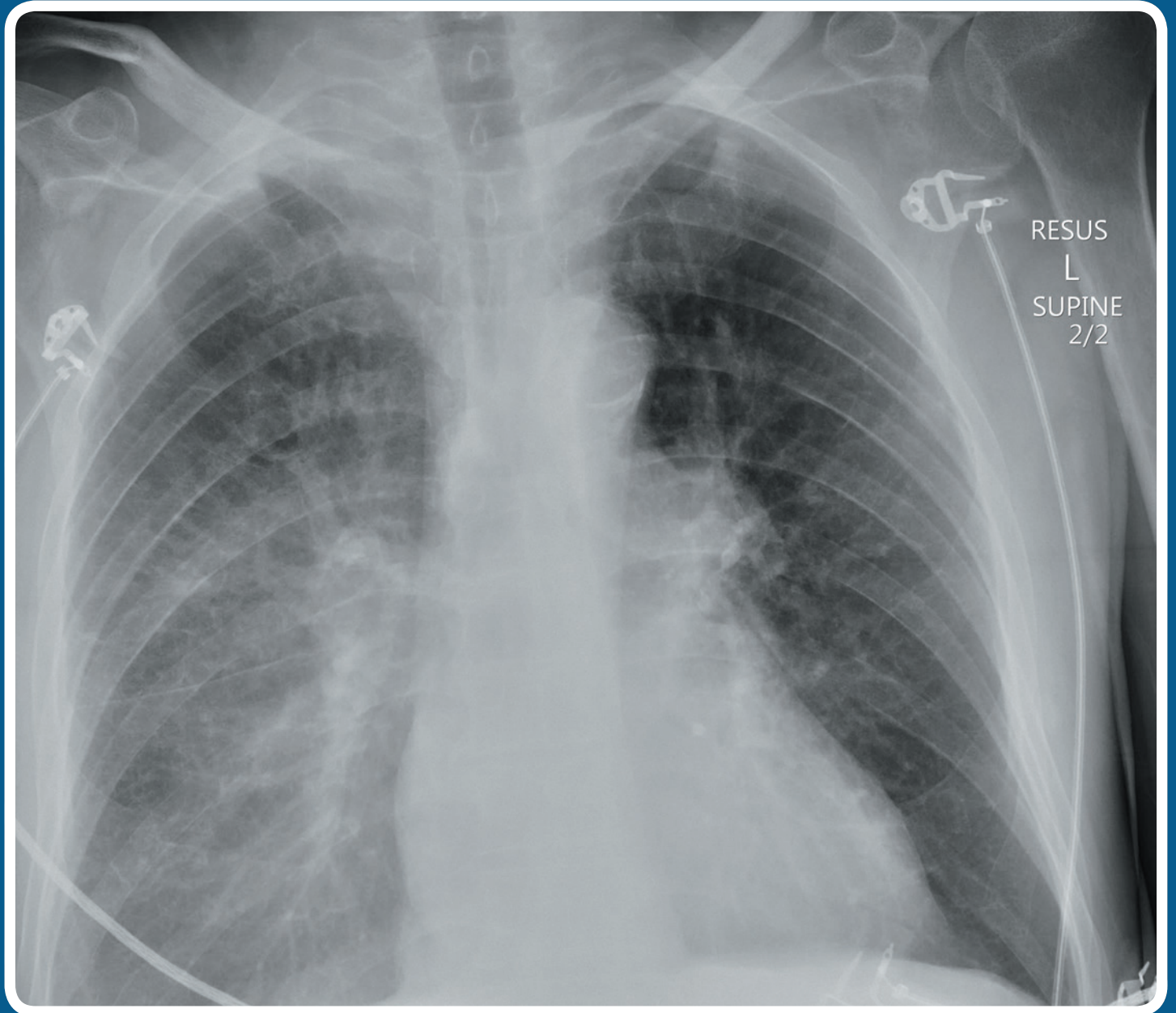
Previous imaging should be reviewed; if the pleural plaques are a new diagnosis the patient should be referred to respiratory for further assessment of asbestos-related lung disease.

ADVANCED CASES



CASE 70

A 58 year old male is brought to ED after falling off a ladder. He has right-sided chest pain and breathlessness. He has no significant past medical history. He is a non-smoker. On examination, he has saturations of 88% in air, his HR is 122 bpm and BP 108/68 mmHg. There is decreased air entry in the right hemithorax. A chest X-ray is requested to assess for a possible pneumothorax.



REPORT – SUPINE PLEURAL EFFUSION

Patient ID: Anonymous
Projection: AP Supine
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central.

BREATHING

The right lower zone, and costophrenic angles have not been fully included on the X-ray.

There is hazy opacification in the right hemithorax compared with the left side. This is more marked in the lower and mid zones, and fades in the upper zone. Normal bronchovascular markings are

clearly visible through the opacification and there are no air bronchograms.

The left lung is clear.

Normal pulmonary vascularity.

CIRCULATION

The heart size cannot be accurately assessed on an AP X-ray. The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

The right hemidiaphragm is not included on the X-ray. Normal appearance and position of the left hemidiaphragm.

It is not possible to accurately assess for pneumoperitoneum due to the limited X-ray coverage and supine positioning.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

EXTRAS + REVIEW AREAS

ECG monitoring leads in situ. No vascular lines, tubes, or surgical clips.

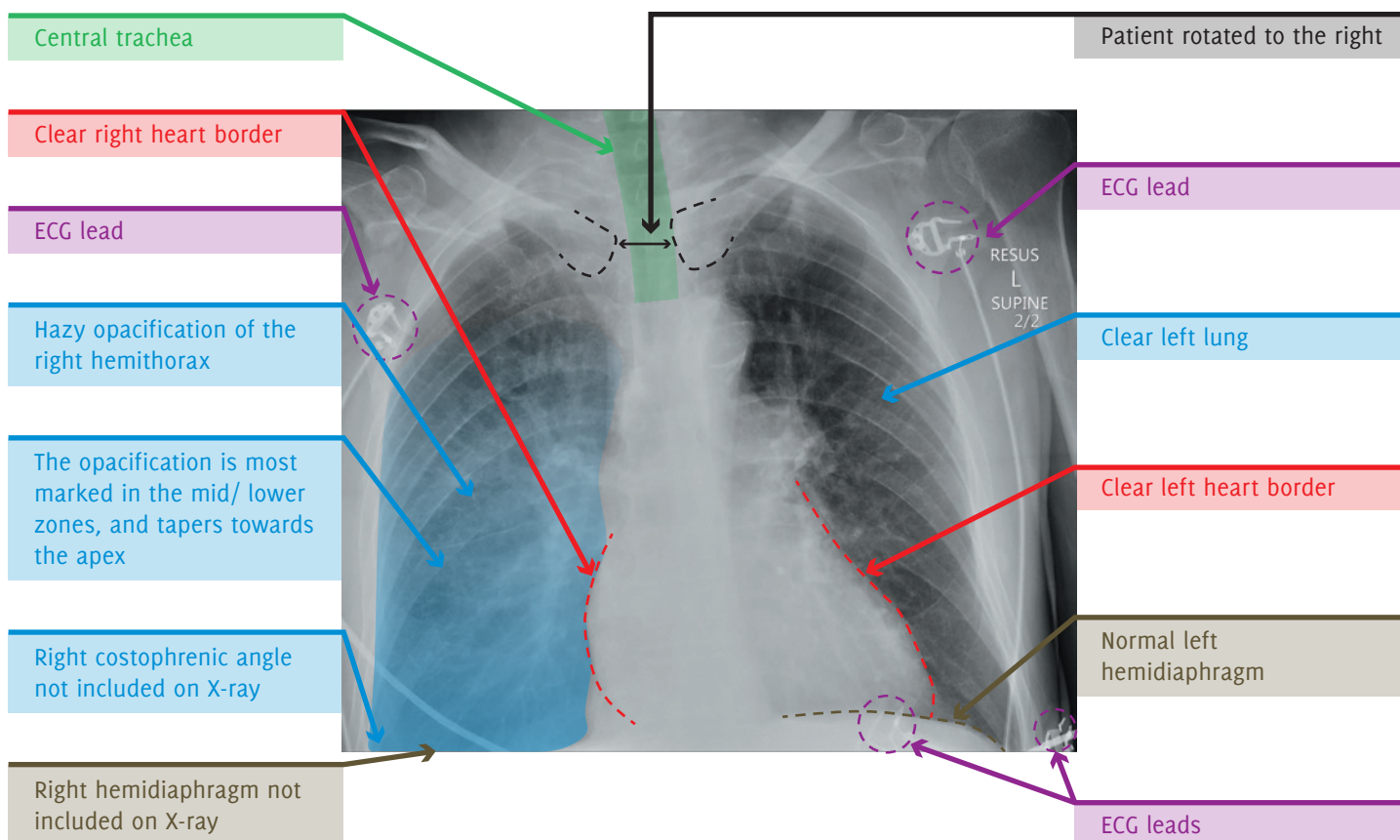
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Not included on the X-ray.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates hazy opacification in the right hemithorax. The presence of normal bronchovascular markings indicates the abnormality is outside the lung parenchyma. Given the supine projection, these findings are in keeping with fluid layering dependently in the posterior pleural space (i.e. a moderate right-sided pleural effusion). The opacification is most marked in the mid/lower zones as this is the most dependent part of the posterior pleural space in the supine position.

In the context of trauma this effusion is likely to represent a haemothorax. There should be a high suspicion for underlying rib fractures even though none are visible on the X-ray. There is

no evidence of pneumothorax, although this can be difficult to identify on a supine X-ray.

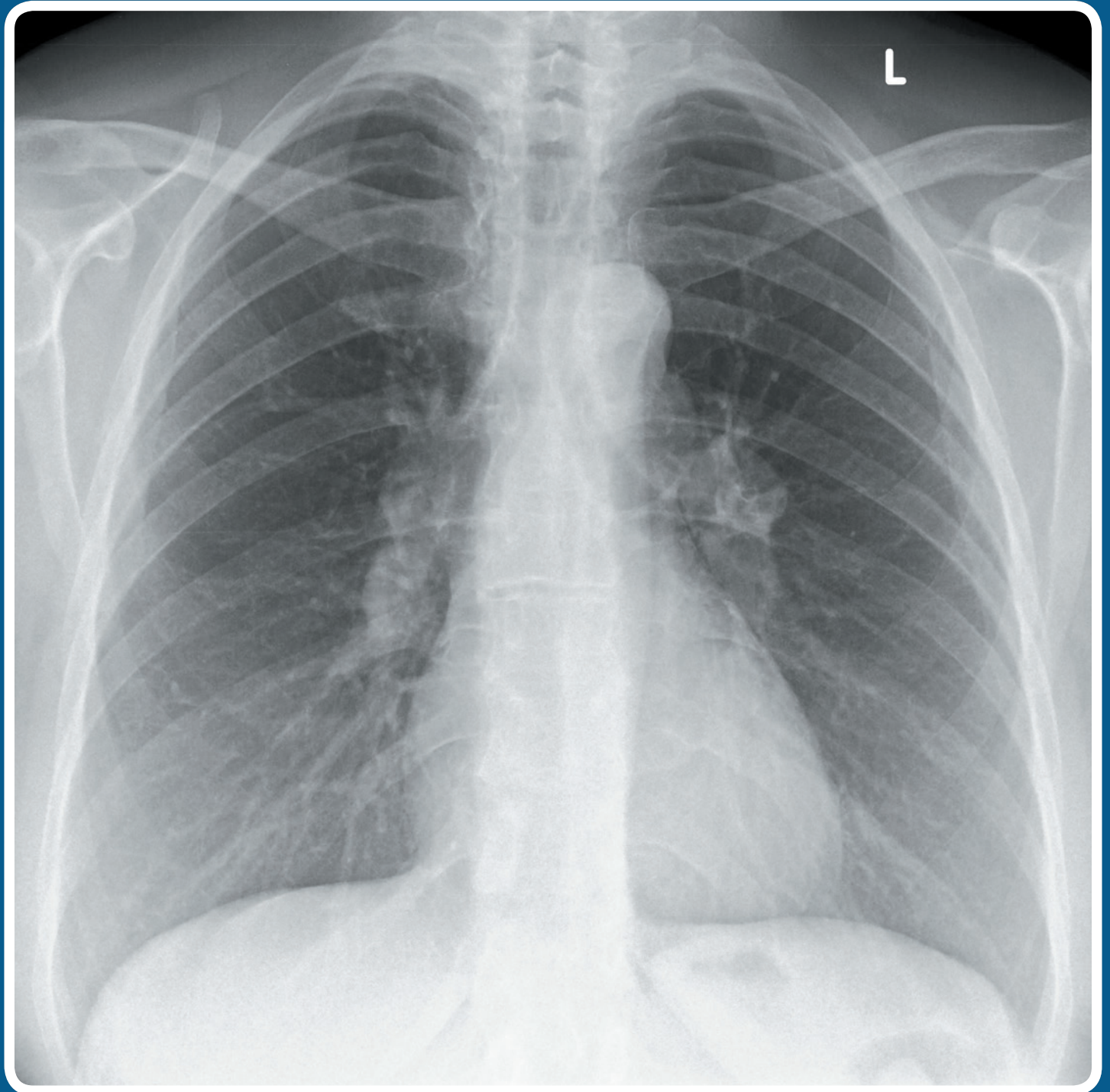
The patient needs to be assessed and resuscitated using the ATLS algorithm. Cardiothoracic surgery should be involved and a right sided chest drain will be required.

Imaging with contrast-enhanced CT will provide more accurate assessment of the thorax. Other parts of the body (head, cervical spine, abdomen or pelvis) can also be imaged with CT depending on the clinical assessment.



CASE 71

A 28 year old female presents to her GP feeling lethargic, breathless, and with a dry cough. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Her RR is 20 with a HR of 83 bpm. Lungs are resonant throughout, with good air entry bilaterally. She has enlarged lymph nodes in her neck. A chest X-ray is requested to assess for possible pneumonia, malignancy or an autoimmune disorder.



REPORT – SARCOIDOSIS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

There is a convex contour to the aortopulmonary window in keeping with lymph node enlargement. The mediastinum is otherwise normal. In particular there is no widening of the right paratracheal stripe.

Both hila have a lobulated convex appearance.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

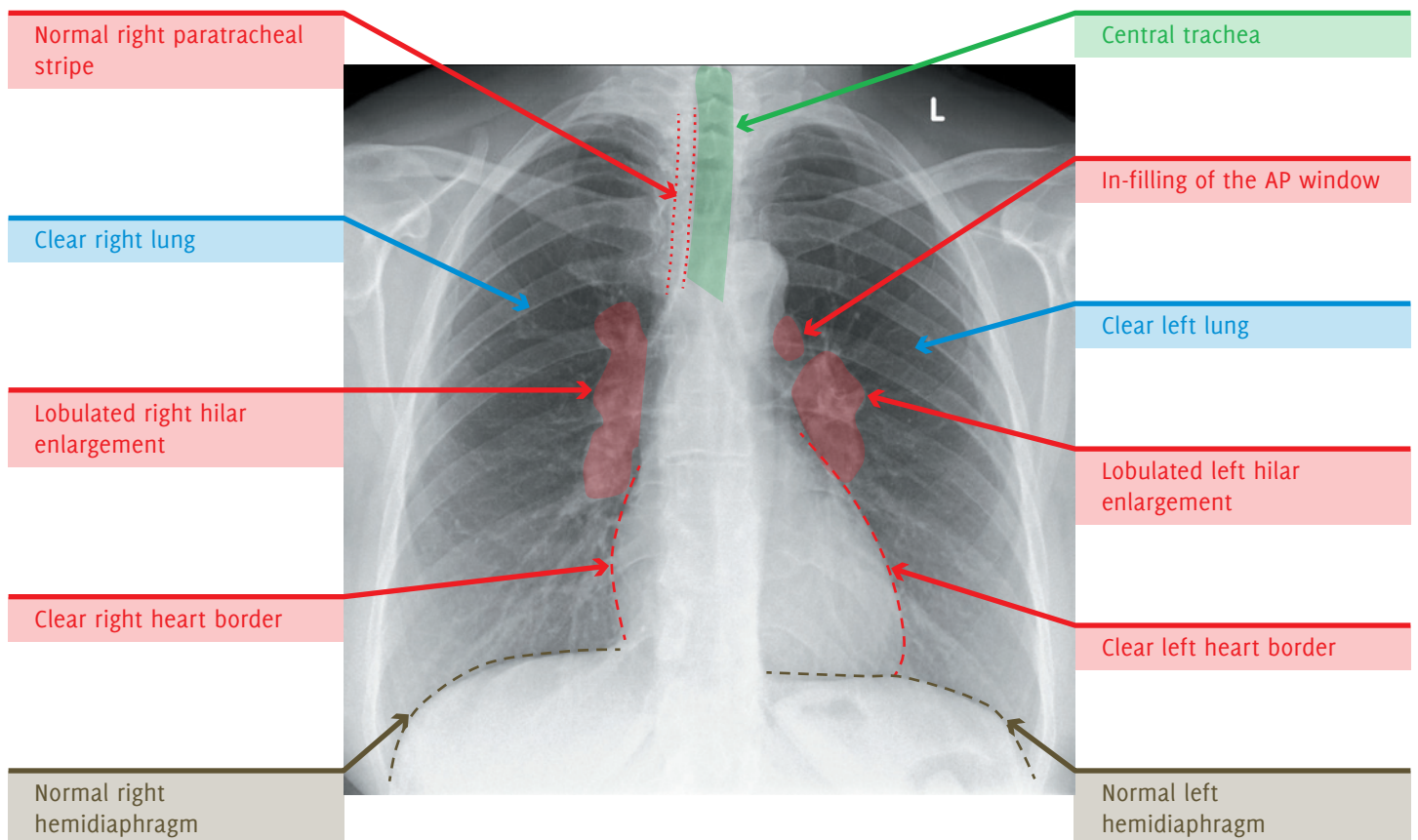
Lung Apices: Normal

Hila: Bilateral hilar and aortopulmonary window lymph nodes

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

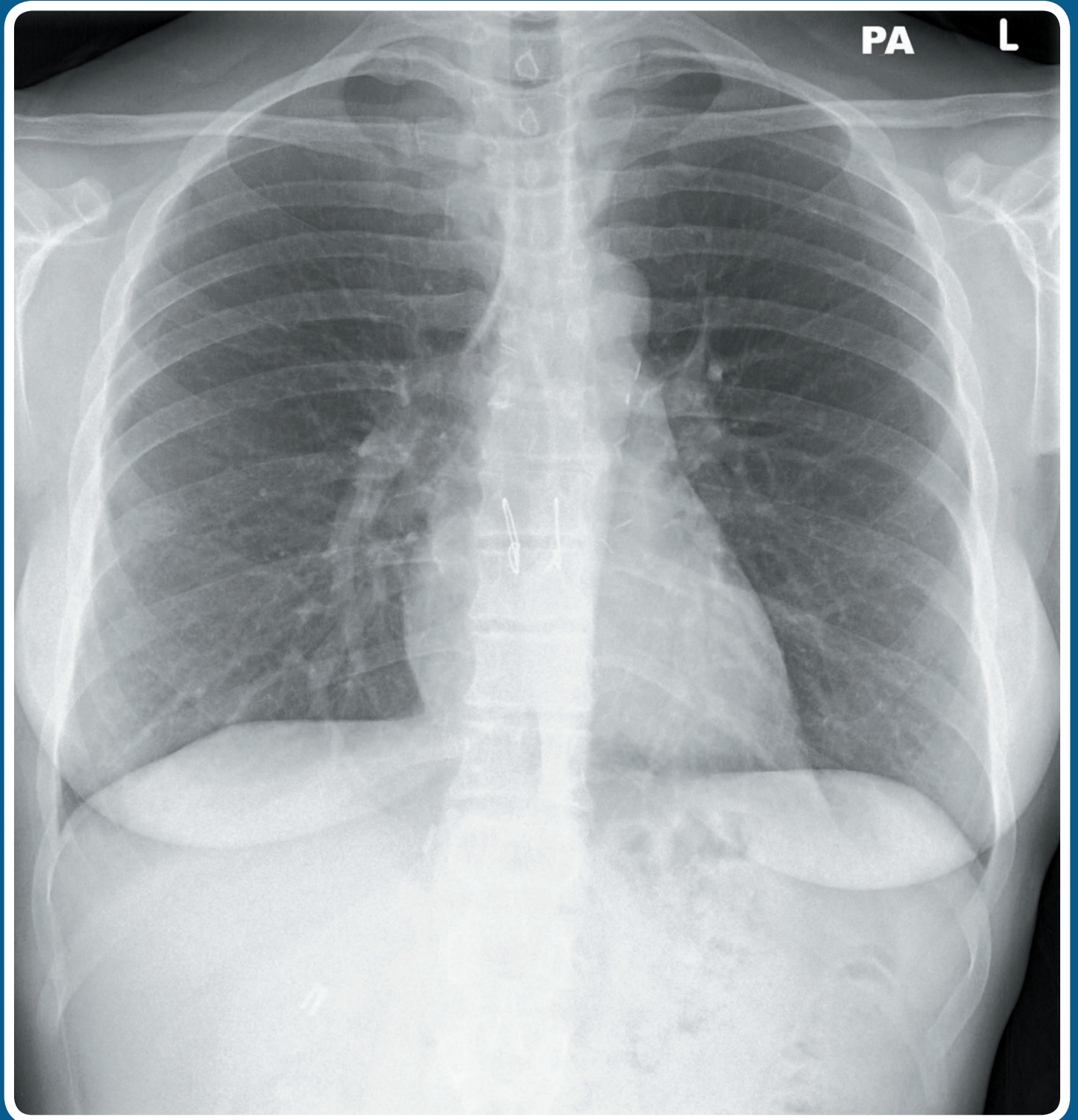
This chest X-ray demonstrates symmetrical hilar lymph node enlargement, with further aortopulmonary window nodes. There is no widening of the right paratracheal stripe to indicate paratracheal lymph node enlargement, and the lung parenchyma appears normal. In the context of the history, the findings are consistent with sarcoidosis (Stage I). The symmetrical hilar appearance makes other causes of lymph node enlargement, such as lymphoma and TB, unlikely.

Initial blood tests may include FBC, U/Es, LFTs, bone profile, serum ACE levels, urinalysis, and ECG. High resolution CT of the chest can be performed if more detailed chest imaging is required. Corticosteroids may be prescribed.



CASE 72

A 34 year old female presents to the respiratory outpatient clinic for follow up after a double lung transplant. She has a background of cystic fibrosis, for which she had the surgery. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Her RR is 16 with a HR of 73 bpm. Lungs are resonant throughout and there is good air entry bilaterally. A chest X-ray is requested as part of routine follow up care to look for any possible transplant complications (e.g. fibrosis or infection).



REPORT – DOUBLE LUNG TRANSPLANT

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There are surgical clips projected bilaterally over the hilar regions. There are transverse sternotomy sutures projected over the lower mediastinum in the midline.

No vascular lines or tubes.

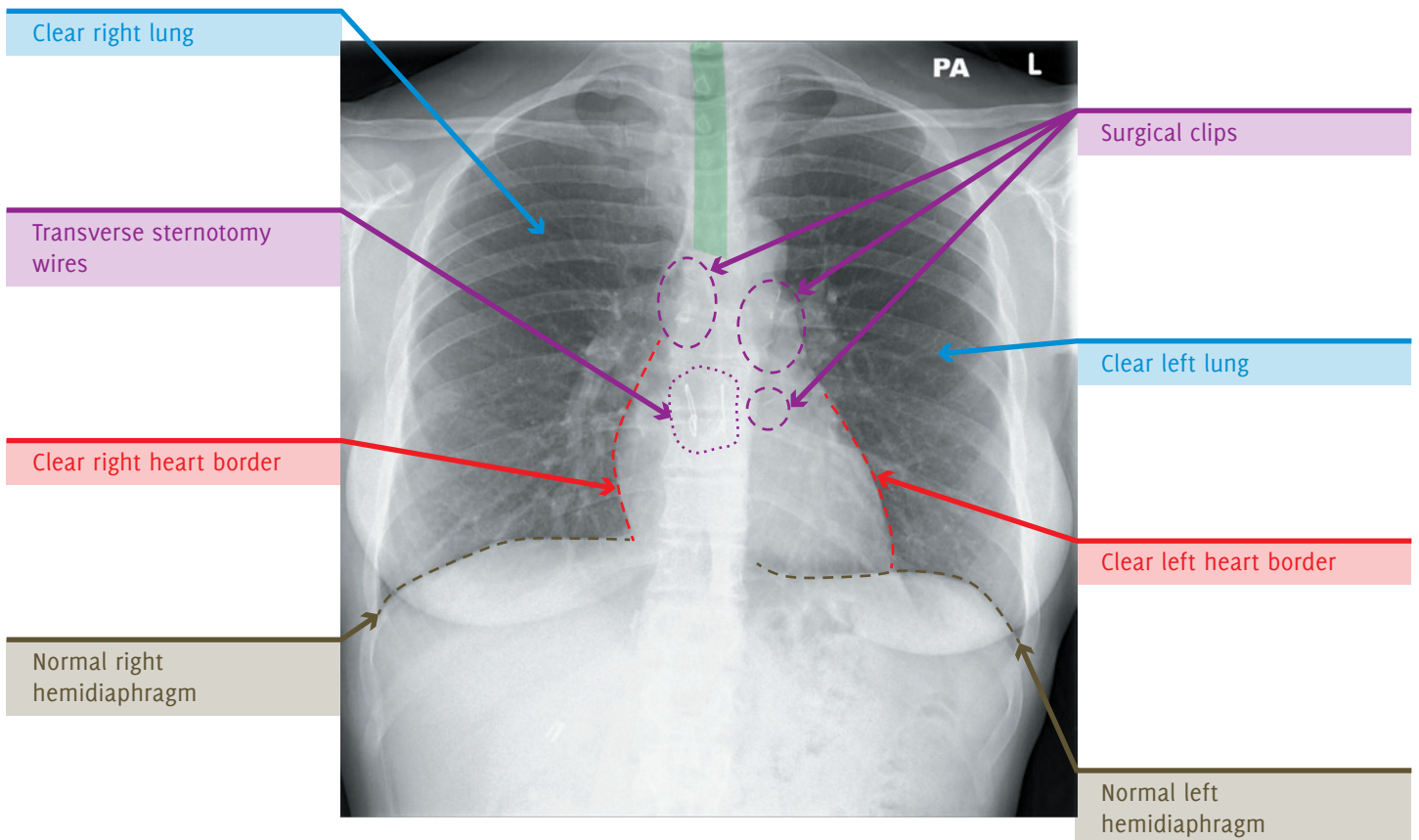
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

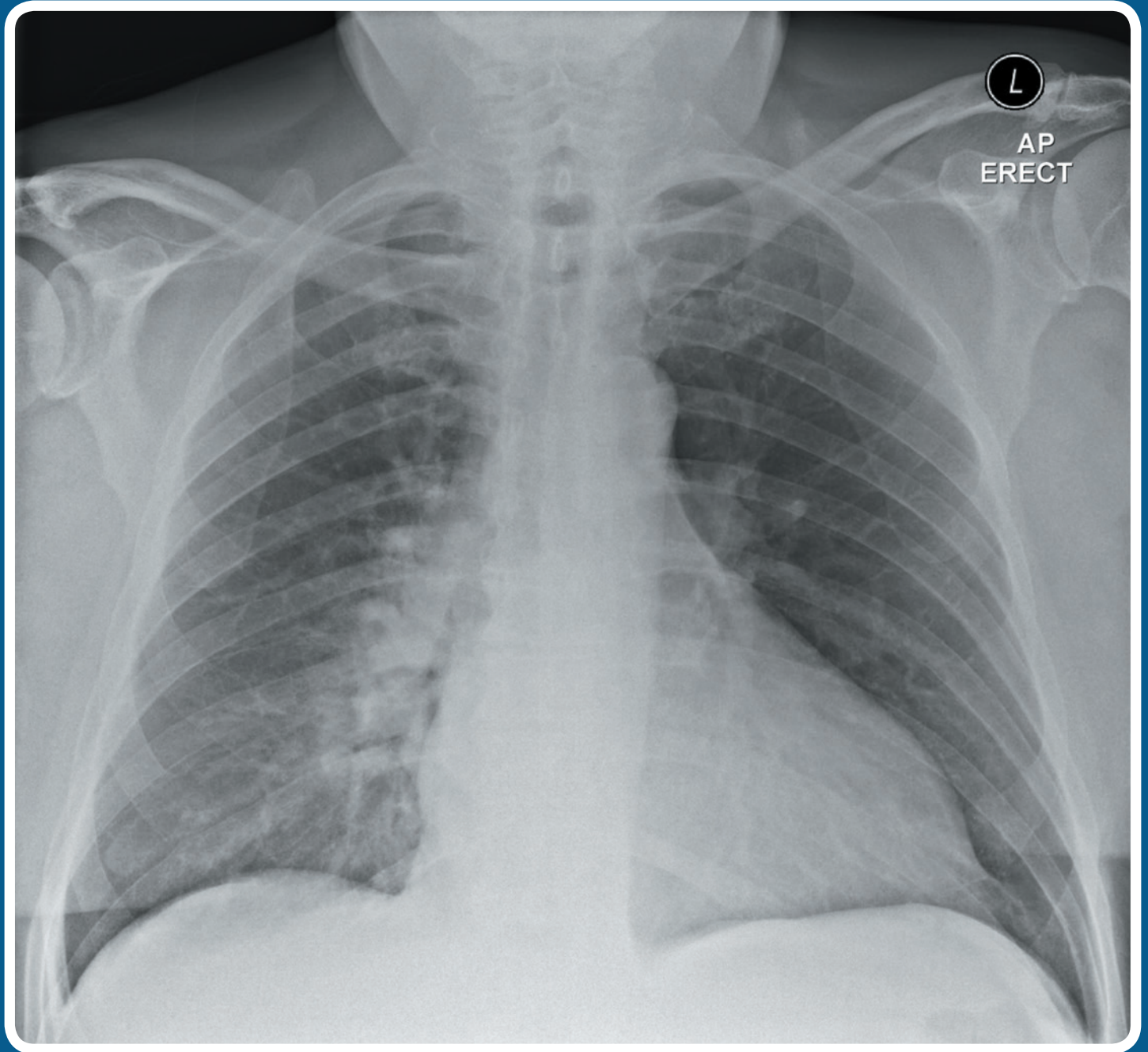
This X-ray demonstrates surgical clips and transverse sternotomy wires, consistent with a previous double lung transplant, presumably for end-stage cystic fibrosis. The lungs and pleural spaces are clear.

No specific additional management is required based on the X-ray. Routine post-transplant investigations should be obtained, including lung function testing, bronchoscopy, and monitoring levels of any immunosuppressant therapy.



CASE 73

A 46 year old male presents to ED with a feeling of general lethargy, malaise, pyrexia and flu-like symptoms. There is no significant past medical history, and he is a non-smoker. On examination, he has saturations of 89% in air and is febrile with a temperature of 38°C. Lungs are resonant throughout with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia.



REPORT – HILAR LYMPHADENOPATHY

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear, although the left costophrenic angle has not been fully included.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

The right hilum is enlarged and abnormally dense. Normal size, shape and position of the left hilum.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes or surgical clips.

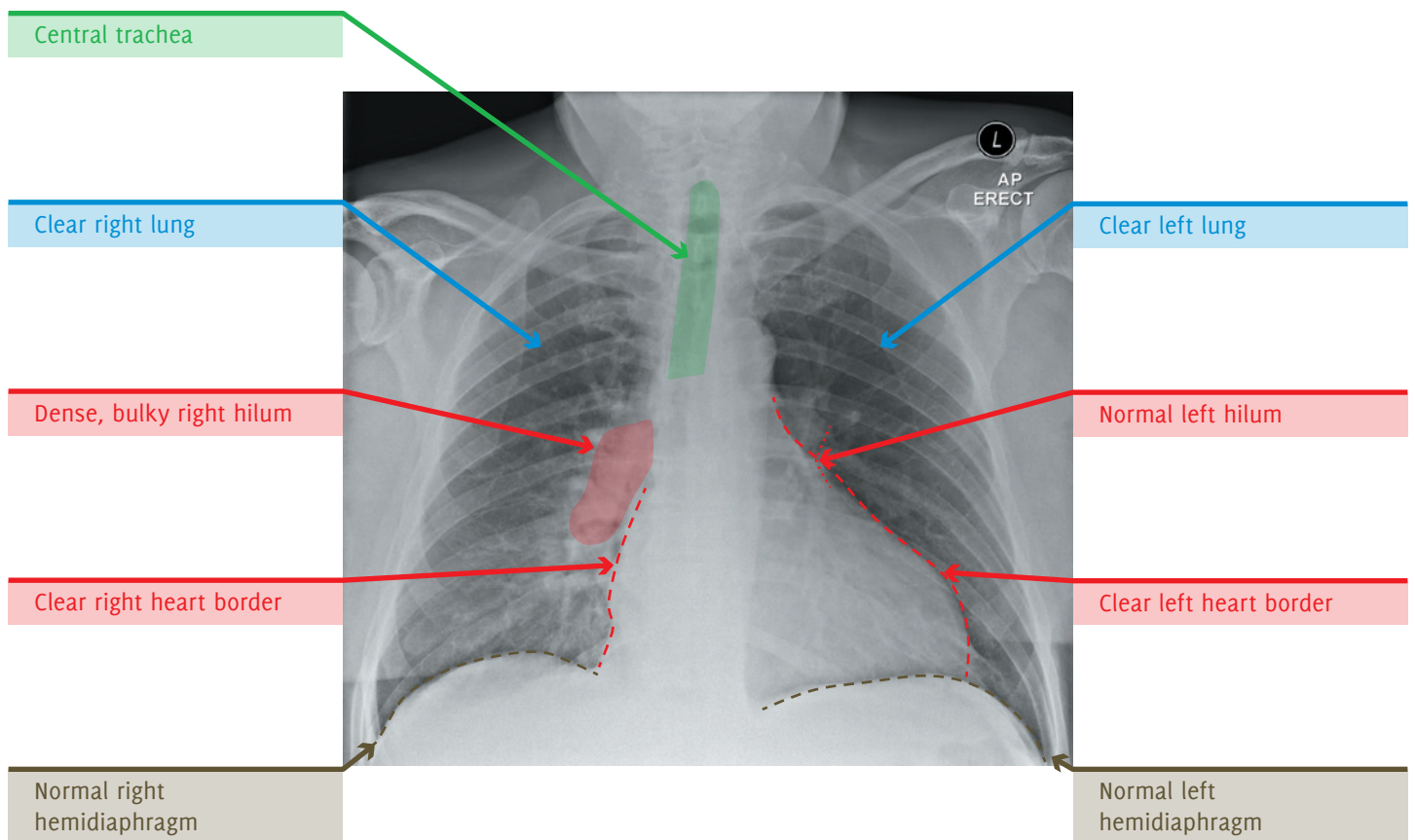
Lung Apices: Normal

Hila: Enlarged, dense right hilum. Normal left hilum.

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates an enlarged, dense right hilum, likely due to hilar lymph node enlargement. The differential diagnosis includes infection, such as tuberculosis and histoplasmosis, lymphoma, sarcoidosis and metastatic disease.

The patient needs further clinical and radiological assessment to narrow the differential diagnosis. Initial blood tests may include FBC, U/Es, ESR, LFTs, bone profile, serum ACE and spirometry. Auto-antibody screening, quantiferon (for TB) and other tests should be considered.

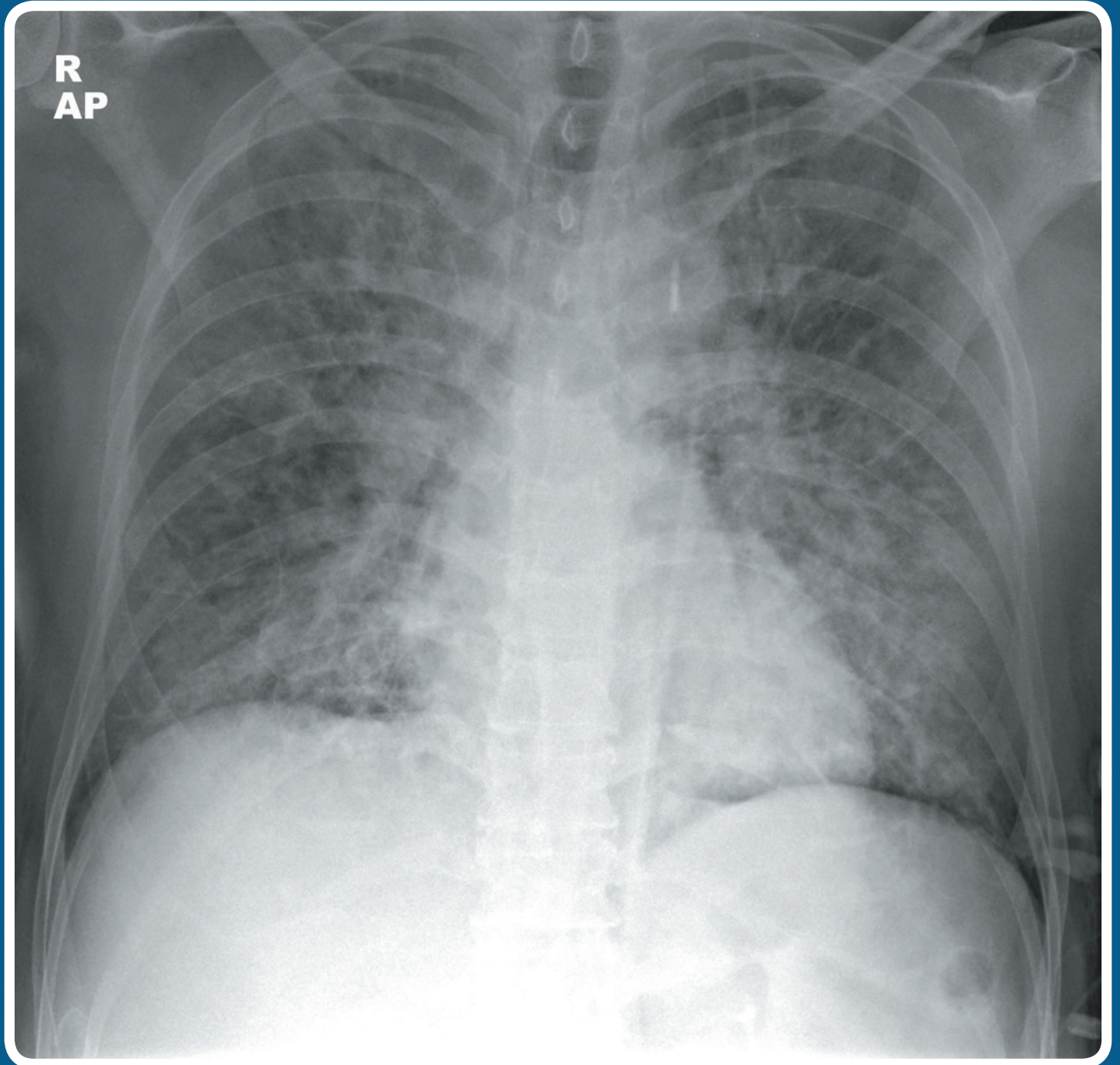
Any previous relevant imaging should be reviewed. A CT of the chest could be performed for further assessment. The abdomen and pelvis should also be imaged if malignant disease is considered likely. If lymphoma is considered then the neck should also be included.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion.



CASE 74

A 55 year old man is in the intensive care unit. He was found collapsed on the street the previous day, and was brought to ED via ambulance. He was haemodynamically unstable on arrival with diffuse crackles in his lungs. The first chest X-ray showed marked pulmonary oedema. He was commenced on a furosemide infusion, and an intra-aortic balloon pump was inserted. A repeat chest X-ray is requested the next day to assess his response to treatment.



REPORT – PULMONARY OEDEMA

Patient ID: Anonymous
 Projection: AP
 Penetration: Adequate – vertebral bodies just visible behind heart
 Inspiration: Adequate – 6 anterior ribs visible
 Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is generalised interstitial opacification with increased pulmonary vascularity seen within the upper lobes, in keeping with bilateral upper lobe venous blood diversion. There is bilateral airspace opacification in the perihilar regions.

The lungs are not hyperinflated.

The pleural spaces are clear.

CIRCULATION

The heart is not enlarged, even allowing for the magnification caused by the AP projection.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Both hila appear enlarged but they are in a normal position, with no increased density.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There is a radio-opacity projected over the arch of the aorta, in keeping with an intra-aortic balloon pump. No vascular lines, tubes, or surgical clips.

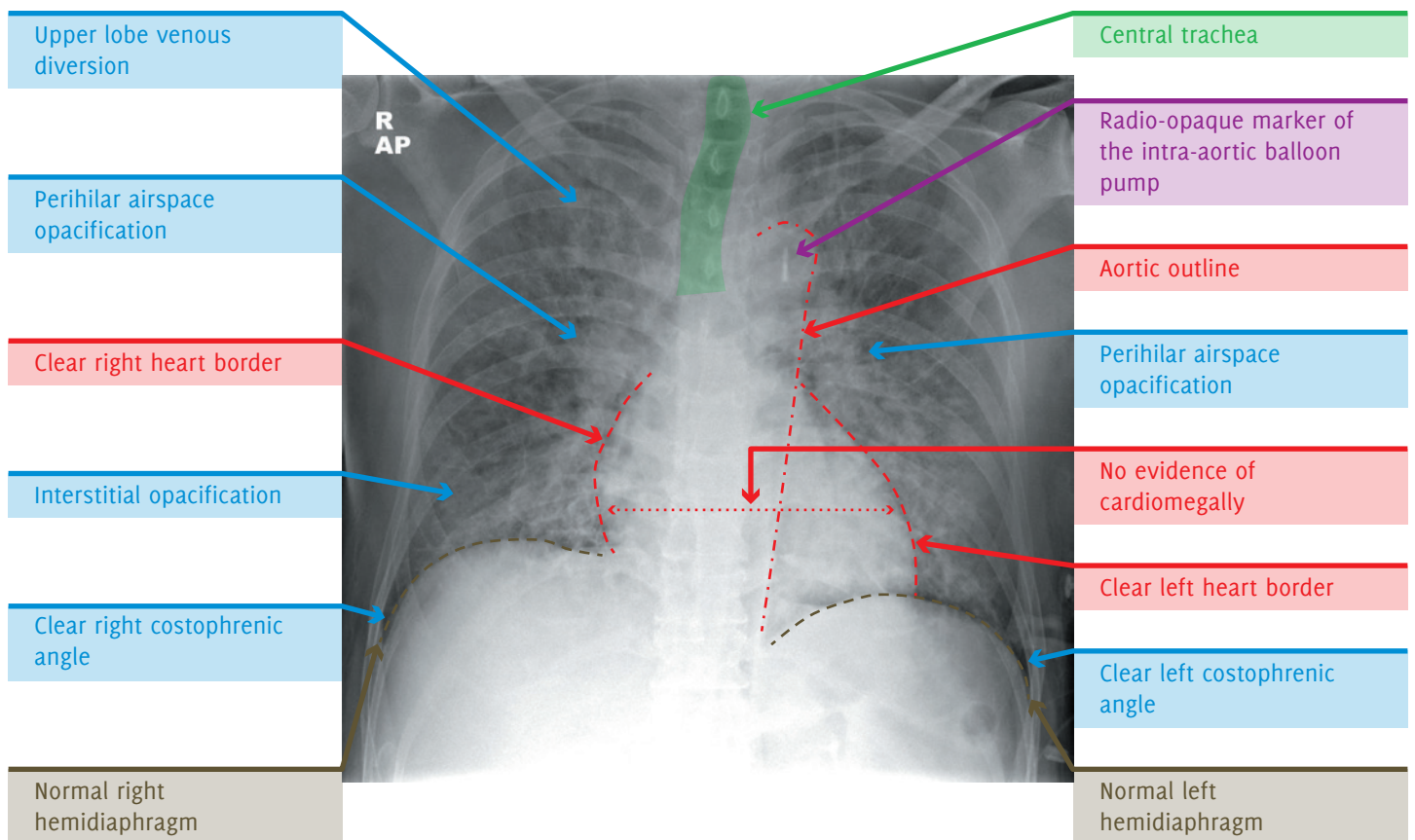
Lung Apices: Increased vascularity within the apices of the lung indicating upper lobe blood diversion

Hila: Increased alveolar opacification in the hilar region

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates interstitial and alveolar opacification along with upper lobe venous diversion, in keeping with pulmonary oedema. There is an intra-aortic balloon pump in situ, suggesting this is cardiogenic pulmonary oedema.

The chest X-ray should be compared with previous X-rays to assess for interval change. An ECHO (if not already performed) should be considered to assess left ventricular function. The patient's oxygenation and ventilation status can be monitored with serial arterial blood gases. Continue fluid monitoring/management and cardiovascular support in Intensive Care Unit.

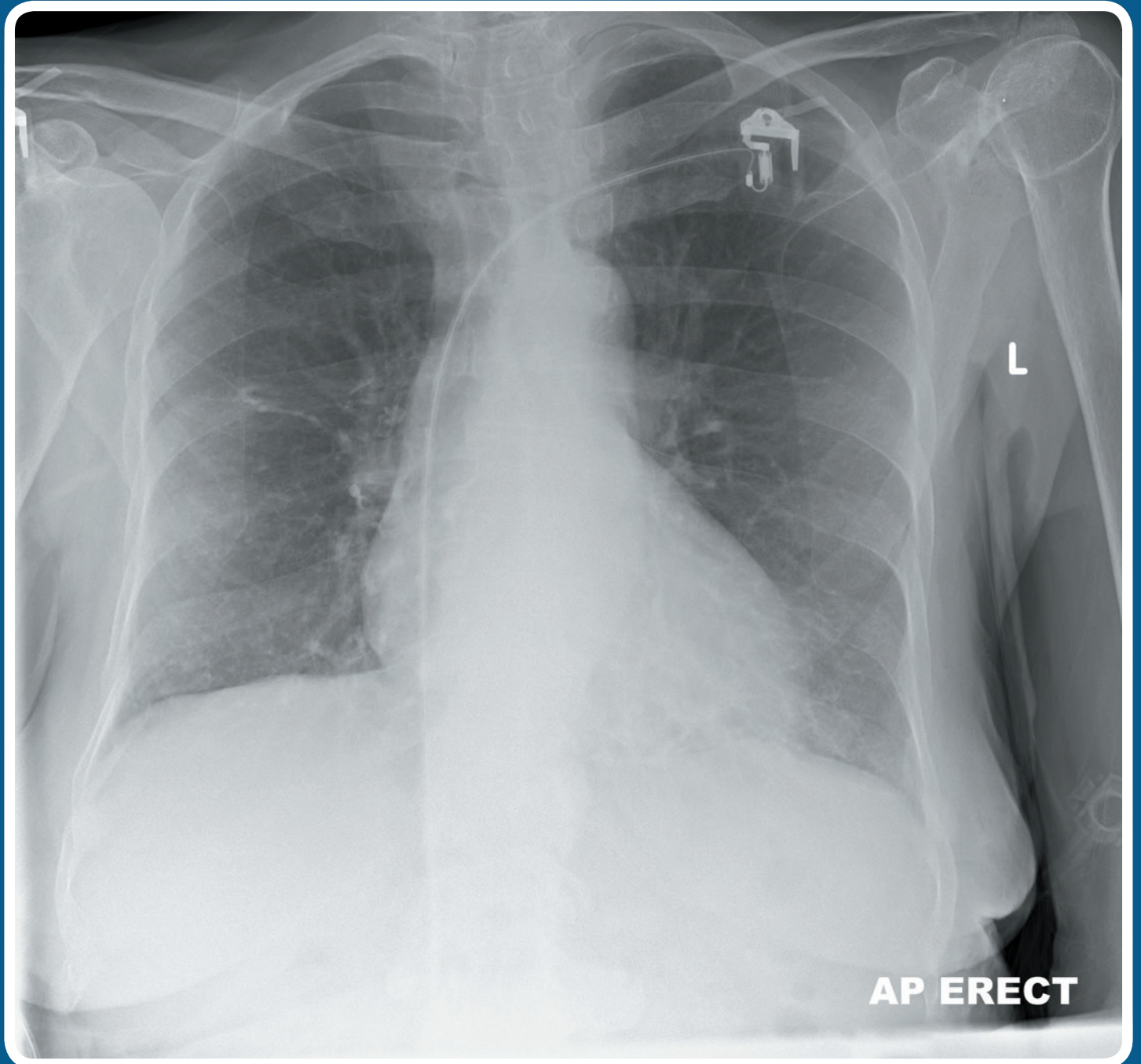
Diuretic therapy may need to be optimised if the pulmonary oedema is worsening.

Serial chest X-rays should be performed to assess response to treatment.



CASE 75

A 78 year old female presents to ED after a mechanical fall, which was preceded by light-headedness. She has severe right-sided chest pain. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 92% in air and is afebrile. Her RR is 24 with a HR of 90 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible rib fractures or a pneumothorax.



REPORT – ANTERIOR SHOULDER DISLOCATION

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea central after factoring in patient rotation.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

There is mild unfolding of the thoracic aorta.

The mediastinum is central allowing for patient rotation, not widened and with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The partially imaged right humeral head is abnormally positioned, lying inferior to the coracoid process. This is suggestive of an anterior dislocation. The imaged skeleton is otherwise intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG monitoring leads in situ. No vascular lines, tubes, or surgical clips.

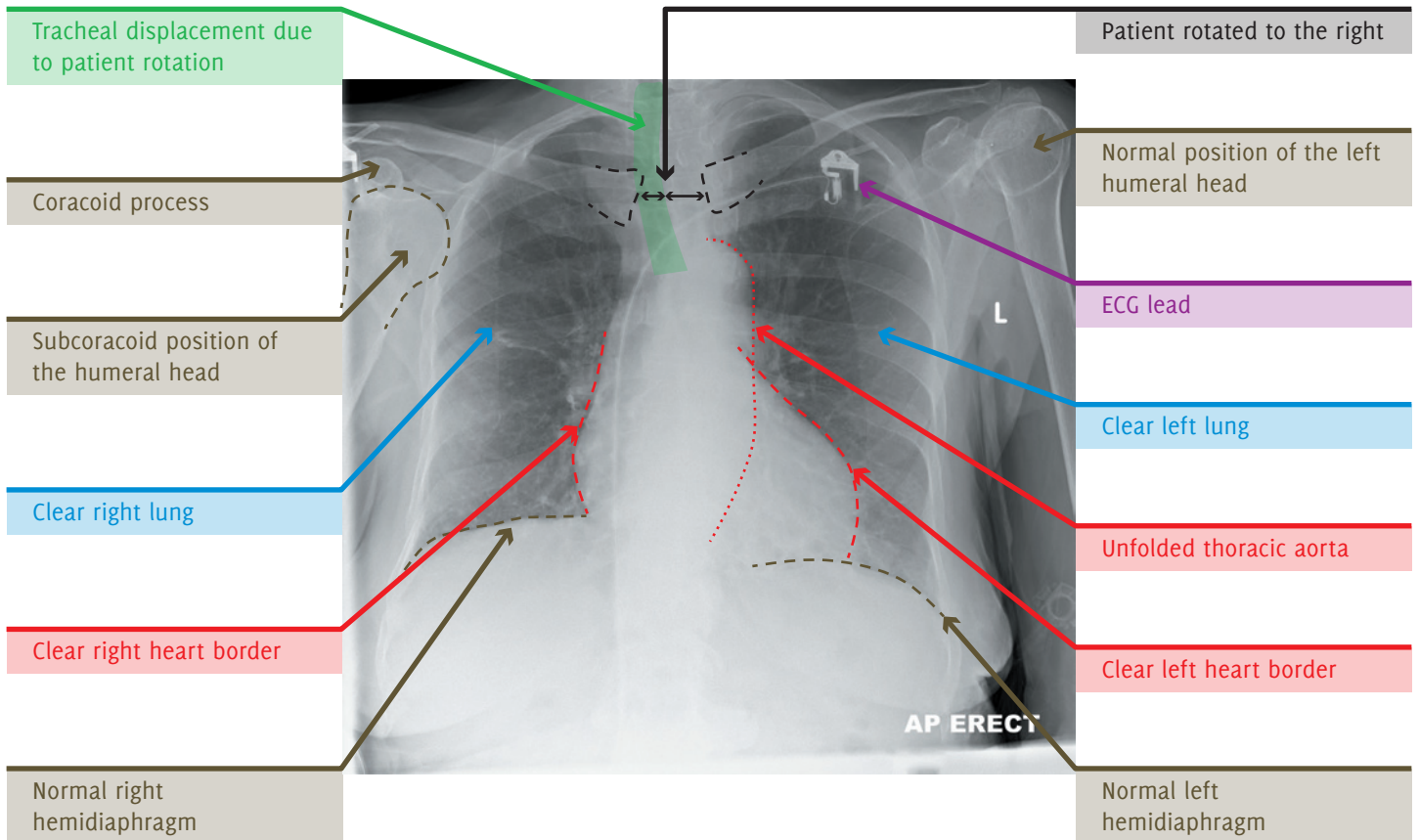
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates a likely anterior dislocation of the right shoulder. The lungs are clear and there is no rib fracture or pneumothorax visible.

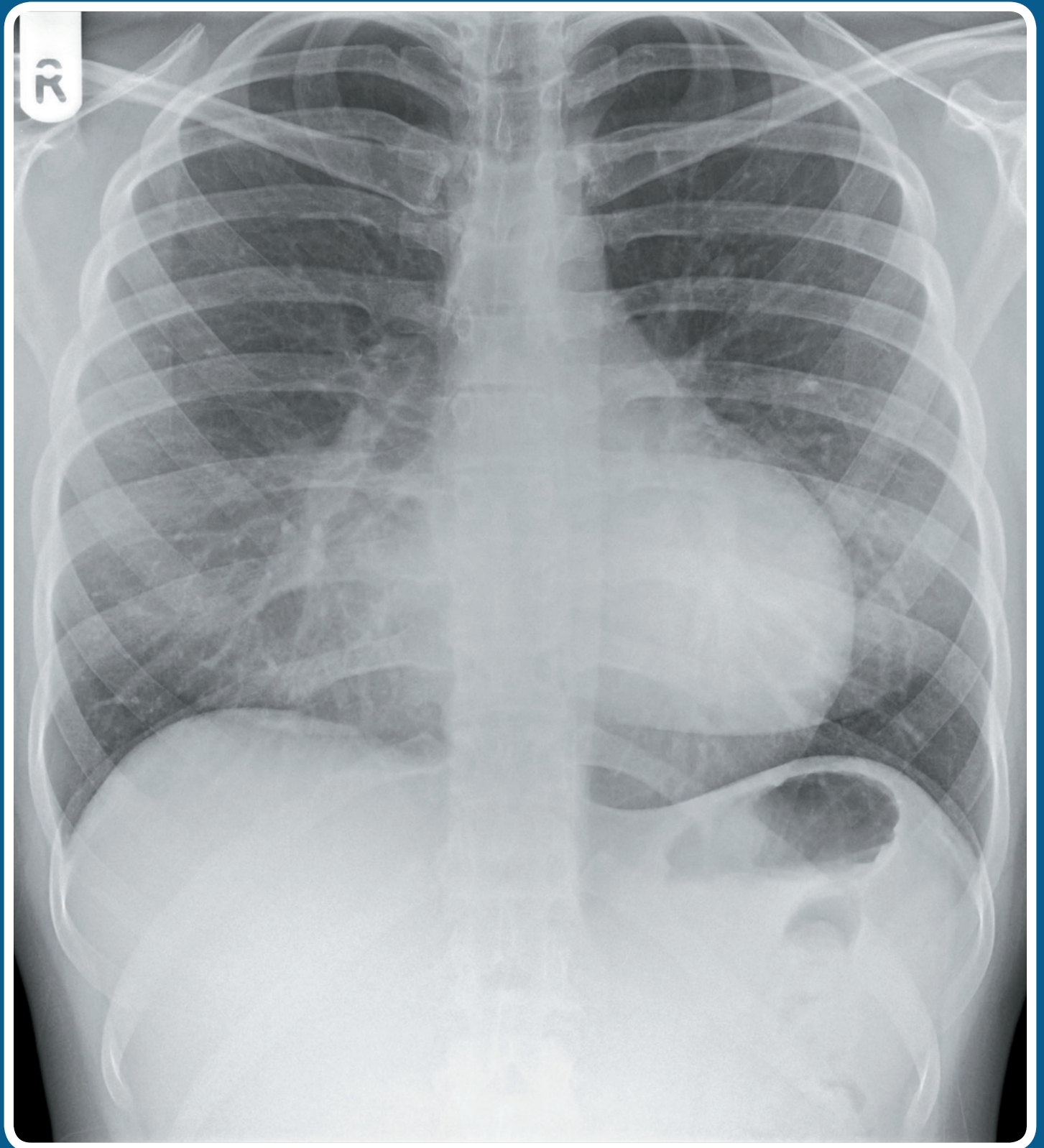
The patient's right shoulder should be assessed, in particular looking for distal neurovascular compromise. Dedicated X-rays of the right shoulder are required to confirm the dislocation. It should be reduced, with a post-reduction X-ray to confirm the reduction was successful.

The episode of light-headedness needs to be assessed. Initial blood tests may include FBC, U/Es, glucose, bone profile, and CRP. An ECG would also be helpful.



CASE 76

A 16 year old female presents to her GP with a chest wall deformity. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Her RR is 17 with a HR of 70 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for any bony abnormalities.



REPORT – PECTUS EXCAVATUM

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is heterogeneous airspace opacification medially in the right lower zone. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The right heart border is difficult to identify as it is projected over the vertebral column and appears indistinct. The left heart border is clear.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The ribs are abnormally orientated – their posterior aspects are horizontally

orientated while anteriorly they are nearly vertical. No fractures or other bony changes.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

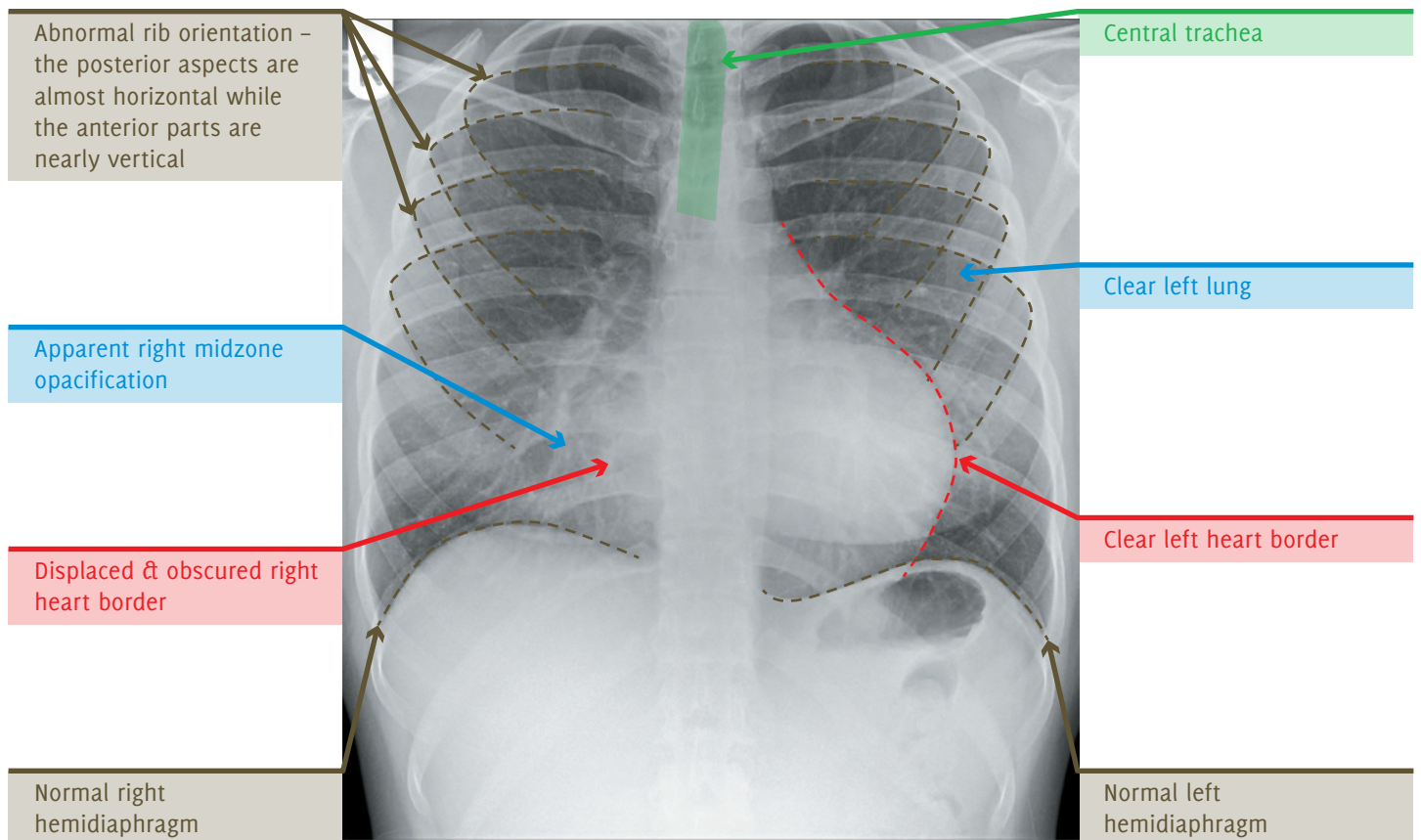
Lung Apices: Normal

Hila: Normal

Behind Heart: Obscured right heart border

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates an indistinct right heart border with adjacent opacification. This may represent right middle lobe consolidation or collapse. However in combination with the abnormal rib orientation and clinical history of chest wall deformity, the appearances are consistent with pectus excavatum.

Further management will depend on the effects of the chest wall deformity. No further assessment or treatment may be required. Pulmonary function tests and an ECHO can be performed to assess any pulmonary and/or cardiovascular compromise. The patient should be referred to cardiothoracics

if surgery is contemplated. A CT of the chest may be required to assess the underlying anatomy pre-surgery.



CASE 77

A 40 year old male presents to ED with recurrent episodes of haemoptysis. He is an ex-intravenous drug user and has a 20 pack year smoking history. On examination, he has saturations of 90% in air and is afebrile. His RR is 20 with a HR of 80 bpm. There are crackles and wheeze in the upper zones of both lungs. A chest X-ray is requested to assess for possible pneumonia, tuberculosis, malignancy or COPD.



REPORT – UPPER ZONE FIBROSIS WITH MYCETOMAS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The upper trachea is central. The mid trachea is deviated to the right in keeping with right upper zone volume loss.

BREATHING

There are bilateral upper and mid zone abnormalities with coarsened bronchovascular lung markings. There is increased lucency at the apices, in keeping with cavitation. In addition there are rounded/ovoid soft tissue density masses in both apices. These are outlined by thin crescents of air. There is pleural thickening

at both apices. The lower zones are unremarkable.

The lungs are not hyperinflated.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta is difficult to identify.

The mediastinum is central and not widened. Its upper borders are difficult to identify.

Both hila are markedly elevated indicating bilateral upper zone volume loss.

DIAPHRAGM + DELICATES

The medial aspect of the right hemidiaphragm is obscured by an epicardial

fat pad. Normal appearance and position of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible. In particular there are no bony changes associated with previous radiotherapy.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

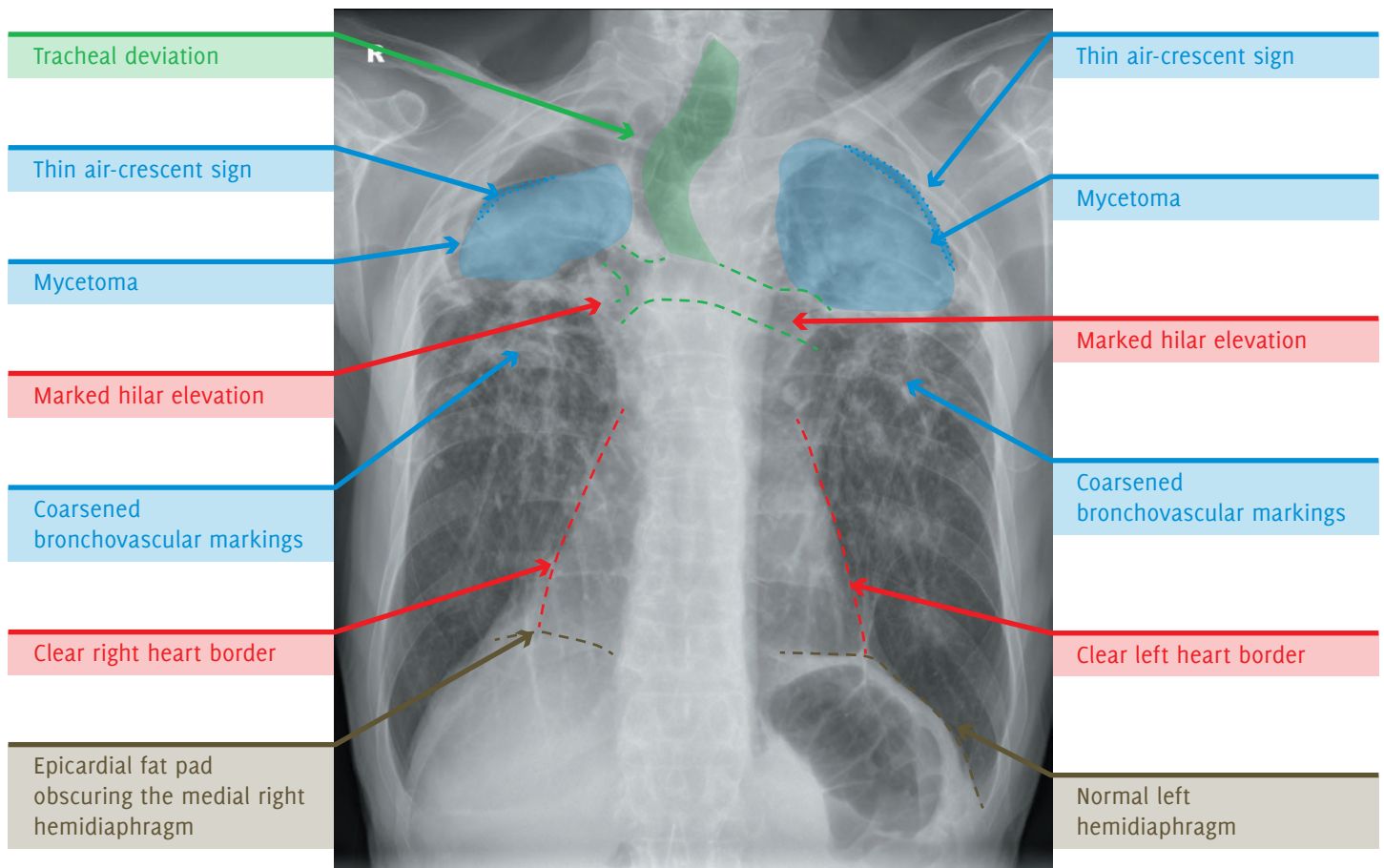
Lung Apices: Bilateral apical cavities with soft tissues masses

Hila: Bilateral elevation of the hila

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates bilateral upper zone fibrosis with large apical cavities. There are also bilateral apical soft tissue masses with air-crescent signs, in keeping with mycetomas.

The differential diagnosis for upper lobe fibrosis includes old TB, pneumoconiosis, ankylosing spondylitis, previous radiotherapy and sarcoidosis. Given the patient's background and the large cavities, TB is the most likely cause.

Supplementary oxygen should be given. Initial blood tests may include FBC, U/Es, and CRP. Sputum cultures should be obtained. An arterial blood gas may also be helpful.

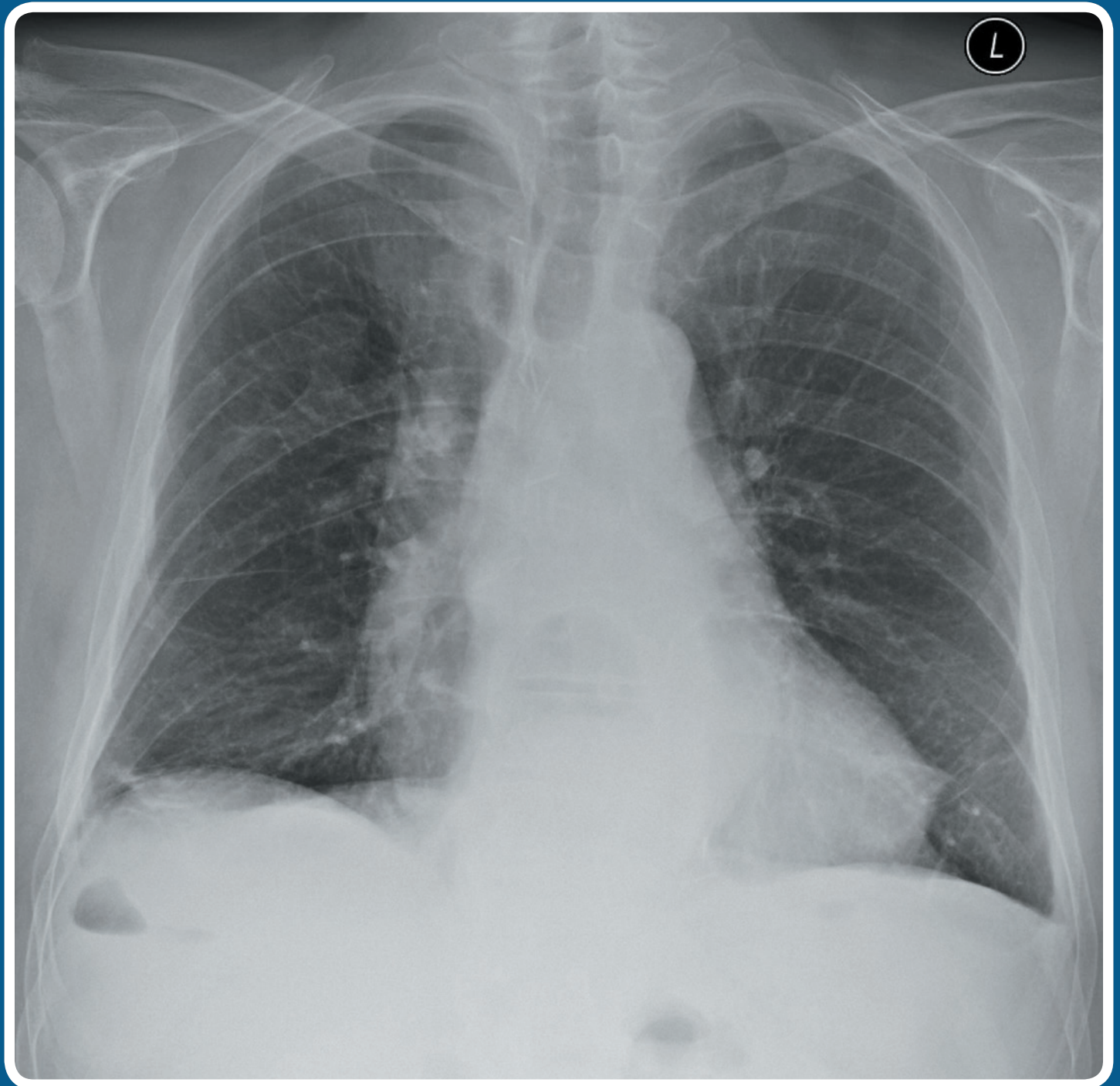
Appropriate antibiotic/antifungal therapy should be considered following discussion with respiratory and microbiology, bearing in mind that old TB does not require active treatment.

Comparison with previous imaging would be useful to assess for progression of changes. A high resolution CT (HRCT) of the chest would provide more detailed assessment if required. Input from the respiratory team would be helpful to guide further management.



CASE 78

A 57 year old male presents to ED with right-sided pleuritic chest pain and fever. He has a background of oesophageal cancer treated with an oesophagectomy. 3 weeks ago he underwent radio-frequency ablation of a liver metastasis. He is a non-smoker. On examination, he has saturations of 90% in air and is febrile with a temperature of 39.5°C. His RR is 35 with a HR of 100 bpm. There is reduced air entry in the right lower zone, with dullness to percussion. A chest X-ray is requested to assess for possible pneumonia, collapse or pleural effusion.



REPORT – LIVER ABSCESS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is minor atelectasis in the right lower zone. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart appears enlarged, although assessment of the size is difficult due to patient rotation.

The heart borders are clear.

The mediastinum is central, not widened and with clear borders. There is an air-fluid level projected over the lower mediastinum.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

There is partial resection of the posterior aspect of the right 6th rib. The imaged

skeleton is otherwise intact with no fractures or destructive bony lesions visible.

There is a lucent area projected over the liver in the right upper quadrant. The visible soft tissues are otherwise unremarkable.

EXTRAS + REVIEW AREAS

There are surgical clips projected over the upper and mid mediastinum. No vascular lines or tubes.

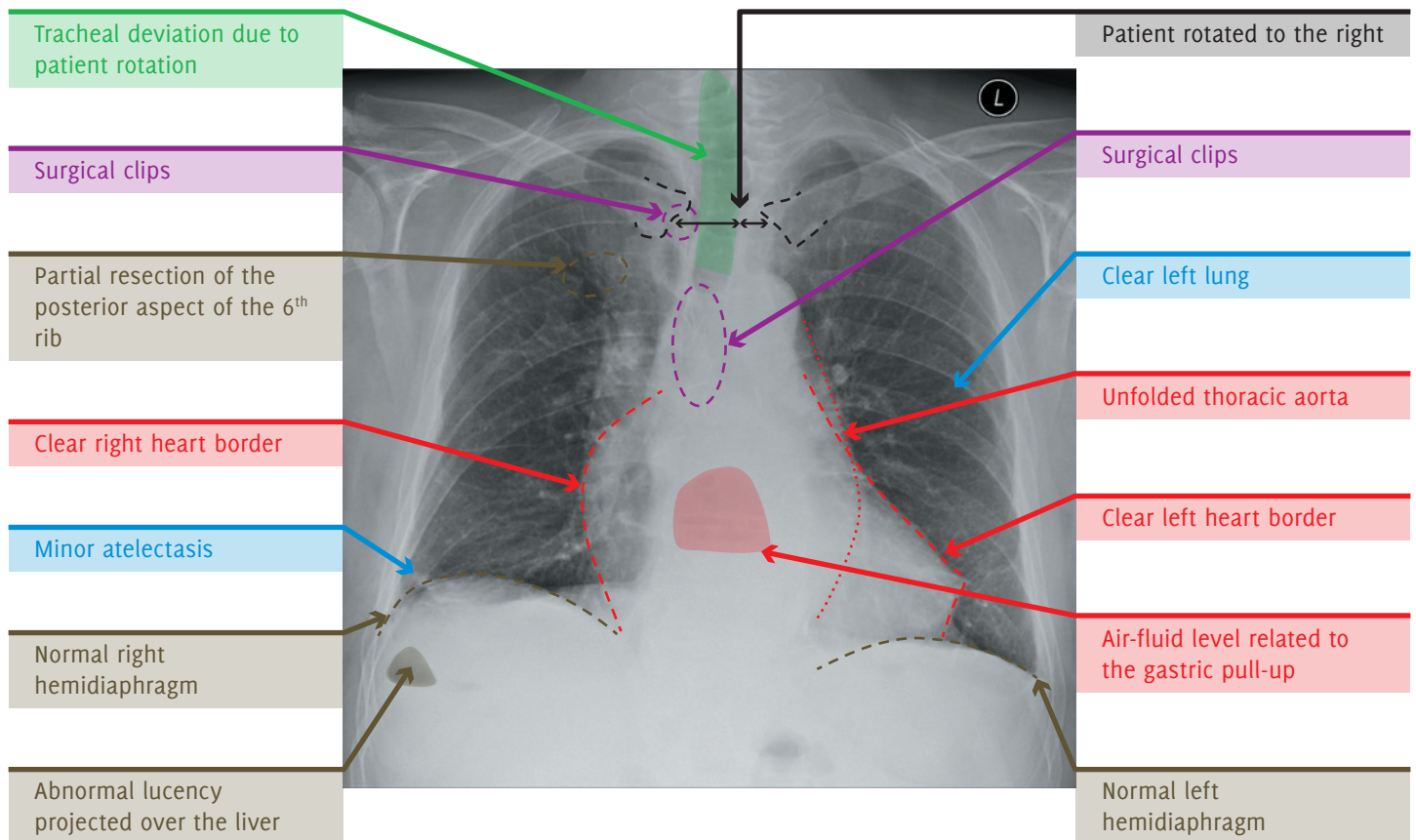
Lung Apices: Normal

Hila: Normal

Behind Heart: Air-fluid level and surgical clips

Costophrenic Angles: Normal

Below the Diaphragm: Lucent area projected over the liver



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates evidence of a previous oesophagectomy with gastric pull-up (there is partial resection of the right 6th rib, surgical clips and a mediastinal air-fluid level). The lucent area projected over the liver is in keeping with gas. This may represent an abscess given the clinical history and previous radiofrequency ablation, or alternatively it could be bowel gas.

Initial blood tests may include FBC, U/Es, LFTs, CRP, and blood cultures.

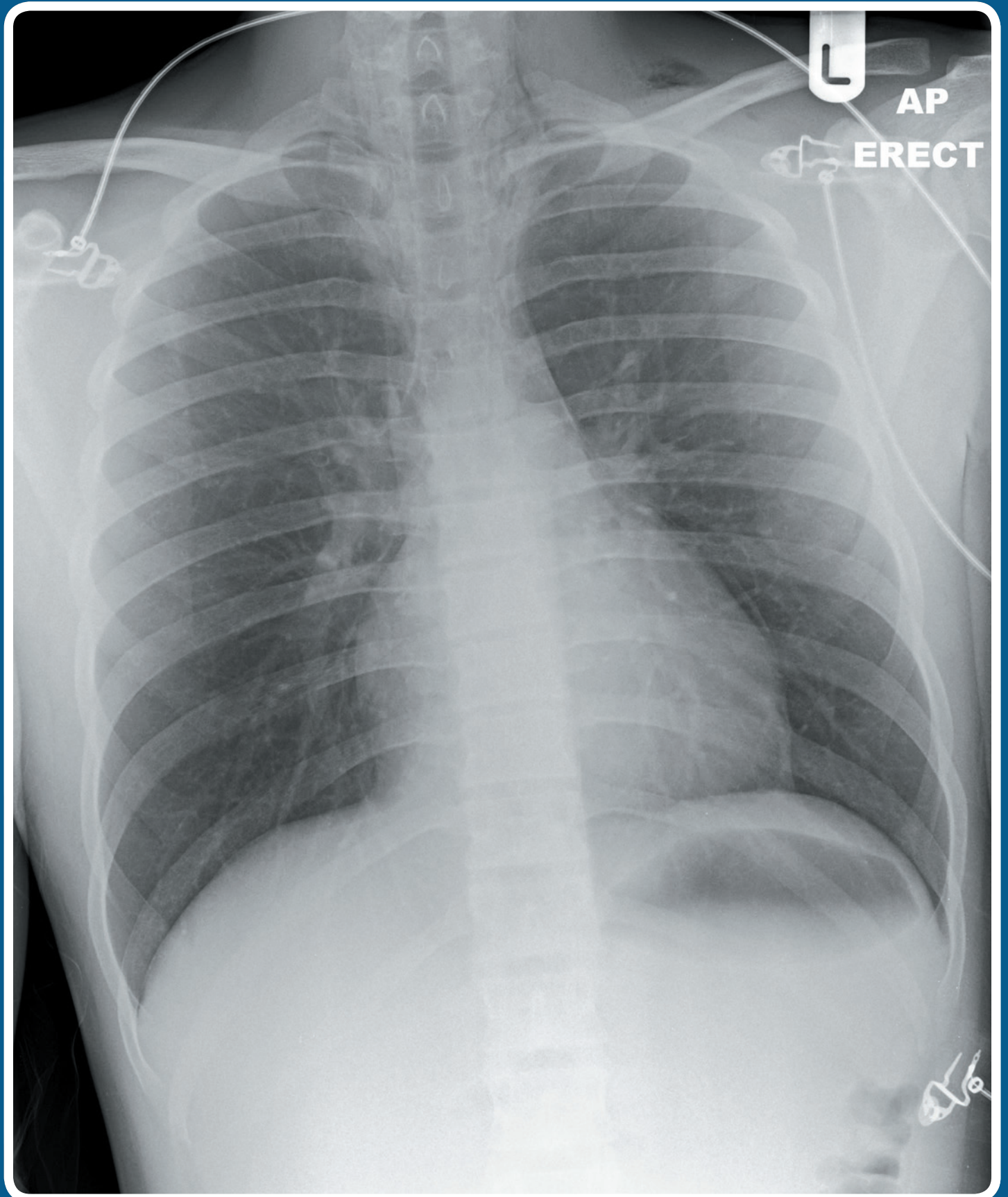
Previous imaging and notes should be reviewed to assess the site of the previous radio-frequency ablation. Further imaging in the form of contrast-enhanced CT of the abdomen would be useful for assessing the liver.

If an abscess is confirmed, treatment would include appropriate antibiotics, and percutaneous drainage under ultrasound guidance.



CASE 79

A 19 year old male presents to ED with increasing wheeze and breathlessness. He is a known asthmatic. He is a non-smoker. On examination, he has saturations of 85% in air and is afebrile. His RR is 30 with a HR of 80 bpm. There are scattered wheezes throughout the lungs with reduced air entry. A chest X-ray is requested to assess for possible pneumonia or a pneumothorax.



REPORT – PNEUMOMEDIASTINUM

Patient ID: Anonymous
Projection: AP erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central and not widened. There are bilateral linear and curvilinear lucencies outlining the mediastinal contours, extending into the soft tissues of the neck and down towards the heart.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

There is a small volume of surgical emphysema in the left supraclavicular fossa. The visible soft tissues are otherwise unremarkable.

EXTRAS + REVIEW AREAS

ECG monitoring leads in situ. No vascular lines, tubes, or surgical clips.

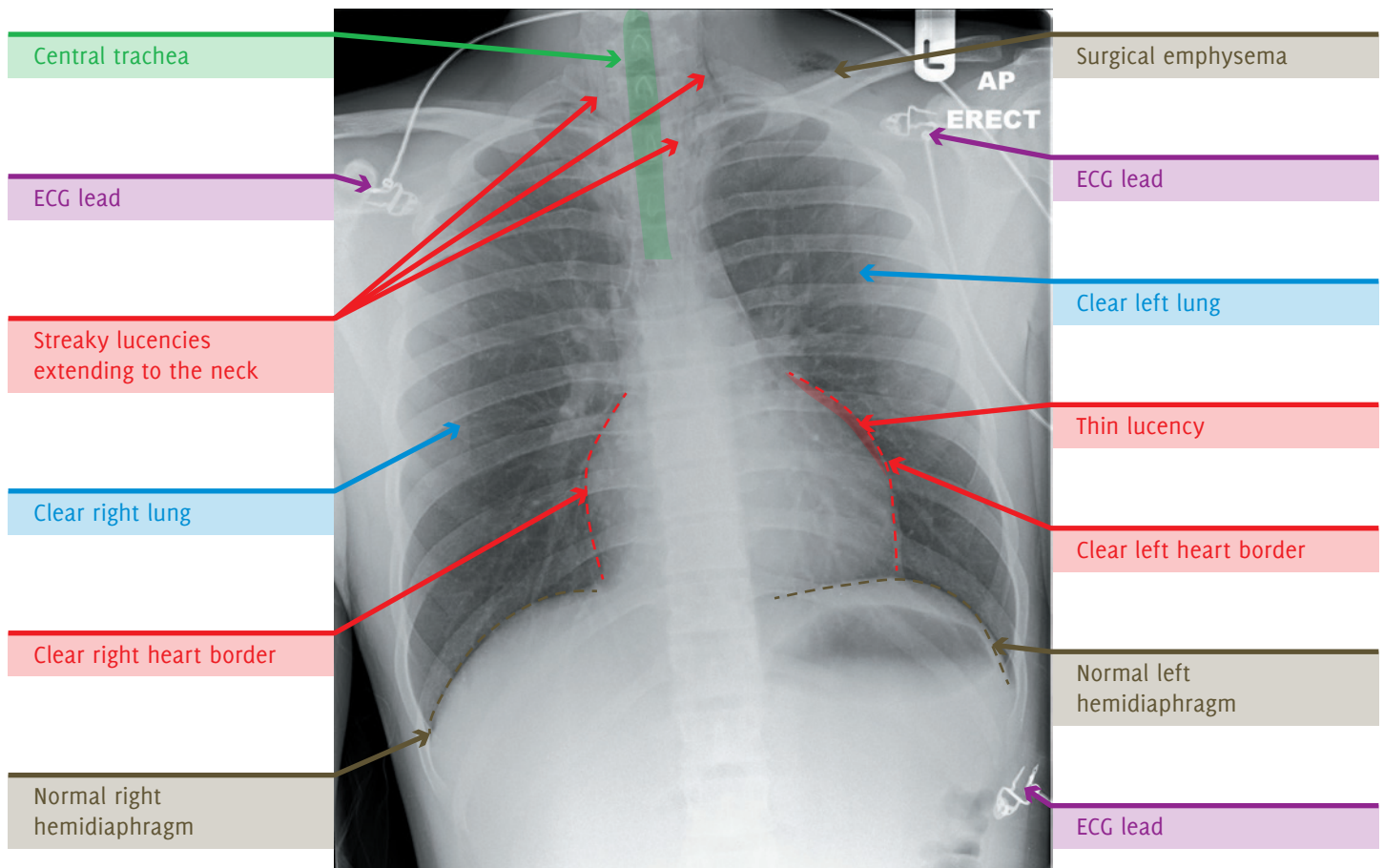
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

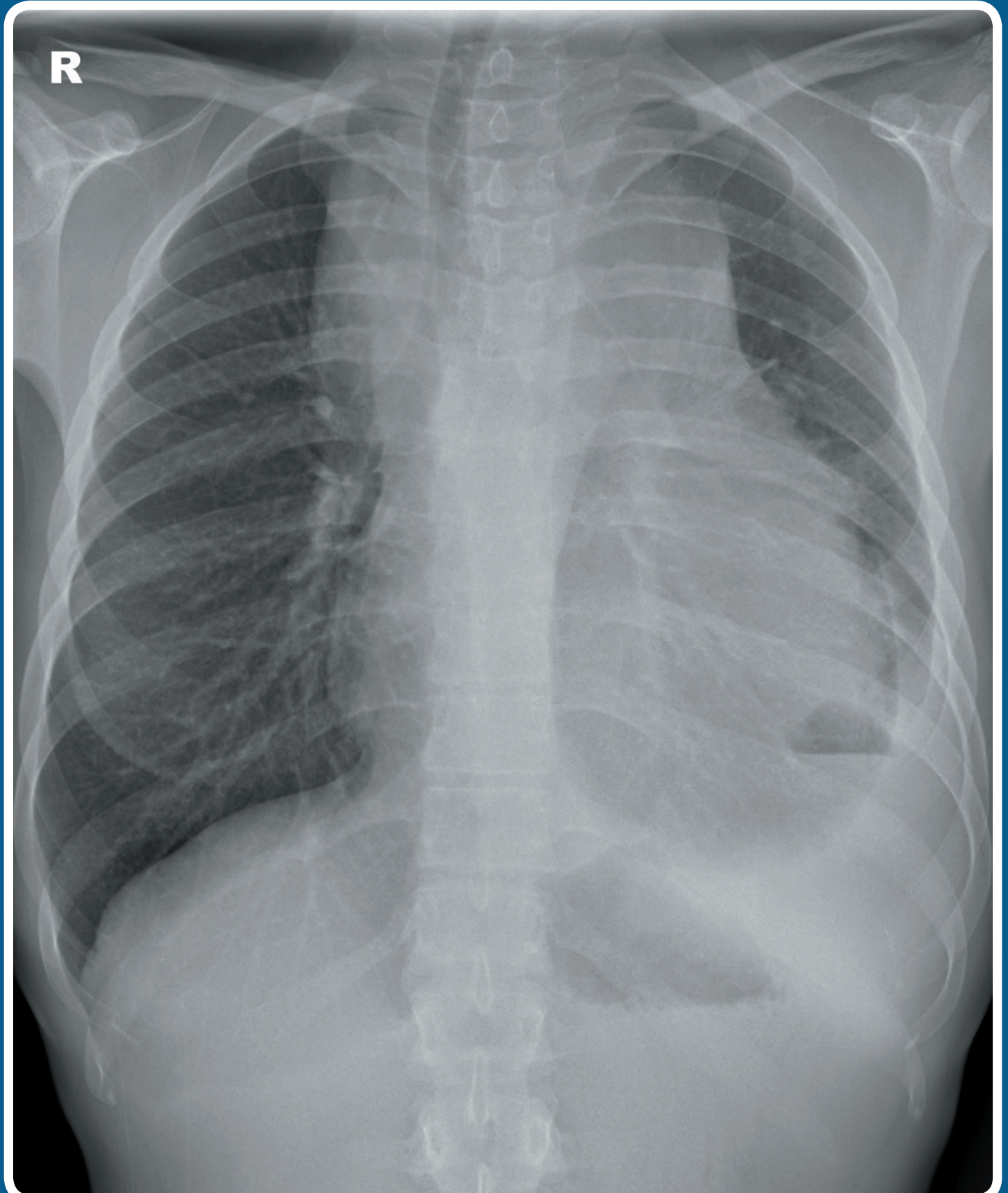
This X-ray demonstrates curvilinear lucencies outlining the cardiomeastinal contours associated with surgical emphysema. In the context of asthma, this is likely to reflect a pneumomediastinum. No evidence of pneumothorax or pleural effusion.

Supplementary oxygen should be given alongside nebulised bronchodilators, and oral corticosteroids. Initial blood tests may include FBC, U/Es, CRP, and an arterial blood gas. A peak flow may also be helpful. Pneumomediastinum in this context can usually be managed conservatively.



CASE 80

A 22 year old male presents to his GP with progressive exertional breathlessness. He has lost some weight over the last few weeks and feels lethargic. There is no significant past medical history, and he is a non-smoker. On examination, he has saturations of 100% in air and is afebrile. There is dullness to percussion and reduced air entry in the left lower zone. A chest X-ray is requested to assess for possible pneumonia, effusion or collapse.



REPORT – ANTERIOR MEDIASTINAL MASS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is deviated to the right.

BREATHING

There is opacification at the left costophrenic angle, in keeping with a pleural abnormality (either effusion or mass). The lungs are otherwise clear.

The lungs are not hyperinflated.

Normal pulmonary vascularity.

CIRCULATION

There is marked widening of the superior mediastinum, including the right paratracheal stripe, in keeping with a mediastinal mass.

The left paravertebral line and aortic knuckle/thoracic aorta are preserved and the left hilar structures can be seen through this mass (hilum overlay sign), indicating that the mass is not in the posterior or middle mediastinum respectively.

The left heart border is obscured by the mediastinal mass. It is therefore difficult to assess the heart size. The right heart border is preserved.

The aorta appears normal.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

The left hemidiaphragm is largely obscured but appears elevated. Normal position and appearance of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

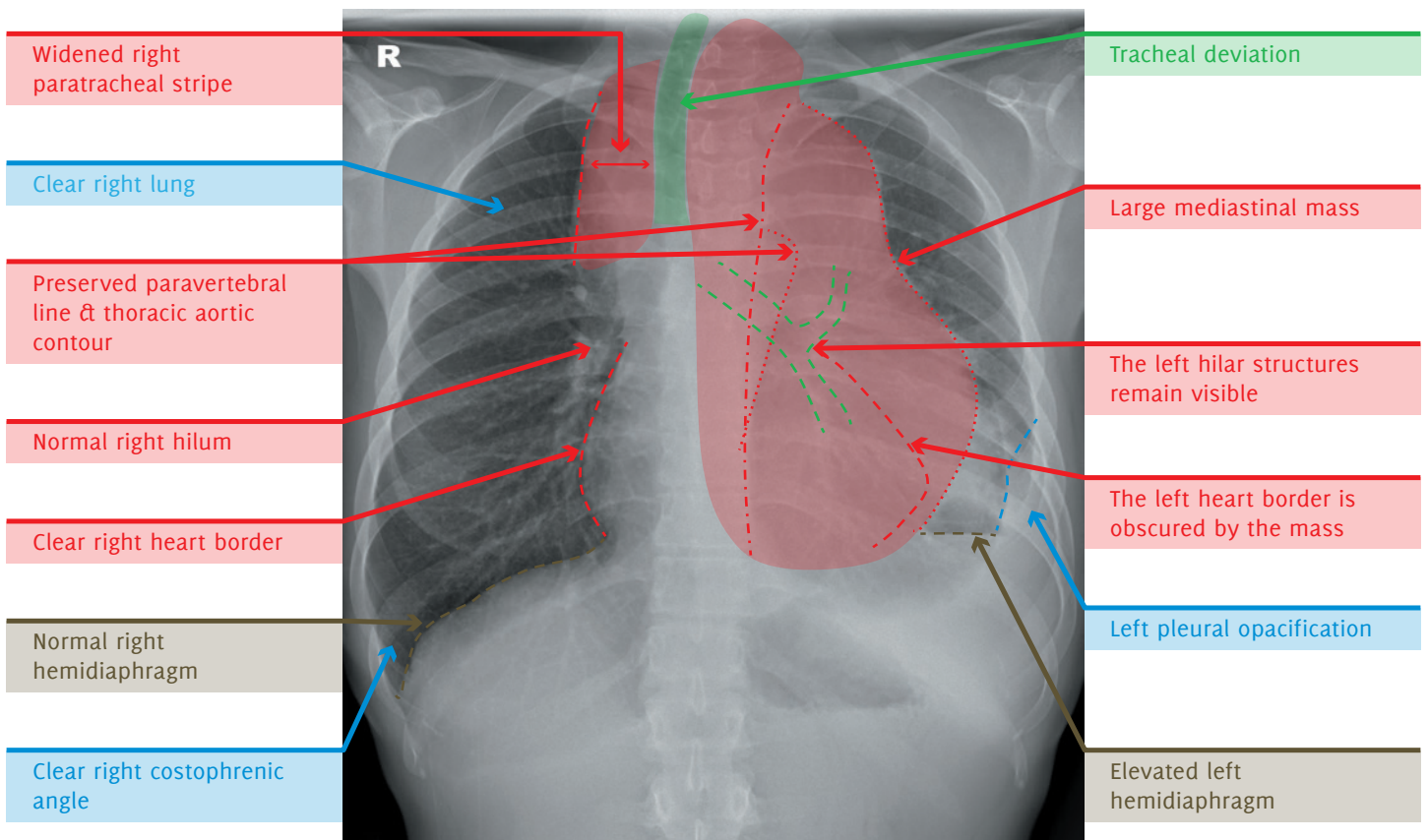
Lung Apices: Mediastinal soft tissue mass encroaches into the left apex

Hila: Normal (left hilum overlay sign)

Behind Heart: Normal

Costophrenic Angles: Left-sided pleural effusion

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a large mediastinal mass. The loss of the left heart border, combined with preserved hila and thoracic aorta, indicates this is an anterior mediastinal mass. There is an additional left-sided pleural abnormality, which may represent a pleural effusion or pleural metastatic disease. Possible elevation of the left hemidiaphragm may relate to damage to the left phrenic nerve.

The differentials of an anterior mediastinal mass include lymphoma, thyroid malignancy, thymoma (although usually in older patients) and teratoma.

The patient needs urgent referral to oncology. A full examination to assess for lymph node enlargement should be undertaken. Initial blood tests may include FBC, U/Es, LFTs, bone profile, and TFTs.

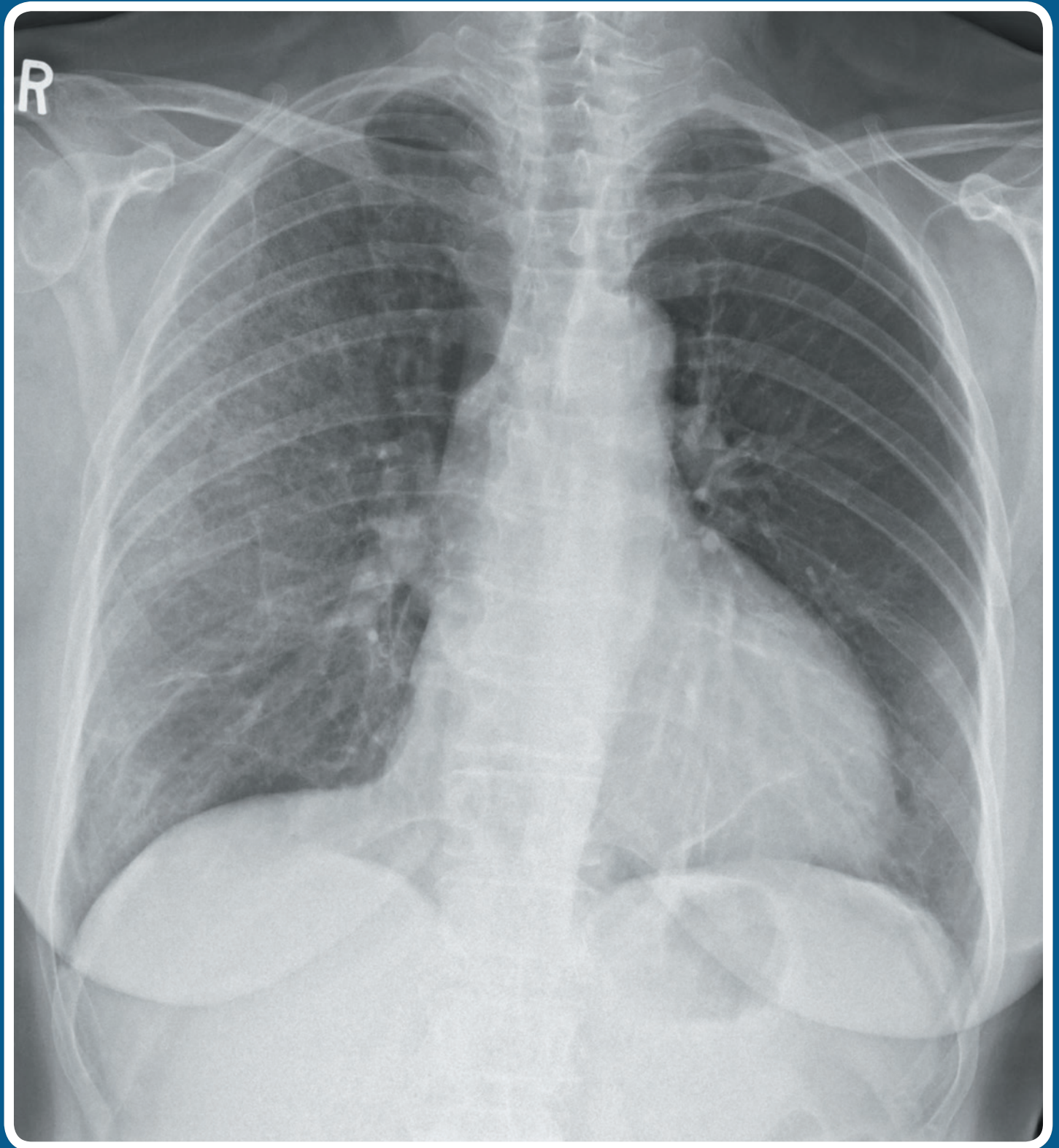
Further imaging in the form of contrast-enhanced CT of the chest should be performed. If lymphoma is suspected then the neck, abdomen and pelvis should also be included in the CT. An ultrasound examination could assess the pleural abnormality, and may permit tissue sampling, otherwise a CT-guided anterior mediastinal mass biopsy may be required for a histological diagnosis.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations and the patient's wishes.



CASE 81

A 30 year old female is referred for a chest X-ray by her GP. She has persistent shortness of breath. There is no significant past medical history. She is a non-smoker. On examination, she is afebrile, with saturations of 95% in air. There is dullness on percussion and inspiratory crackles in the right upper zone. A chest X-ray is requested to look for possible pneumonia or collapse.



REPORT – GROUND GLASS OPACIFICATION

Patient ID: Anonymous
 Projection: PA
 Penetration: Adequate – vertebral bodies just visible behind heart
 Inspiration: Adequate – 6 anterior ribs visible
 Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is peripheral ground glass opacification in the right upper and mid zones. Minor atelectasis is present in the left lower zone. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.
 Normal pulmonary vascularity.
CIRCULATION
 The heart is not enlarged.
 The heart borders are clear.
 The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

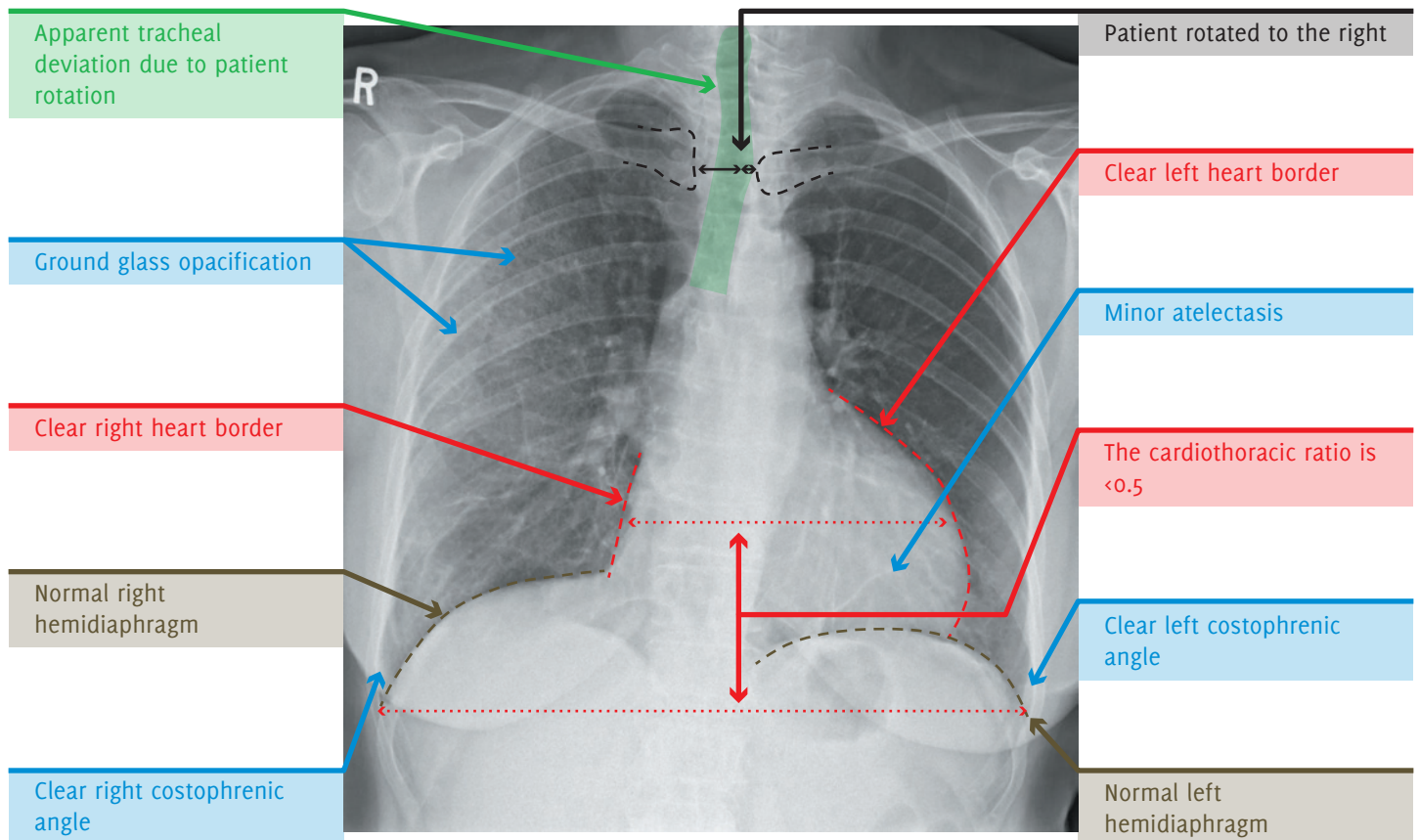
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

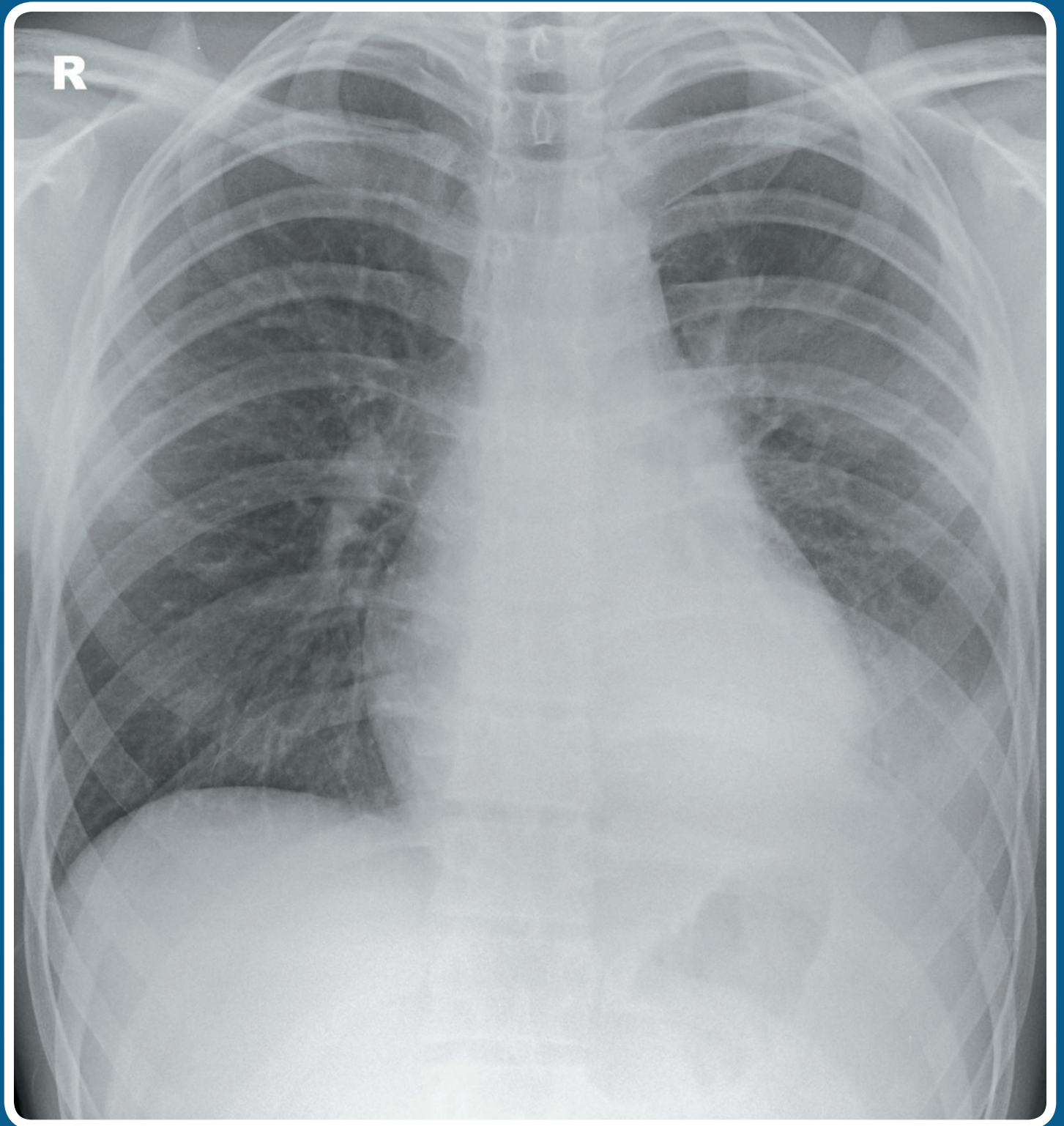
This X-ray demonstrates peripheral ground glass opacification in the right upper and mid zones. The differential diagnosis is wide and includes infection (especially viral infection), eosinophilic pneumonia, interstitial pneumonias, hypersensitivity pneumonitis and pulmonary oedema.

Initial blood tests may include FBC, U/Es, and CRP. An ECG and arterial blood gas may also be helpful. Any previous imaging should be reviewed to assess whether this is a new or longstanding abnormality. Appropriate antibiotics should be considered. Referral to the respiratory team may be helpful.



CASE 82

A 32 year old male presents to the ED with worsening shortness of breath. There is no significant past medical history and he is a non-smoker. On examination, he has saturations of 99% in air and is afebrile. There is dullness to percussion and crackles with reduced air entry in the left lower zone. A chest X-ray is requested to assess for possible pneumonia, collapse or effusion.



REPORT – LEFT LOWER LOBE CONSOLIDATION AND PSEUDOTUMOUR

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is heterogeneous airspace opacification in the left lower zone including the left retrocardiac position. Some air bronchograms are visible in this region, consistent with consolidation. The right lung is clear. The lungs are not hyperinflated.

There is blunting of the left costophrenic angle, in keeping with a pleural effusion.

There is also opacification in the left mid/upper zone. This has a very sharp curvilinear inferior margin and probably represents fluid encysted in the oblique fissure. The right sided pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

The left hemidiaphragm is obscured. Normal position and appearance of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

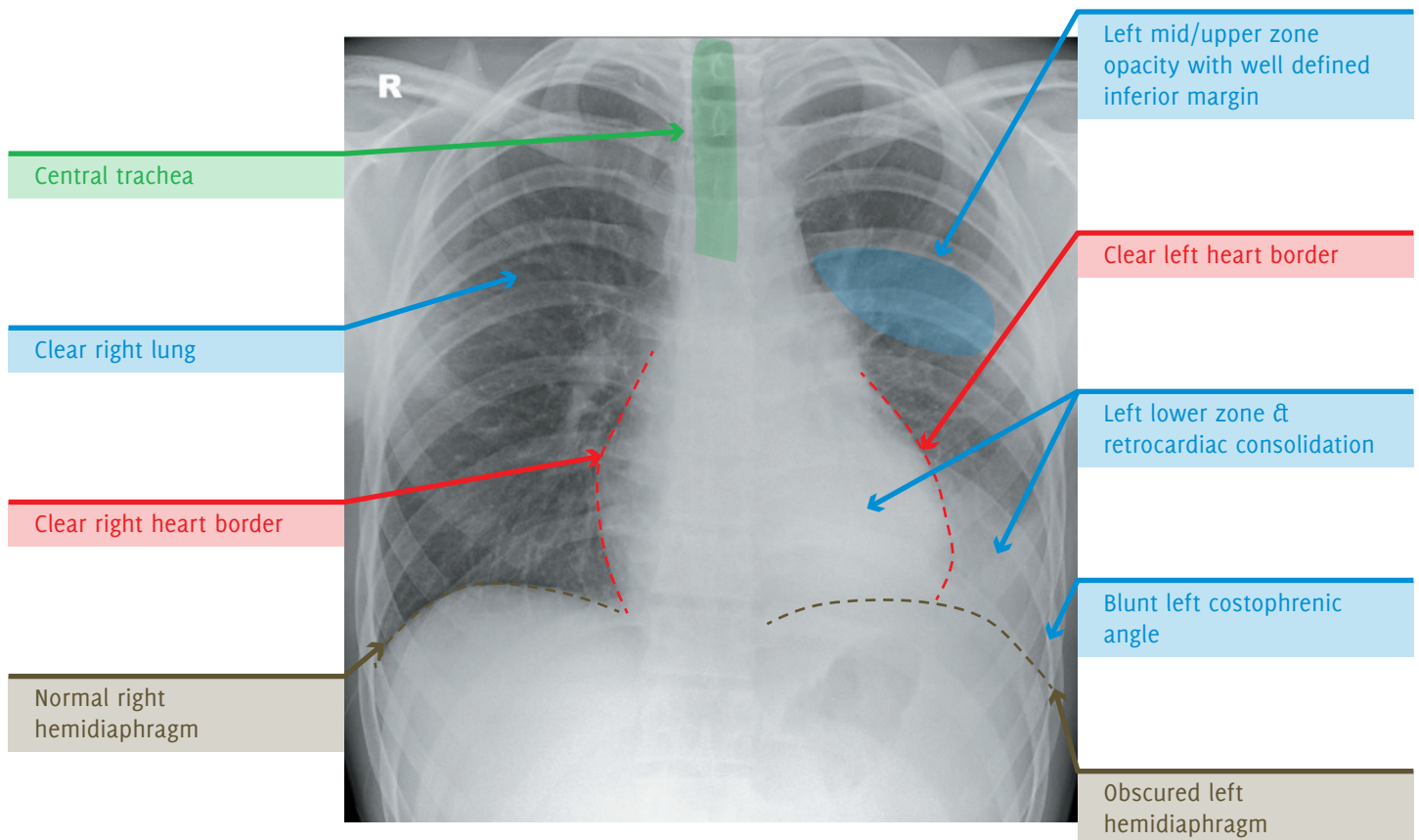
Lung Apices: Normal

Hila: Normal

Behind Heart: Left retrocardiac consolidation

Costophrenic Angles: Blunting of the left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates left lower zone consolidation, obscuring the left hemidiaphragm but with the left heart border preserved. The appearances are consistent with left lower lobe pneumonia. A left-sided pleural effusion is present. The opacity in the left mid/upper zone has a very sharp curvilinear inferior margin and most likely represents fluid encysted in the oblique fissure (Pseudotumour).

Initial blood tests may include FBC, U/Es, CRP and blood cultures. A sputum culture may also be obtained.

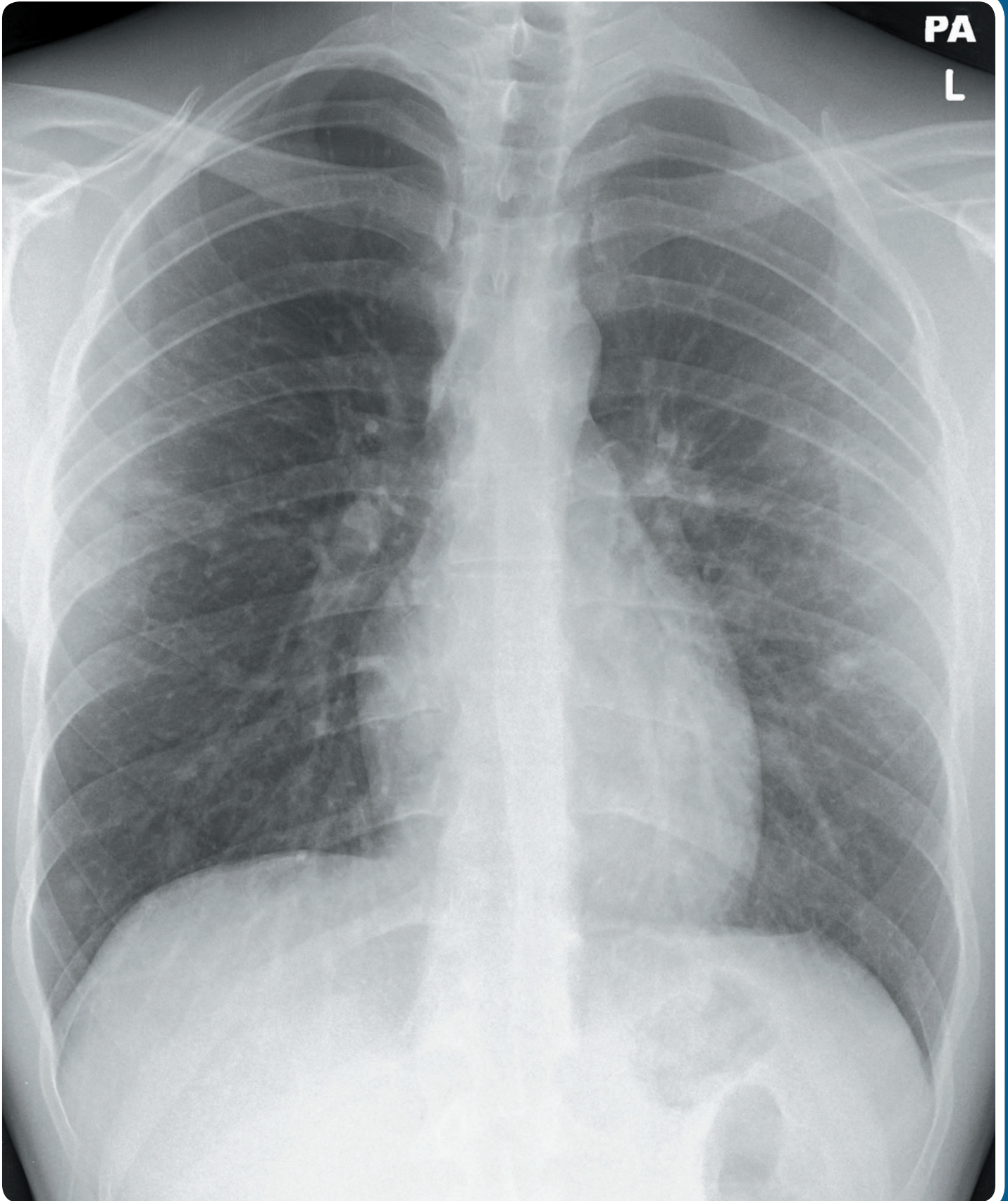
The patient should be treated with appropriate antibiotics for community-acquired pneumonia and a follow-up chest X-ray performed in 4-6 weeks to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65). No specific additional action is required for the pseudotumour.

Ultrasound could be used to further assess the volume of the pleural effusion, particularly if a diagnostic pleural aspiration is being considered.



CASE 83

A 35 year old male presents to ED with worsening shortness of breath and a fever. He is an IV drug user. He has a 10 pack year smoking history. On examination, he has saturations of 89% in air and is febrile with a temperature of 39°C. Lungs are resonant with good bilateral air entry and occasional crackles throughout. A systolic murmur is audible. A chest X-ray is requested to assess for possible pneumonia or pulmonary oedema.



REPORT – LUNG NODULES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There are multiple ill-defined nodules seen throughout both lungs. They are all less than 1cm in size. There is no cavitation or visible calcification and no consolidation.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

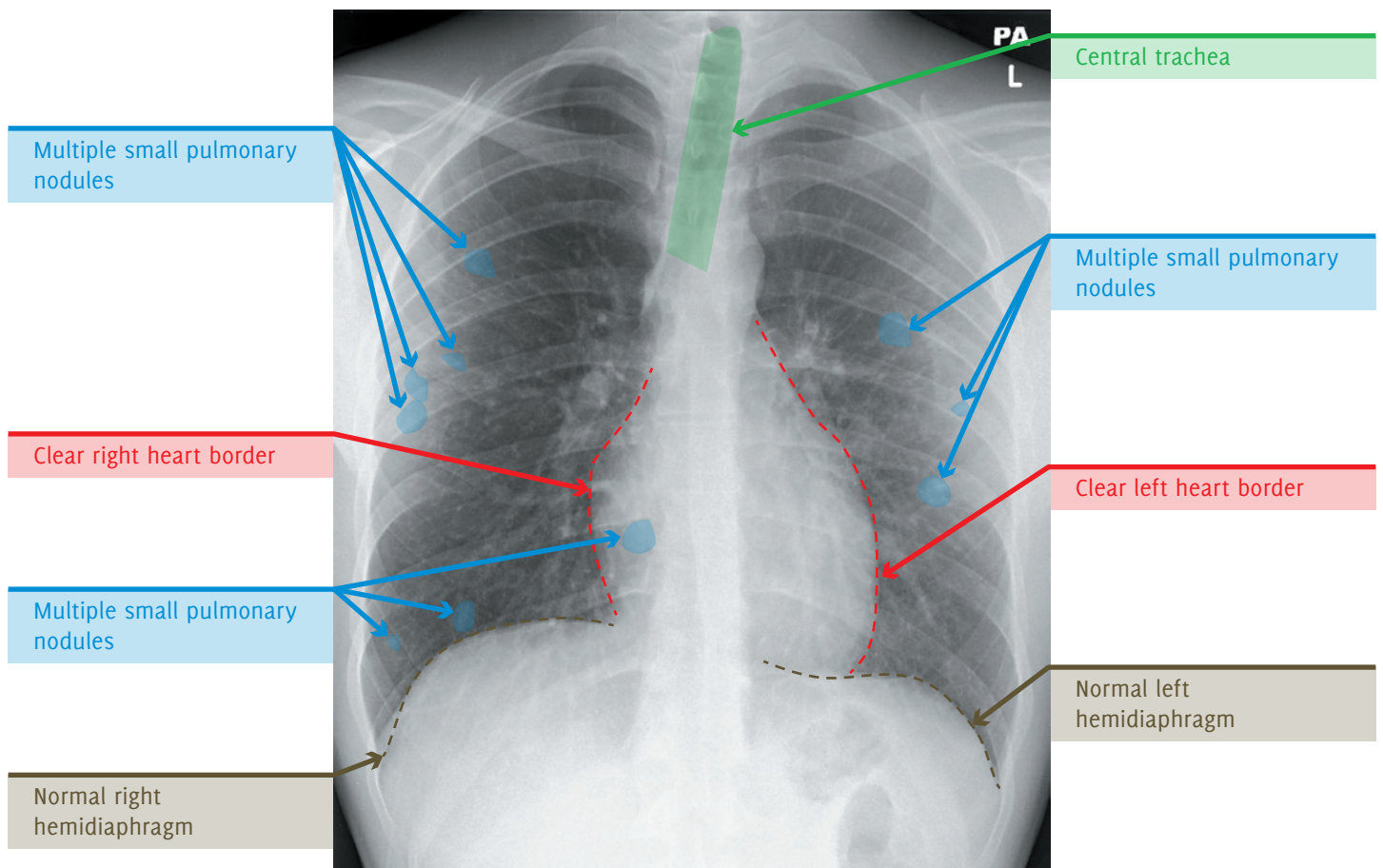
Lung Apices: Normal

Hila: Normal

Behind Heart: At least 1 nodule is projected over the right side of the cardiac silhouette.

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates multiple ill-defined lung nodules (5-10mm). There is a wide differential for these appearances but in combination with the clinical history, septic emboli and other forms of infection, such as fungal or TB, are highest on the list. Other differentials include metastases, autoimmune conditions, such as Wegener's granulomatosis, vascular malformations, and sarcoidosis.

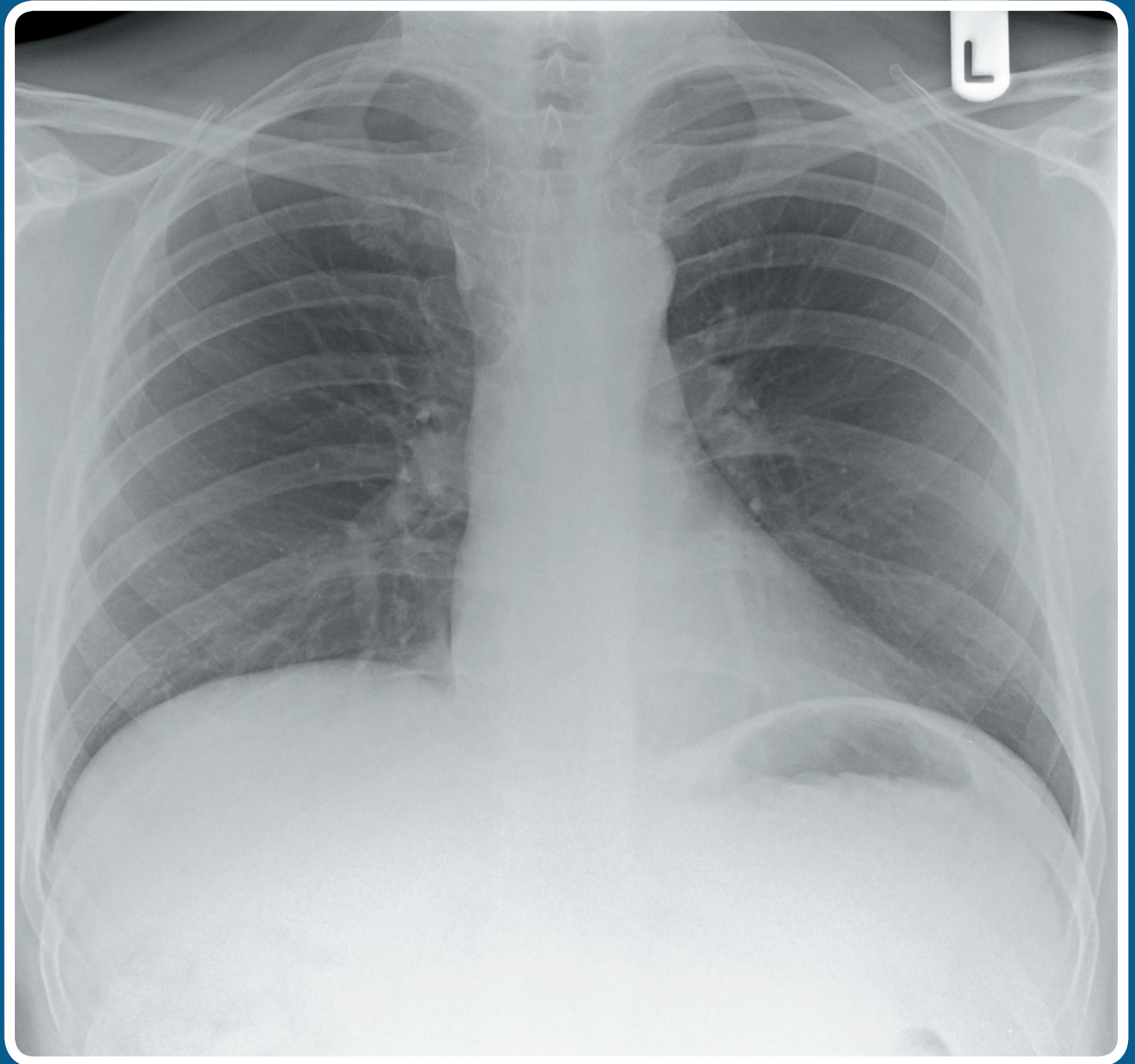
Supplementary oxygen should be given. Initial blood tests may include FBC, U/E's, CRP, ESR, LFTs, bone profile, and three sets of blood cultures. A sputum culture and urine culture may also be helpful. After blood cultures are taken, appropriate antibiotics should be commenced.

An ECHO to assess the murmur and look for evidence of vegetations should be done. A contrast-enhanced CT would provide a better assessment of the pulmonary nodules.



CASE 84

A 40 year old male presents to ED with shortness of breath. There is no significant past medical history. He is a non-smoker. On examination, he has saturations of 100% in air and is afebrile. His RR is 20 with a HR of 80 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia or a pneumothorax.



REPORT – AZYGOUS LOBE

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

There is a thin curvilinear line (convex relative to the mediastinum) crossing the apex of the right lung. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

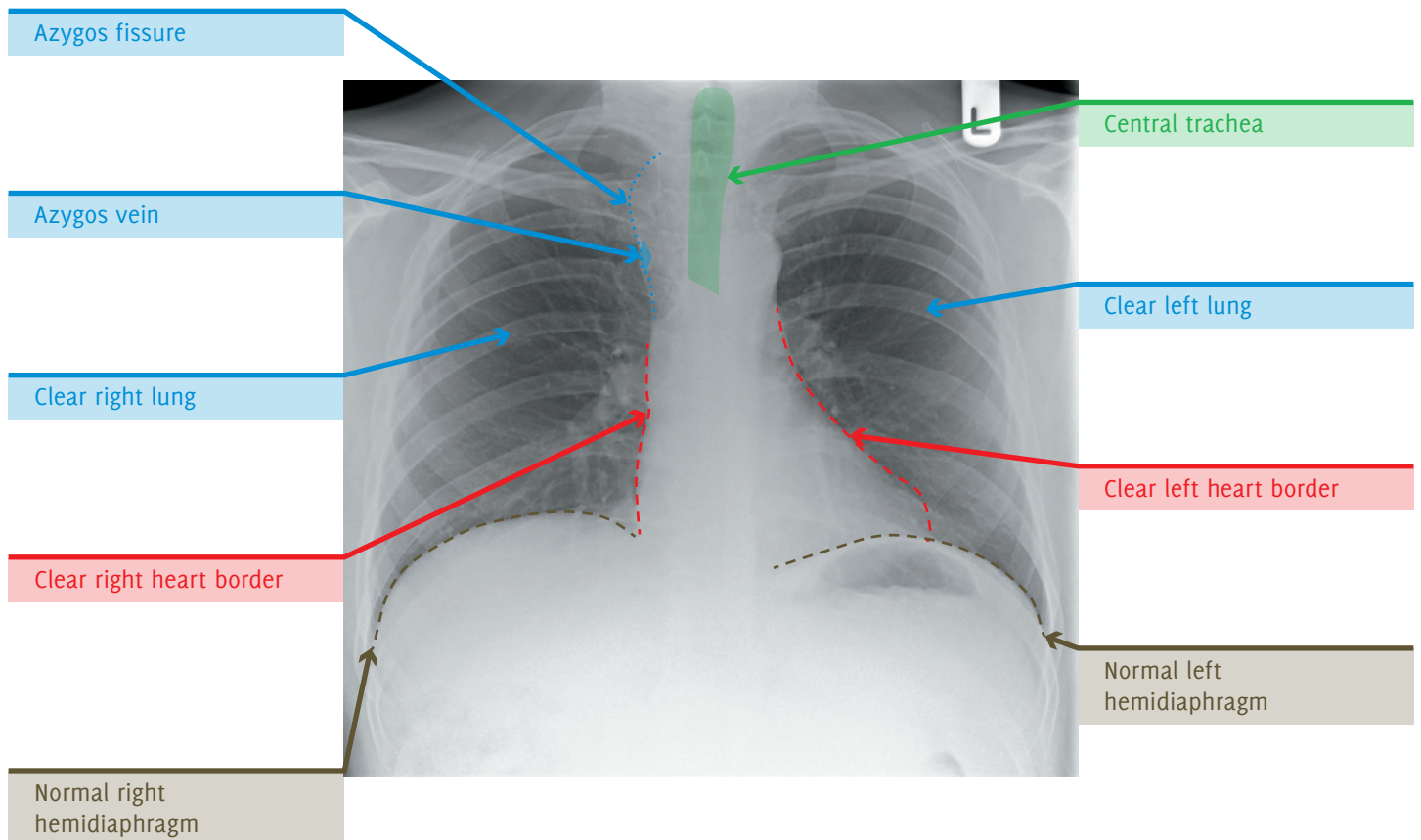
Lung Apices: Fine curvilinear line in the right apex

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

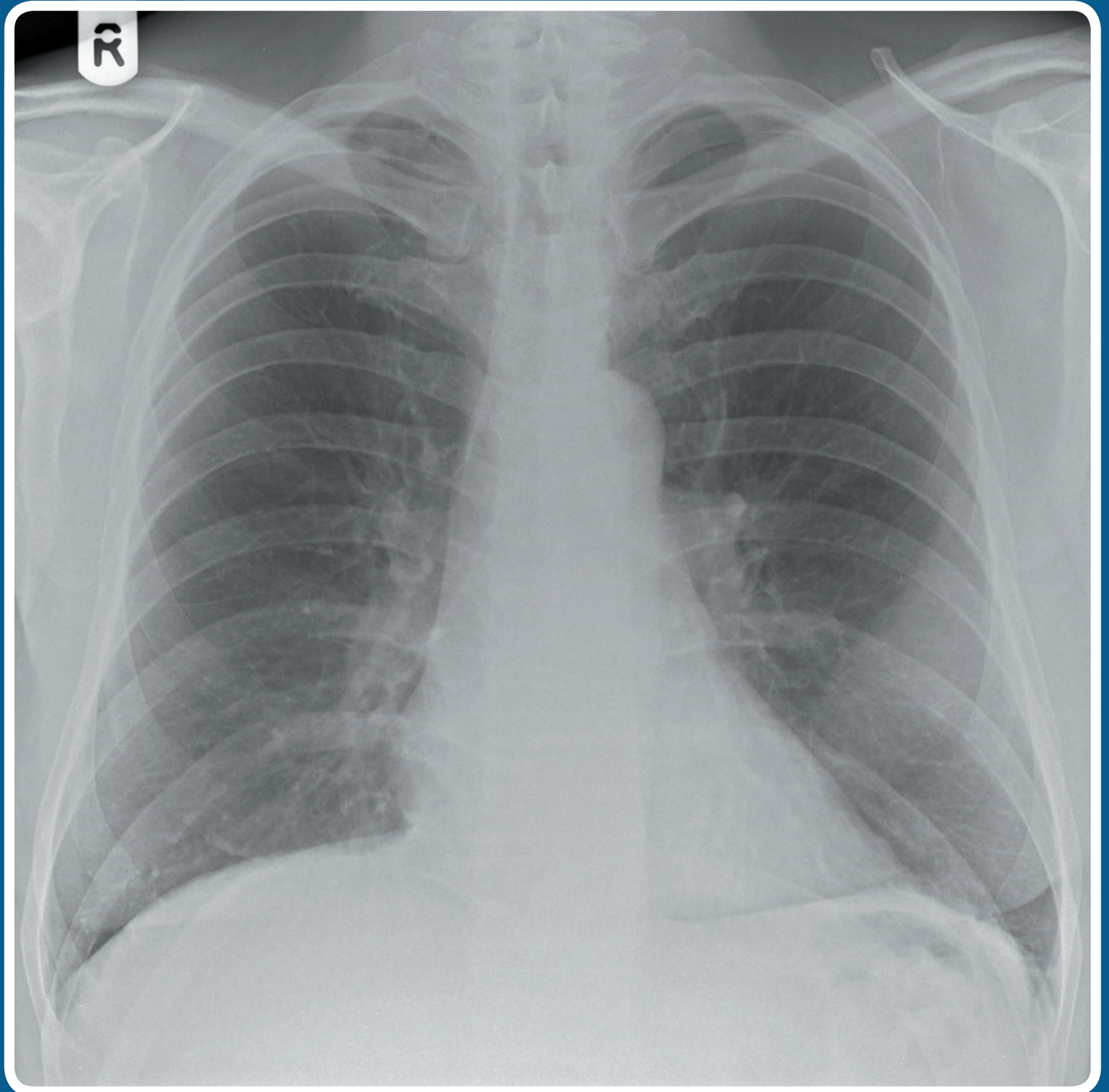
This X-ray demonstrates a fine curvilinear opacity in the right apex, which is in keeping with an azygos fissure and azygos lobe. This is a normal variant and requires no further investigation. No cause for breathlessness demonstrated.

Further investigations are therefore required to account for the clinical presentation. Initial blood tests may include FBC, U/Es, CRP, and D-Dimer. A blood gas may be helpful. If there is a strong suspicion of a PE, a CTPA would be indicated.



CASE 85

A 43 year old female presents to ED with left-sided chest pain. She has recently returned from New Zealand. She is a non-smoker. On examination, she has saturations of 98% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry. She is tender over the left side of her chest. A chest X-ray is requested to assess for possible pneumonia, pneumothorax, or pulmonary embolism.



REPORT – LUNG MASS PLUS RIB DESTRUCTION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is an ill-defined left lower zone opacification in the region of the left 5th rib. The remainder of the lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the diaphragm.

No pneumoperitoneum.

There is destruction of the anterior aspect of the right 5th rib. No other destructive bony lesions or bony changes are visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

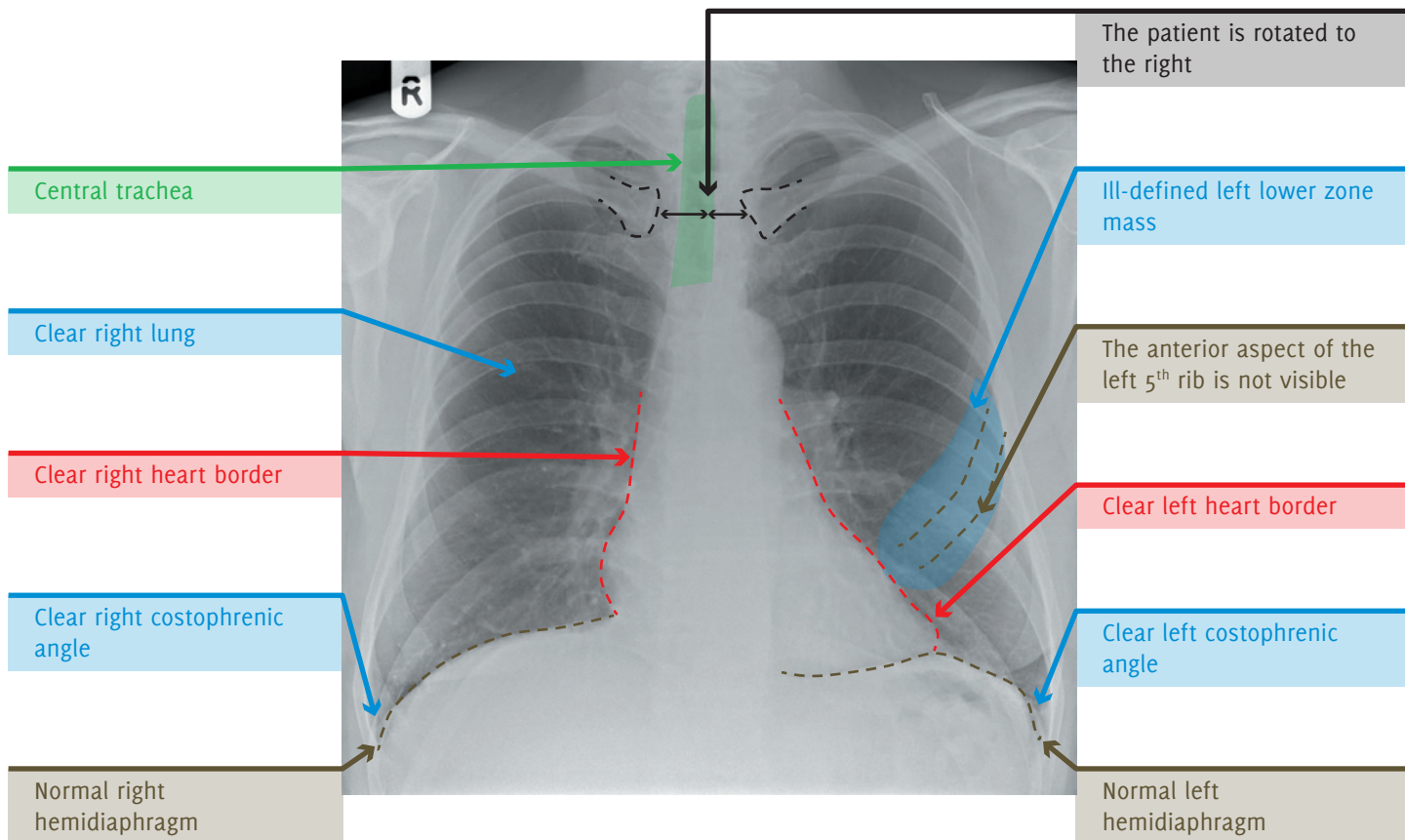
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates an ill-defined left lower zone mass associated with rib destruction. The differentials include a lung tumour with localised rib invasion, a pleural mass with rib destruction, or a primary rib lesion (e.g. myeloma, plasmacytoma, metastasis or sarcoma).

Initial blood tests may include FBC, U/Es, LFTs, bone profile, and a myeloma screen.

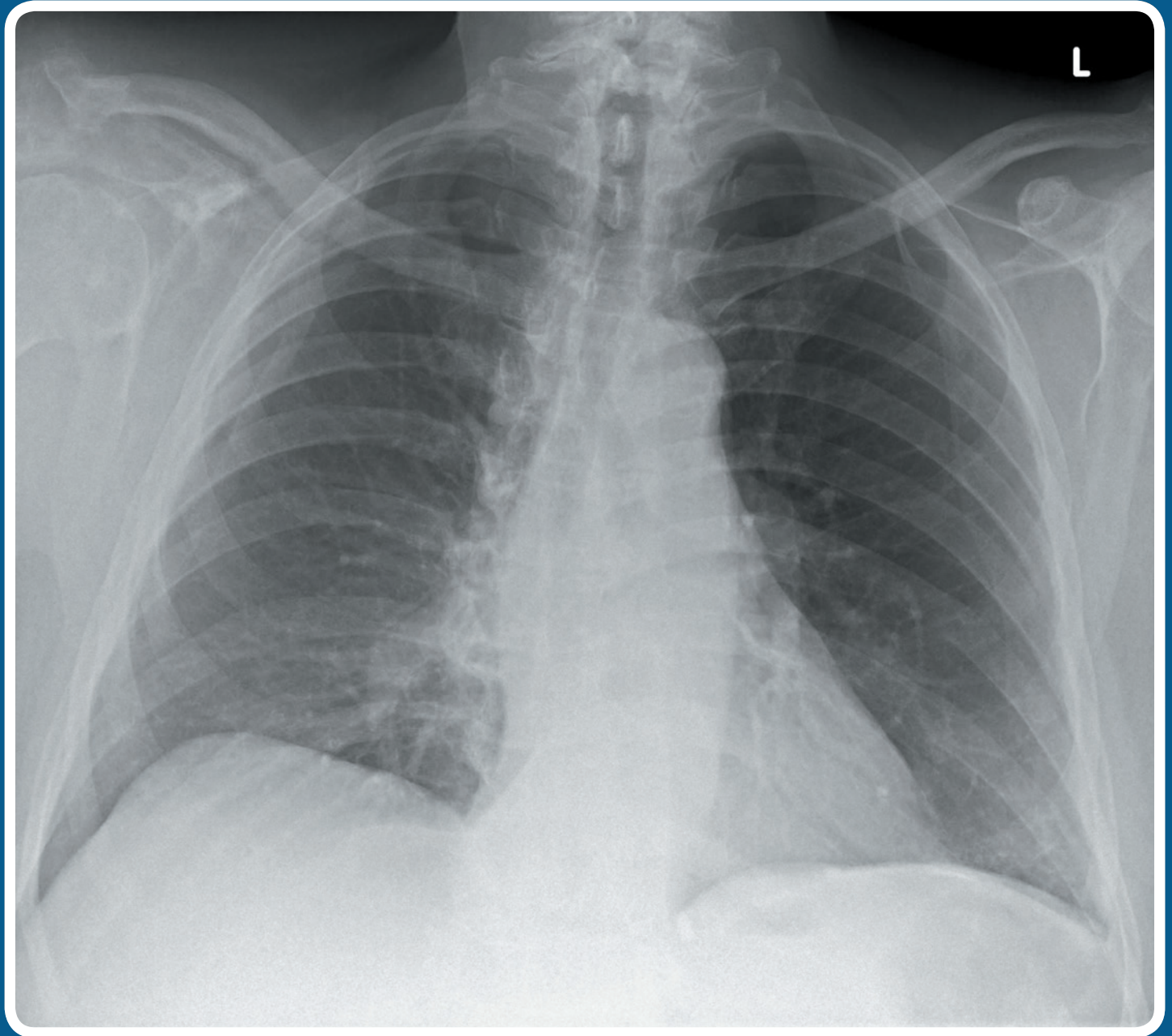
A staging CT chest, abdomen and pelvis with IV contrast should be performed.

Depending on the underlying aetiology the patient should be referred to respiratory, oncology or haematology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 86

A 50 year old male presents to his GP with worsening right shoulder/chest pain. He has a 50 pack year smoking history. On examination, he has saturations of 100% in air and is afebrile. His RR is 17 with a HR of 75 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for a possible apical lung tumour.



REPORT – DESTRUCTIVE SCAPULAR LESION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear, apart from minor blunting of the left costophrenic angle.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Mild blunting of the left costophrenic angle which may represent pleural thickening or a small effusion. Otherwise normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The right scapula has a permeative destructive appearance in the region of the coracoid and acromion. The right proximal humerus and right clavicle appear normal. There are no other destructive bone lesions.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

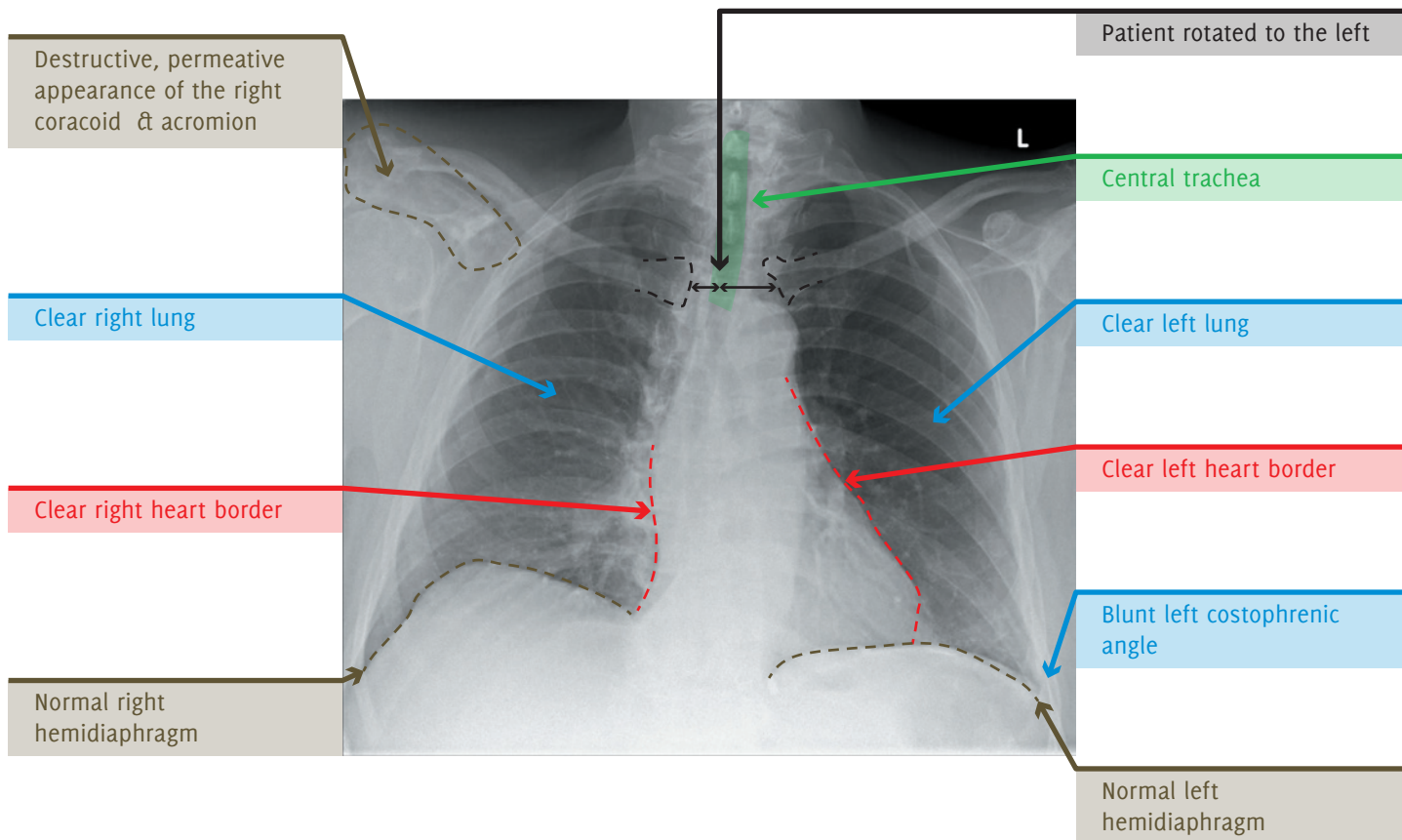
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Mild blunting of the left costophrenic angle

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a subtle bony destruction of the right scapula which is likely accounting for the patient's symptoms. The differential for this aggressive lesion includes malignancy (primary tumours e.g. sarcoma, plasmacytoma, or metastatic disease) and infection. Metastatic disease is most likely in a patient of this age.

Dedicated X-rays of the right shoulder should be performed. Initial blood tests may include FBC, U/Es, CRP, ESR, LFTs, & bone profile.

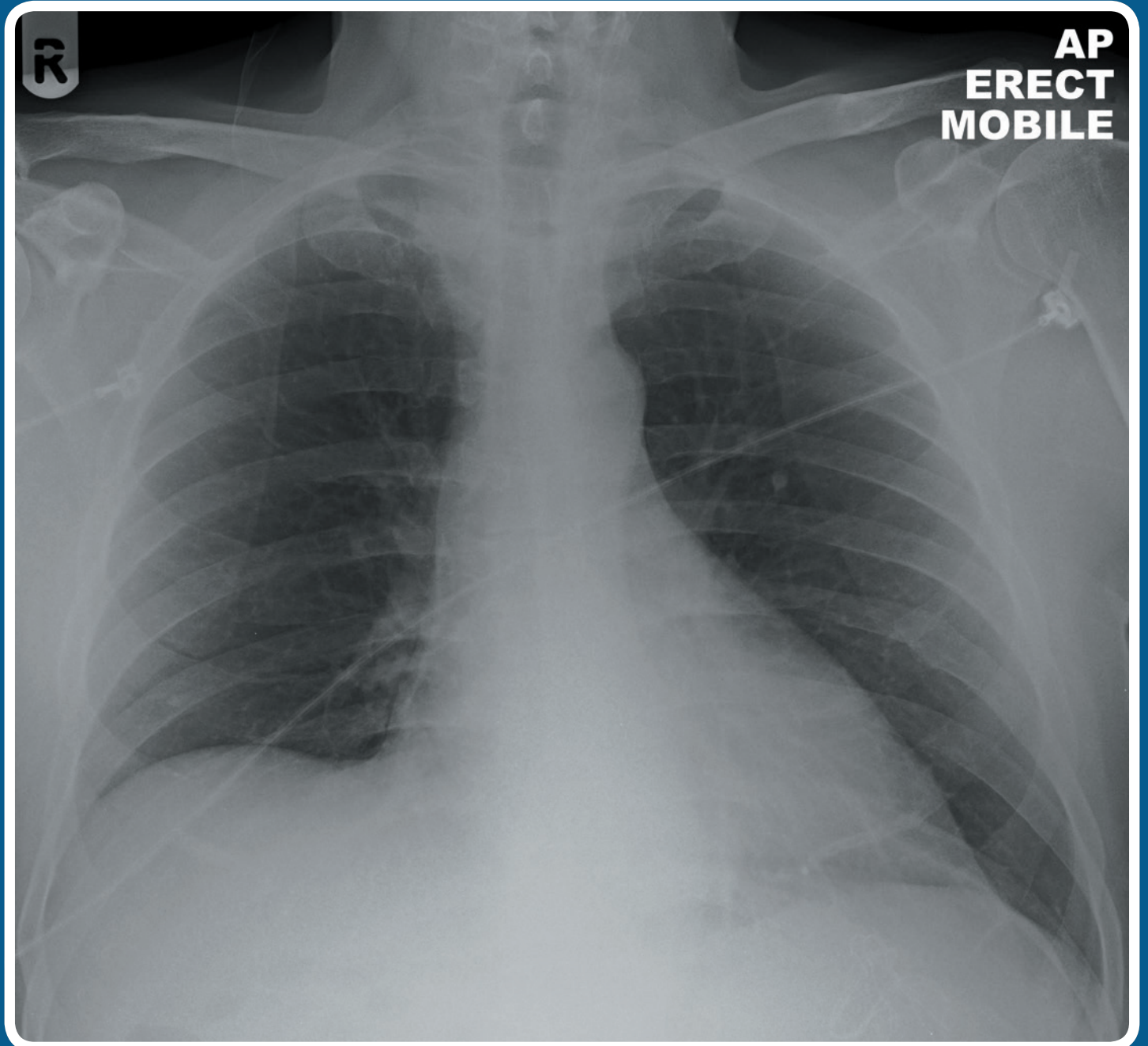
A contrast-enhanced CT of the chest, abdomen and pelvis to look for malignancy should be performed. If required,

the scapula lesion could be imaged in more detail with MRI. The patient should be referred to oncology if malignancy is confirmed.



CASE 87

A 58 year old male presents to ED with left-sided pleuritic chest pain. He had a left hemicolectomy for bowel cancer 6 days previously. He is a non-smoker. On examination, he has saturations of 90% in air and is febrile. His RR is 23 with a HR of 90 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for a possible pneumonia or pulmonary embolus.



REPORT – RETAINED SURGICAL SWAB

Patient ID: Anonymous
Projection: Mobile AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart size cannot be accurately assessed on an AP X-ray. The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened and with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG monitoring leads in situ.

There is a subtle curvilinear radio-opacity beneath the left hemidiaphragm, in the left upper quadrant. Its appearance is in keeping with a surgical swab.

No vascular lines, tubes, or surgical clips.

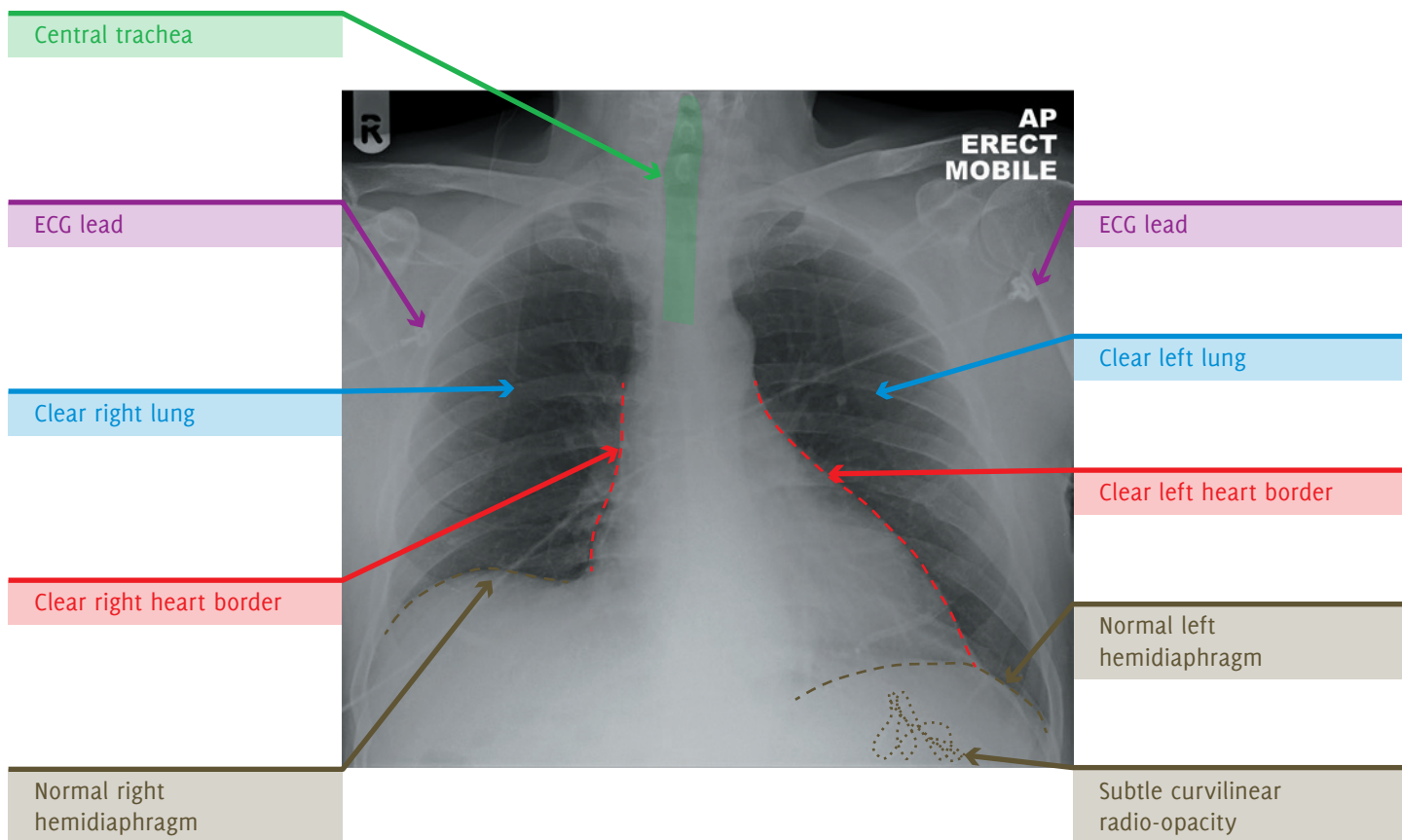
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Probable surgical swab in the left upper quadrant



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a foreign body in the left upper quadrant. Its appearance is consistent with a retained surgical swab, which is probably accounting for the patient's deterioration. The lungs are clear.

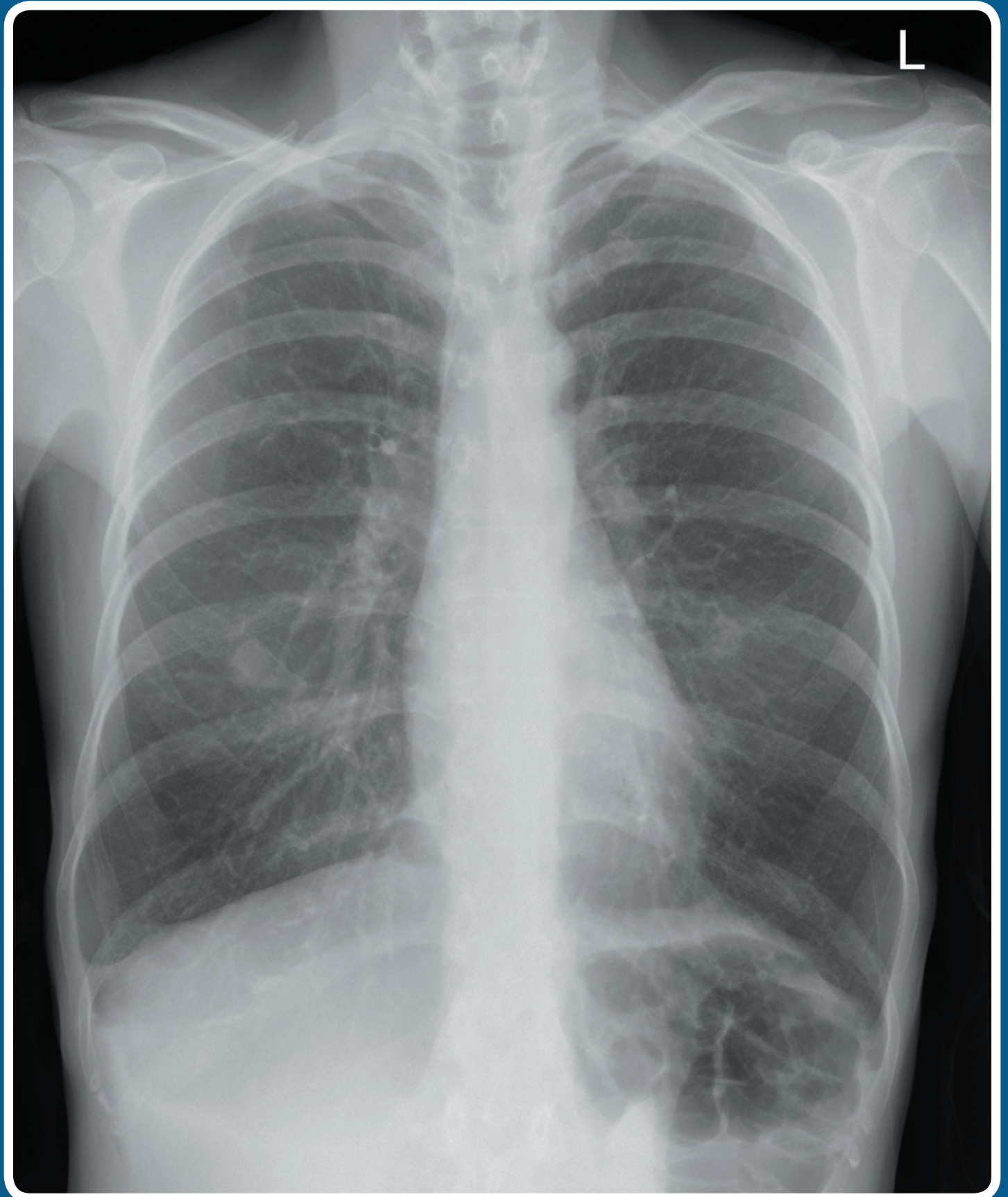
The patient should be discussed urgently with the surgical team regarding the possibility of a retained swab from the recent hemicolectomy. He needs to be assessed to ensure the swab is not on his skin/clothing. Initial blood tests may include FBC, U/Es, CRP, blood cultures and crossmatch. If further imaging is needed a CT of the abdomen with IV contrast could

be performed. Surgical exploration and removal of the swab is likely to be required.



CASE 88

A 60 year old female presents to her GP for a health insurance medical. She has a 50 pack year smoking history. On examination, she has saturations of 99% in air and is afebrile. Her RR is 16 with a HR of 72 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested as part of the health insurance assessment.



REPORT – NIPPLE SHADOWS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There are two small, well-defined circular densities within the right and left mid zones, projected over the anterior aspects of the 5th ribs. The lungs are otherwise clear.

The lungs appear hyperexpanded with flattening of the diaphragms, in keeping with COPD.

There is pleural thickening at the lung apices and costophrenic angles.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

The hemidiaphragms are flattened. There is minor blunting of the costophrenic angles in keeping with pleural thickening.

No pneumoperitoneum.

There is an old, healed left clavicular fracture. The imaged skeleton is otherwise intact with no destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

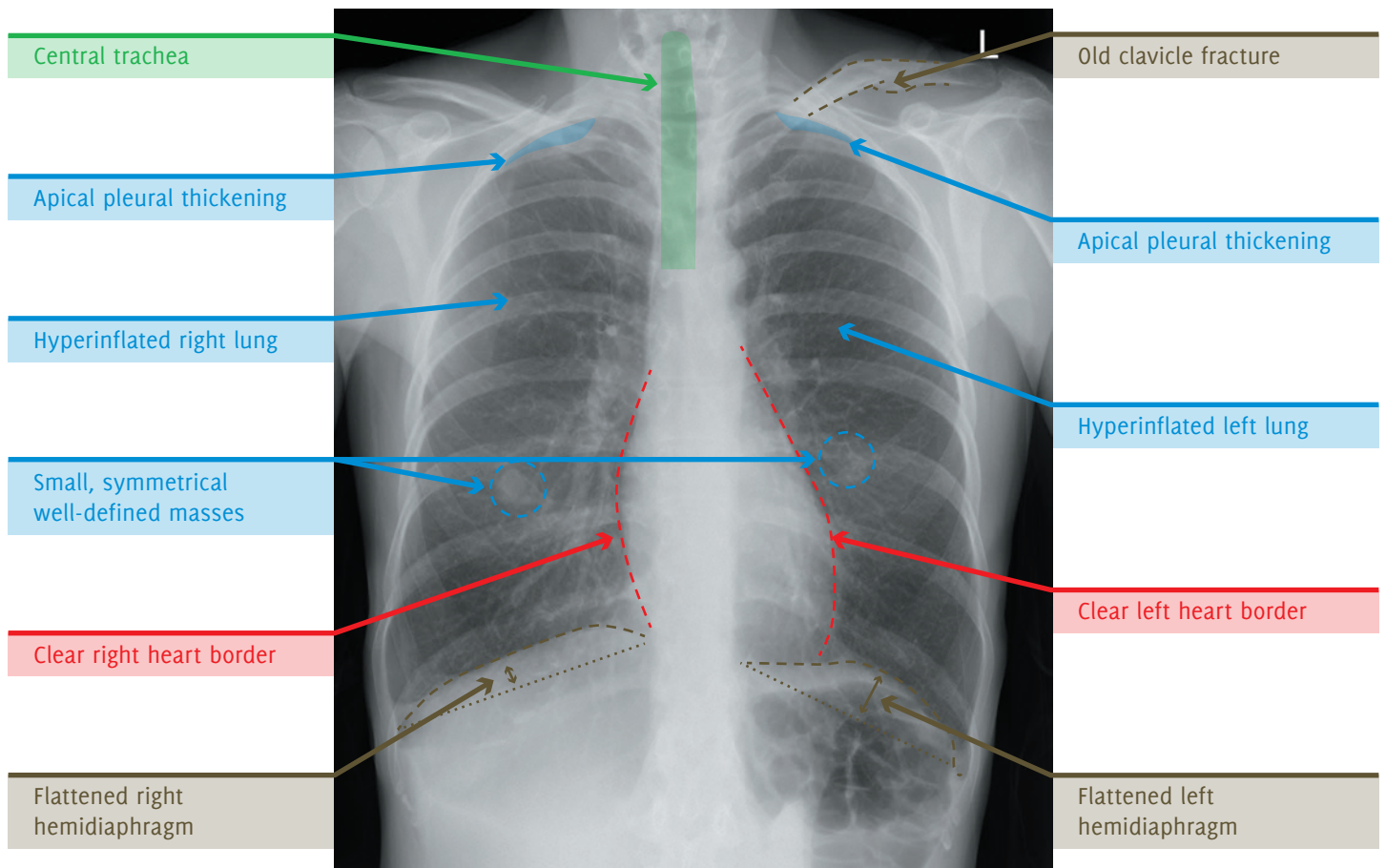
Lung Apices: Bi-apical pleural thickening

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Pleural thickening bilaterally

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

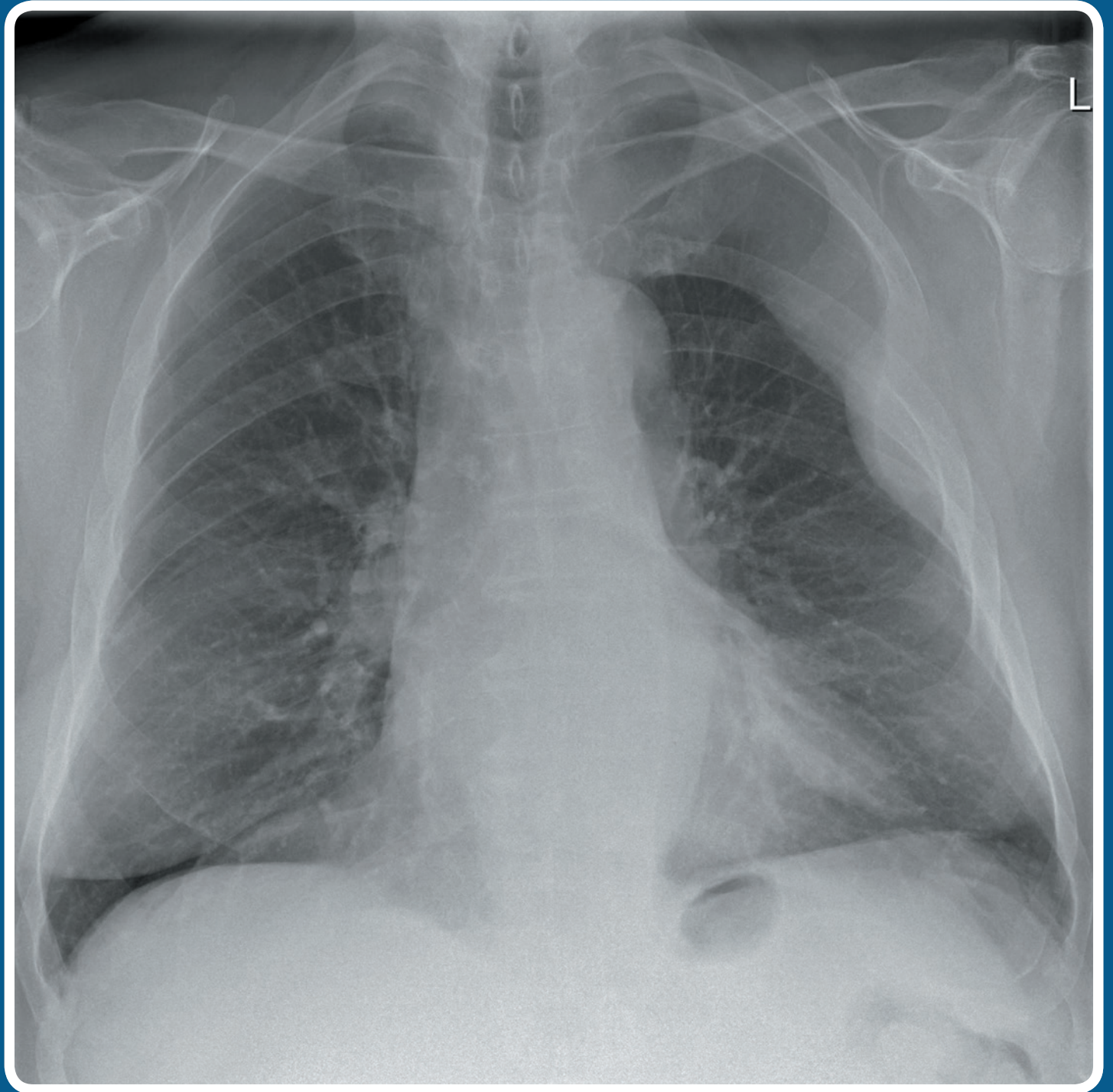
This X-ray demonstrates hyperinflated lungs, in keeping with COPD. The two well-defined, symmetrical circular densities in the midzones are likely to represent nipple shadows. The remainder of the X-ray is unremarkable.

No specific action is required. If there is clinical uncertainty, a repeat chest X-ray with nipple markers should be performed for clarification.



CASE 89

A 60 year old male presents to ED with severe left-sided pleuritic chest pain. He has a 50 pack year smoking history. On examination, he has saturations of 100% in air and is afebrile. Lungs are resonant throughout and there is good bilateral air entry. He is focally tender over the left upper chest wall. A chest X-ray is requested to assess for possible pneumonia or a pneumothorax.



REPORT – PLEURAL MASS

Patient ID: Anonymous
 Projection: PA
 Penetration: Adequate – vertebral bodies just visible behind heart
 Inspiration: Adequate – 7 anterior ribs visible
 Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is homogeneous peripheral opacification in the left upper and mid zones. Some lung markings can be seen through this. Inferiorly, the opacity makes an obtuse angle with the chest wall, suggesting it is within the pleural space or chest wall rather than lung parenchyma. The lateral margin of the lesion is difficult to identify.

The right lung is clear.
 The lungs are not hyperinflated.
 The right-sided pleural space is clear.
 Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.
 The heart borders are clear. There is an epicardial fat pad at the right cardiophrenic angle.
 There is mild unfolding of the thoracic aorta.
 The mediastinum is central, not widened, with clear borders.
 Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The posterolateral aspect of the left 4th rib is not visible. The imaged skeleton is otherwise intact with no fractures or other destructive bony lesions visible.

The soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

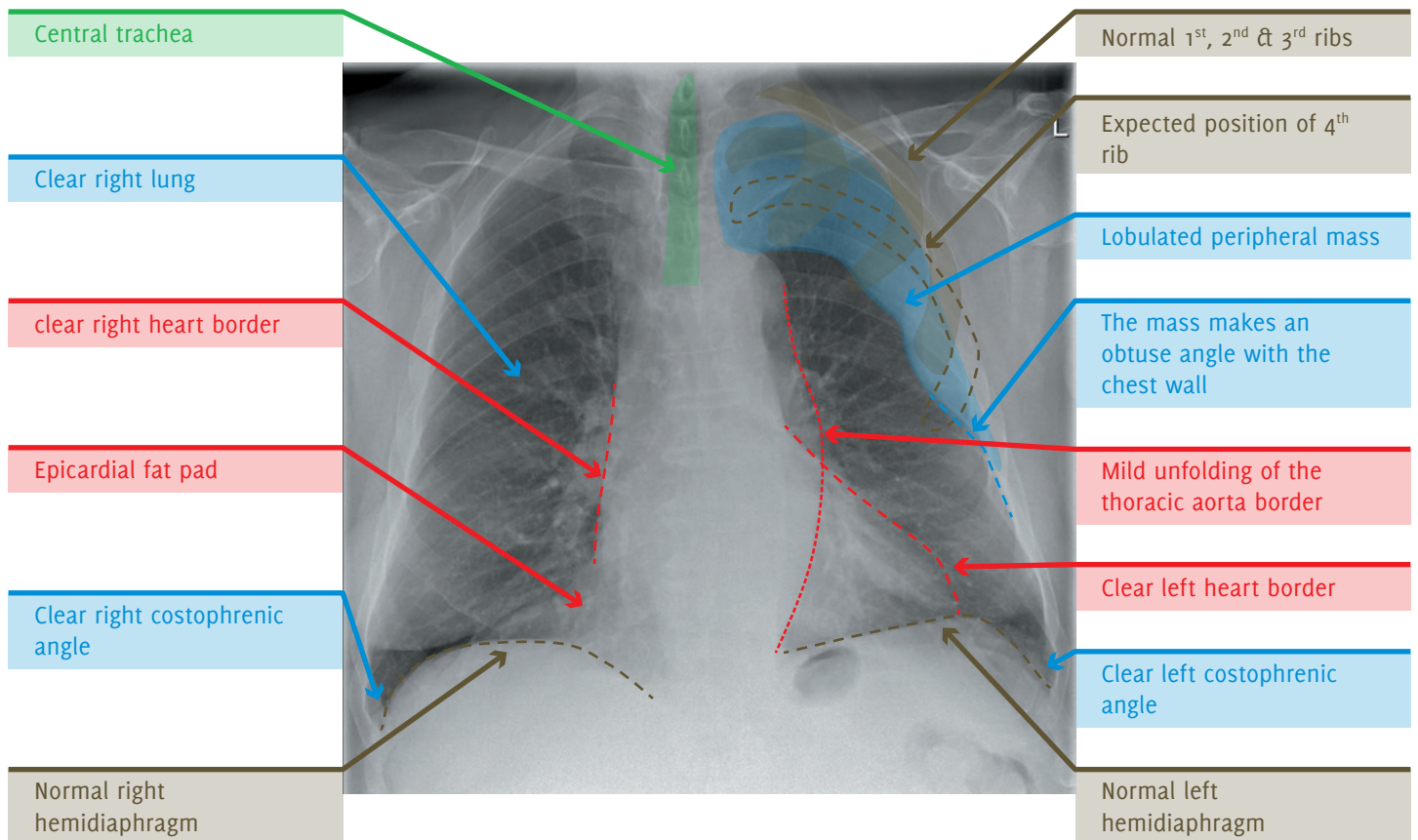
Lung Apices: Increased soft tissue opacification within the left apex

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a peripheral lobulated abnormality in the left upper and mid hemithorax with destruction of the underlying left 4th rib. The abnormal lesion makes an obtuse angle with the chest wall. The findings are suggestive of an aggressive pleural or extrapleural mass. The differentials include pleural-based tumours (e.g. mesothelioma, adenocarcinoma metastases or invasive thymoma) and chest wall masses (rib metastasis, plasmacytoma or sarcoma).

Initial blood tests may include FBC, U/Es, LFTs, and bone profile.

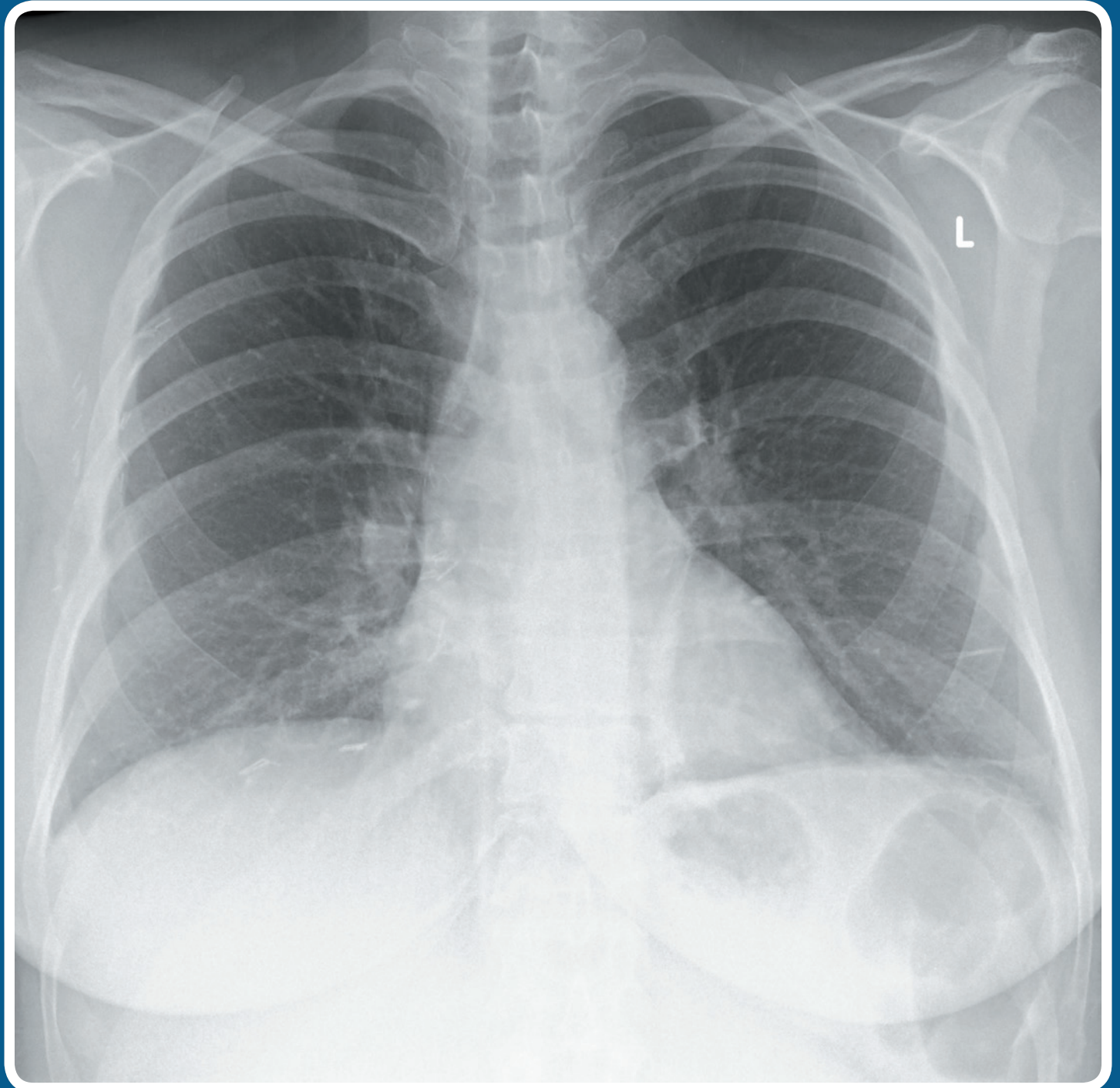
Previous imaging should be reviewed to ascertain if this is a new abnormality. A contrast-enhanced CT of the chest would provide more information on the mass.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 90

A 67 year old female presents to her GP with chest pain on inspiration. She previously had surgery for breast cancer 10 years ago. She is a non-smoker. On examination, she has saturations of 100% in air and is afebrile. Her RR is 16 with a HR of 75 bpm. There is some localised tenderness over the ribs bilaterally. A chest X-ray is requested to assess for a pneumothorax or rib fracture.



REPORT – RIB METASTASES

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

There is minor linear atelectasis in the left lower zone. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

There is a subtle expansile lucent lesion within the lateral aspect of the left 5th rib. A further lesion is present in the right 6th rib. The right 3rd and left 6th ribs also have abnormal areas.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

There are multiple surgical clips within the right axilla and overlying the right breast, in keeping with previous breast surgery with axillary node clearance.

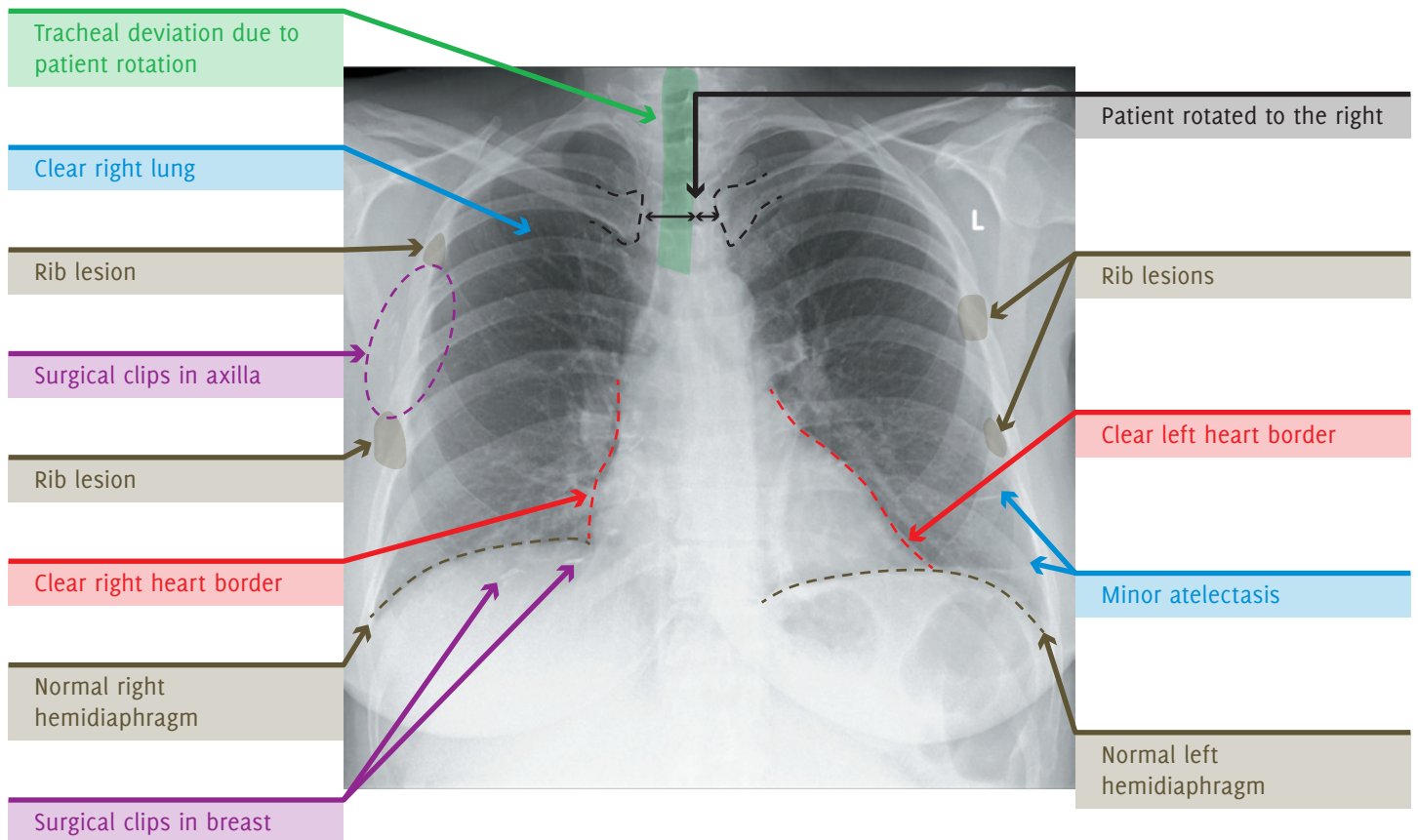
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Minor left atelectasis

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

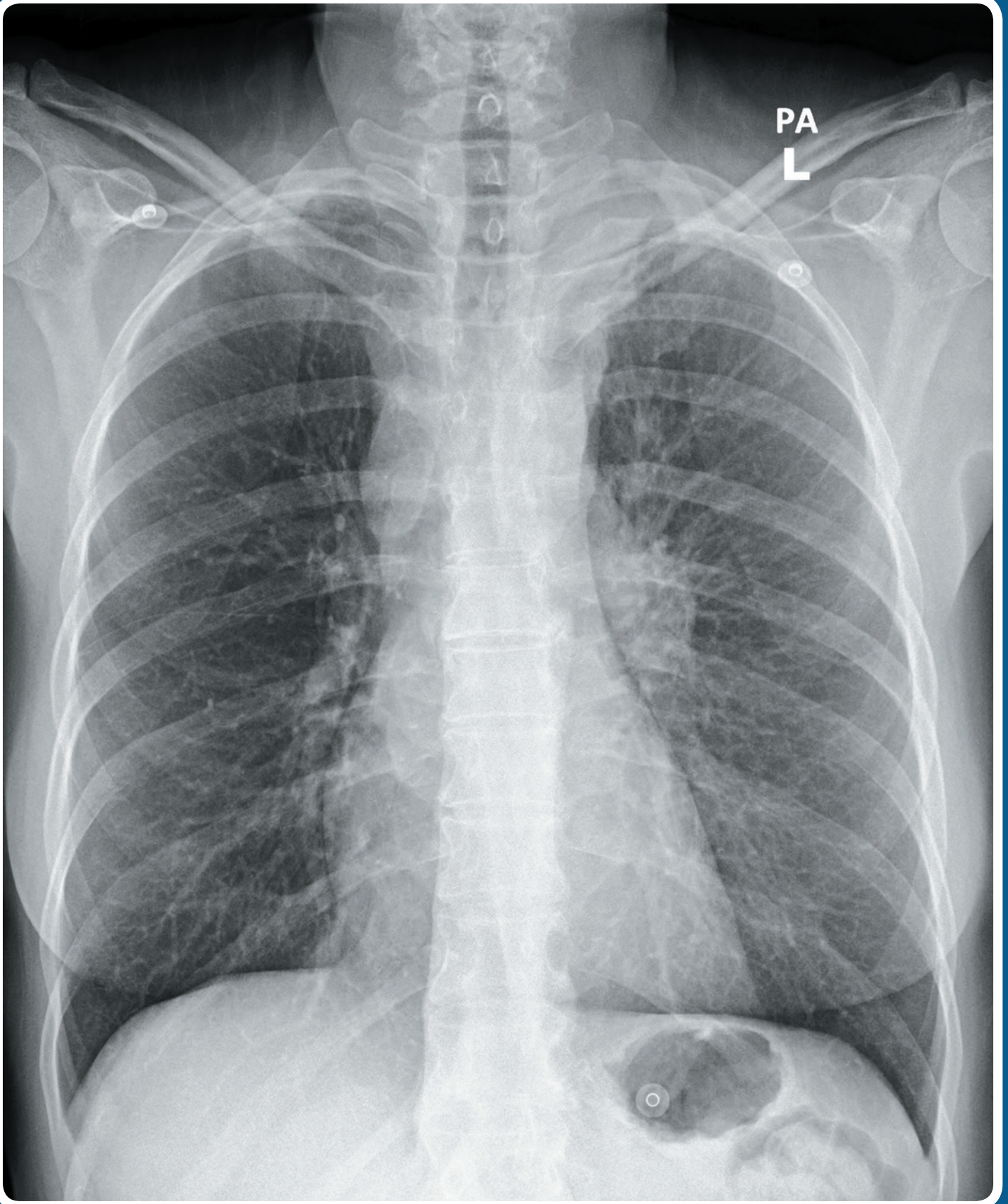
This X-ray demonstrates bilateral rib lesions. In the context of previous breast and axillary surgery for breast cancer, these rib lesions are highly suspicious for metastatic deposits.

This patient needs restaging with contrast-enhanced CT of the chest, abdomen, and pelvis and referred to oncology for further management.



CASE 91

A 68 year old female presents to her GP with unintentional weight loss. She has a 50 pack year smoking history. On examination, she has saturations of 100% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry. There is a left-sided Horner's syndrome. A chest X-ray is requested to assess for possible malignancy.



REPORT – LUNG MASS AND MEDIASTINAL LYMPHADENOPATHY

Patient ID: Anonymous
 Projection: PA
 Penetration: Adequate – vertebral bodies just visible behind heart
 Inspiration: Adequate – 8 anterior ribs visible
 Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

There is asymmetry of the lung apices with increased density in the left apex. A subtle lace-like opacification in the left lung is present, in keeping with interstitial opacification.

The right lung is clear.

The lungs are not hyperinflated. There is coarsening of the bronchovascular markings, in keeping with COPD.

The pleural spaces are clear.

CIRCULATION

The heart is not enlarged.

The heart borders are clear. There is a well-defined, lobulated mass projected over the right side of the cardiac silhouette, which is separate to the right hilum.

The aorta appears normal.

There is widening of the right paratracheal stripe. The mediastinum has clear borders.

Normal size, shape, and position of right hila. The left hilum is enlarged and dense, consistent with lymph node enlargement.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible. In particular, the left 1st and 2nd ribs appear intact.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

ECG electrodes in situ.

No vascular lines, tubes, or surgical clips.

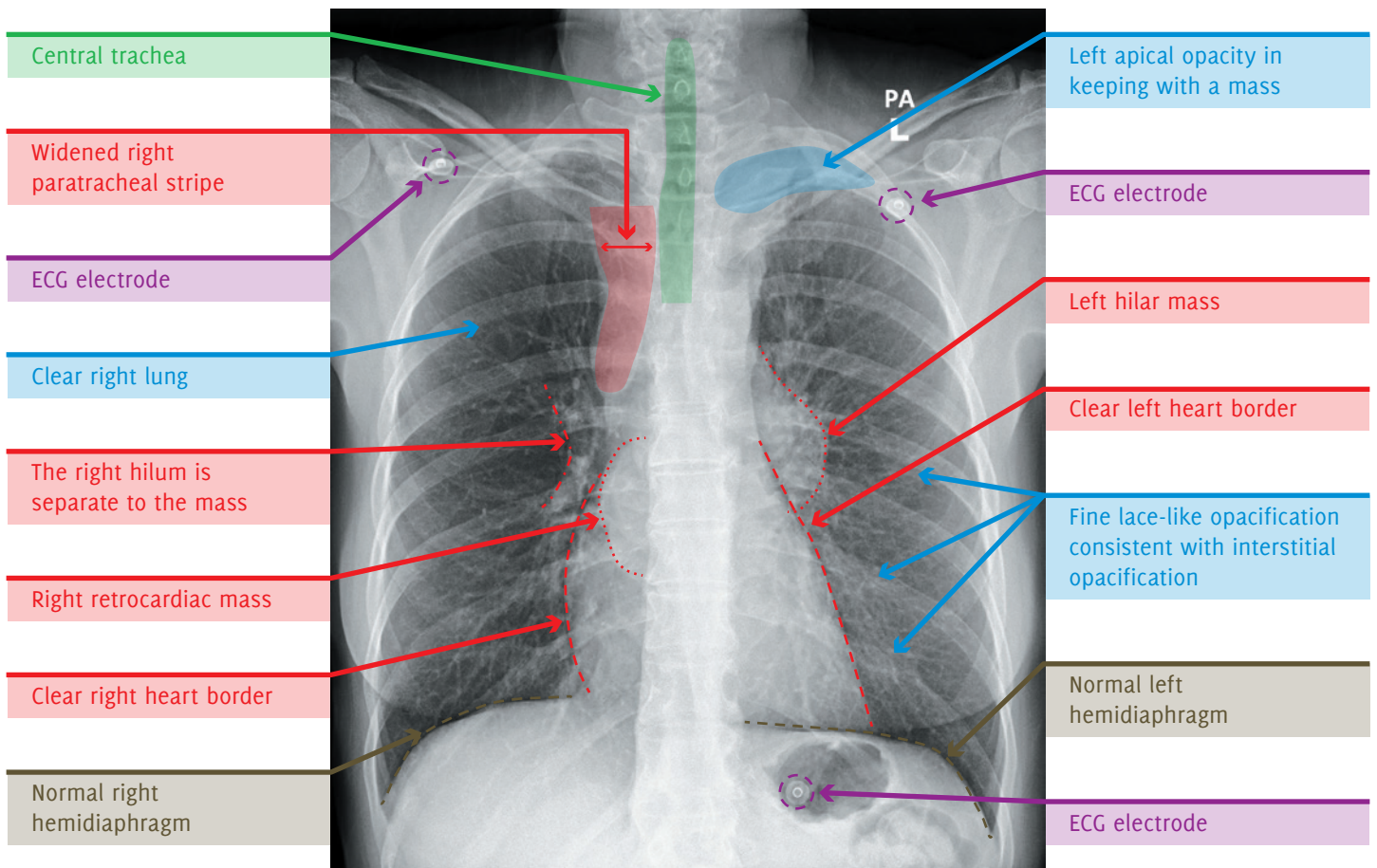
Lung Apices: Left apical mass

Hila: Enlarged, dense left hilum

Behind Heart: Right retrocardiac mass

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates a left apical mass, which is likely accounting for the Horner's syndrome. There is evidence of mediastinal lymph node enlargement (widened right paratracheal stripe, dense left hilum and right retrocardiac mass). The interstitial opacification in the left lung probably represents malignant spread via the lymphatics (lymphangitis carcinomatosa).

Initial blood tests may include FBC, U/Es, LFTs and bone profile.

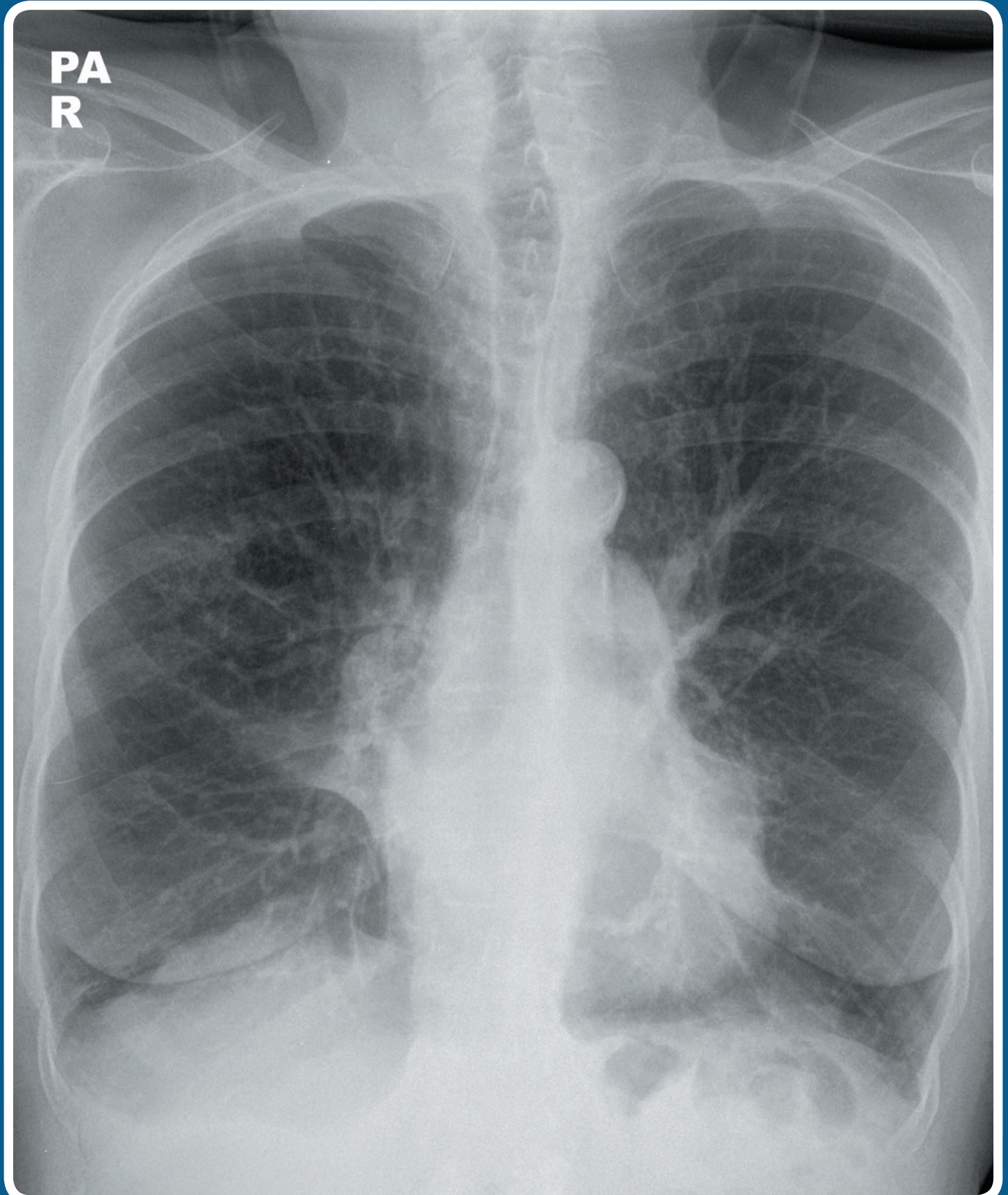
A staging CT chest and abdomen with IV contrast should be performed.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.



CASE 92

A 70 year old female presented to her GP with a 3 week history of a cough. She described recent weight loss and 'constantly feeling tired'. She has a 45 pack year smoking history. On examination, she has saturations of 98% in air and is afebrile. Lungs are resonant throughout, with good air entry bilaterally. There is a dry cough, and cachexia. The GP requests a chest X-ray to assess for possible malignancy.



REPORT – RIGHT MIDDLE LOBE COLLAPSE

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 8 anterior ribs visible
Rotation: Not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are hyperinflated with coarsening of the lung markings.

There is increased density in the medial aspect of the right lower zone. The horizontal fissure cannot be identified. Additionally, there is a 2cm opacity in the right mid zone projected over the posterior intercostal space of the 7th and 8th ribs.

The left lung is clear.
The pleural spaces are clear.
Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.
The right heart border is indistinct. The left heart border is clear.
The aorta appears normal.
The mediastinum is central.
The right hilum is bulky with a convex margin and increased density. Normal size, shape, and position of the left hilum.

DIAPHRAGM + DELICATES

The medial aspect of the right hemidiaphragm is slightly elevated. The left hemidiaphragm is flattened, but in a normal position.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

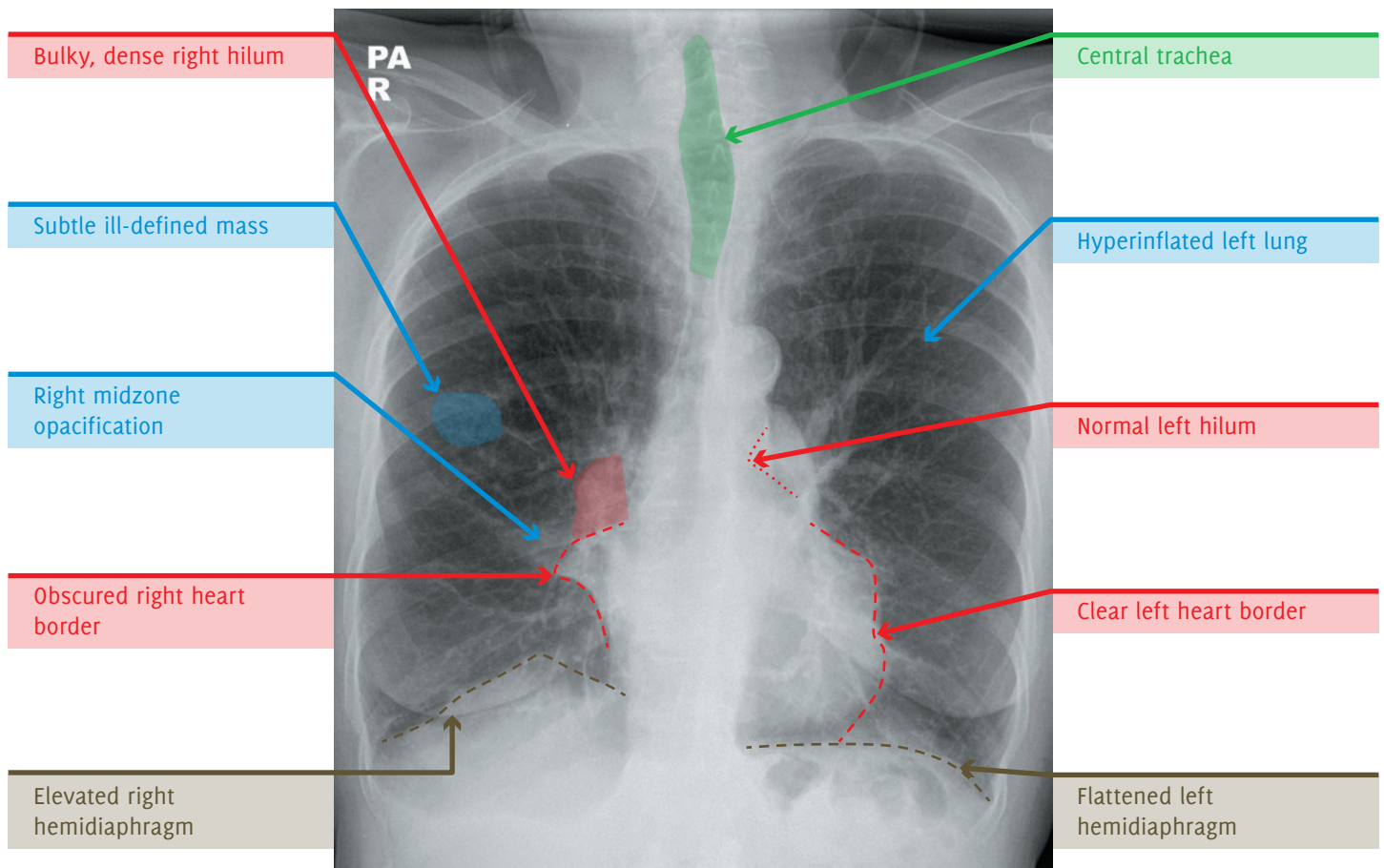
Lung Apices: Normal

Hila: Right hilum is bulky, with a convex margin and increased density

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a right middle lobe collapse (opacification obscuring the right heart border and mild elevation of the right hemidiaphragm). Additionally, the right hilum is abnormal and there is an ill-defined opacity in the right mid zone.

The lungs are hyperinflated with coarsening of the markings, in keeping with COPD.

The most likely diagnosis is underlying malignancy. Mucus plugging or a foreign body could also cause collapse but are less likely given the lung mass and abnormal right hilum.

Initial blood tests may include FBC, U/Es, LFTs, bone profile, CRP, ESR and TFTs.

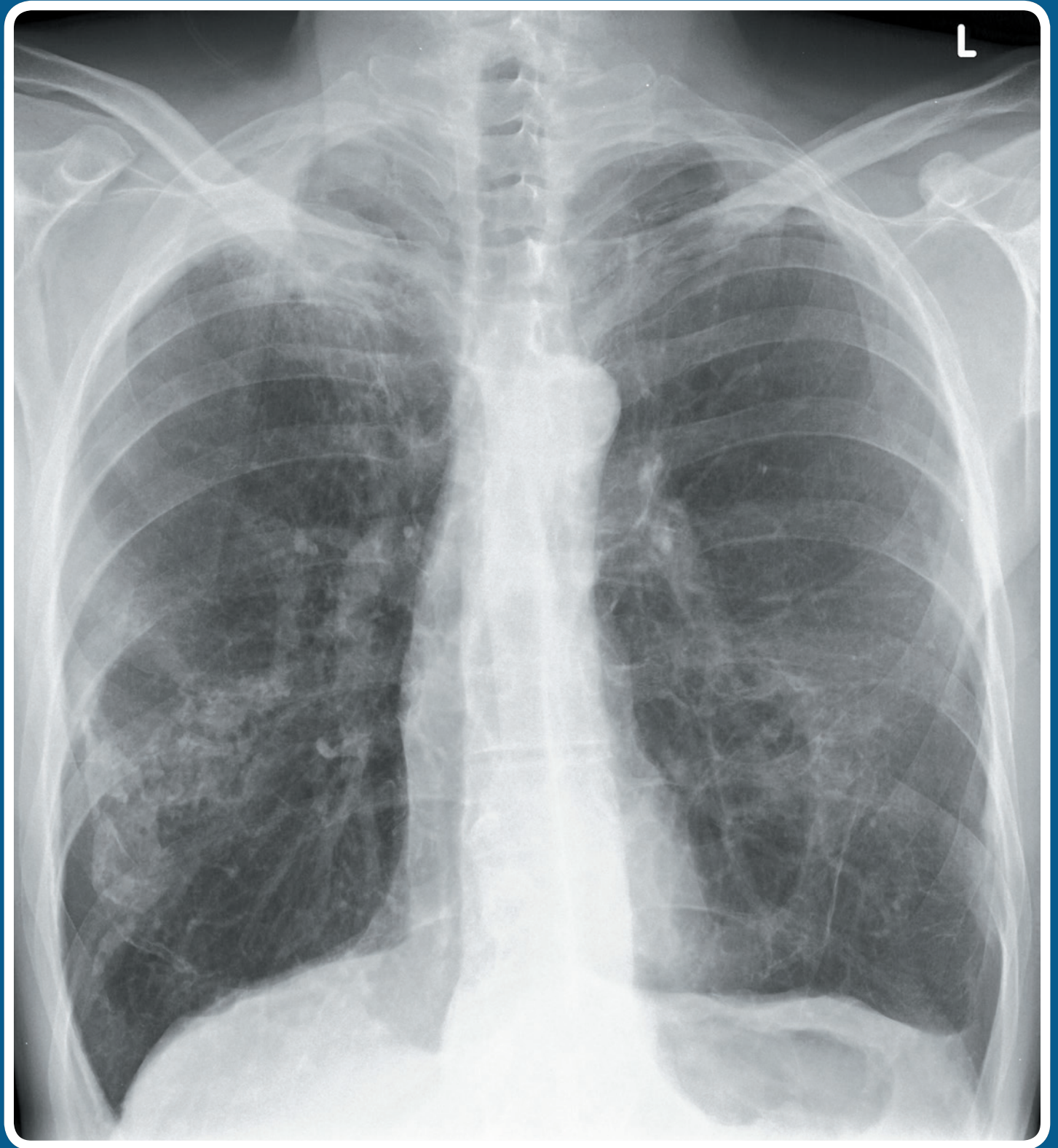
The patient should be urgently referred to respiratory/oncology services for further management. This will include an urgent outpatient CT chest with IV contrast performed to assess for an underlying tumour. A CT of the abdomen will usually also be acquired at the same time to enable lung cancer staging.

Further treatment may include surgery, radiotherapy, chemotherapy, or palliative treatment, depending on the outcome of the MDT discussion and the patient's wishes.



CASE 93

A 71 year old male presents to his GP with a chronic cough and right shoulder pain. He has a 40 pack year smoking history. On examination, he has saturations of 96% in air and is afebrile. Lungs are resonant throughout with good bilateral air entry and occasional wheeze. There is a full range of movement in the shoulder, but some weakness in the right hand. A chest X-ray is requested to assess for possible malignancy.



REPORT – APICAL LUNG MASS

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lung apices are asymmetrical with right apical opacification. There are bilateral calcified pleural plaques, in keeping with previous asbestos exposure.

The lungs are hyper-inflated in keeping with COPD, but otherwise clear.

The pleural spaces are clear, apart from the pleural plaques.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Both hemidiaphragms are flattened but clear.

No pneumoperitoneum.

The posterolateral aspect of the right 3rd rib is not visible, in keeping with localised destruction. No other destructive bone lesions or other bony changes.

The soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

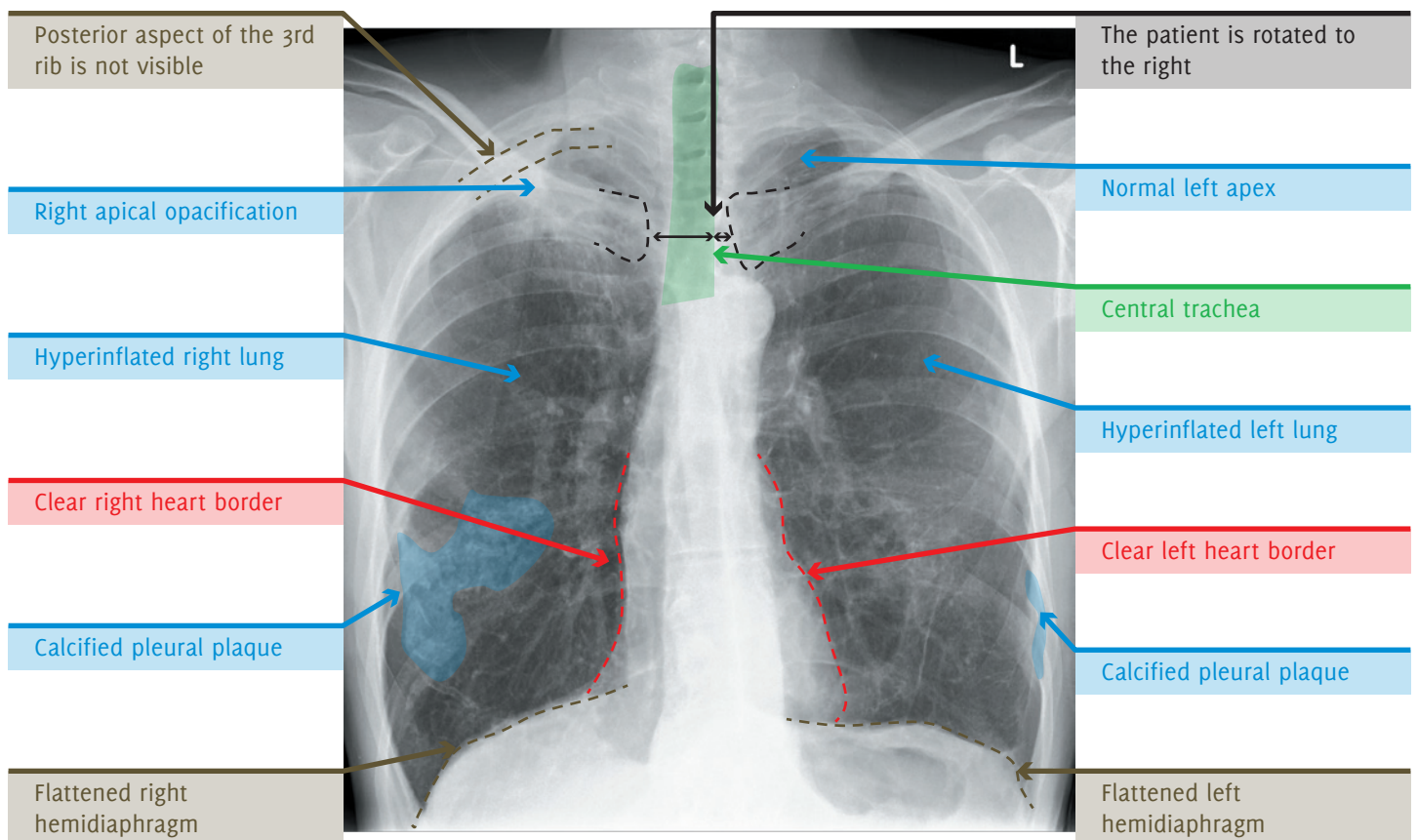
Lung Apices: There is a right apical mass with associated destruction of the right 3rd rib.

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a right apical mass with associated destruction of the right 3rd rib. There are background changes of COPD and previous asbestos exposure. The findings are in keeping with a primary lung (Pancoast) tumour with direct involvement of the adjacent rib. Given the previous asbestos exposure, mesothelioma is one of the differentials.

Initial blood tests may include FBC, U/Es, LFTs and bone profile.

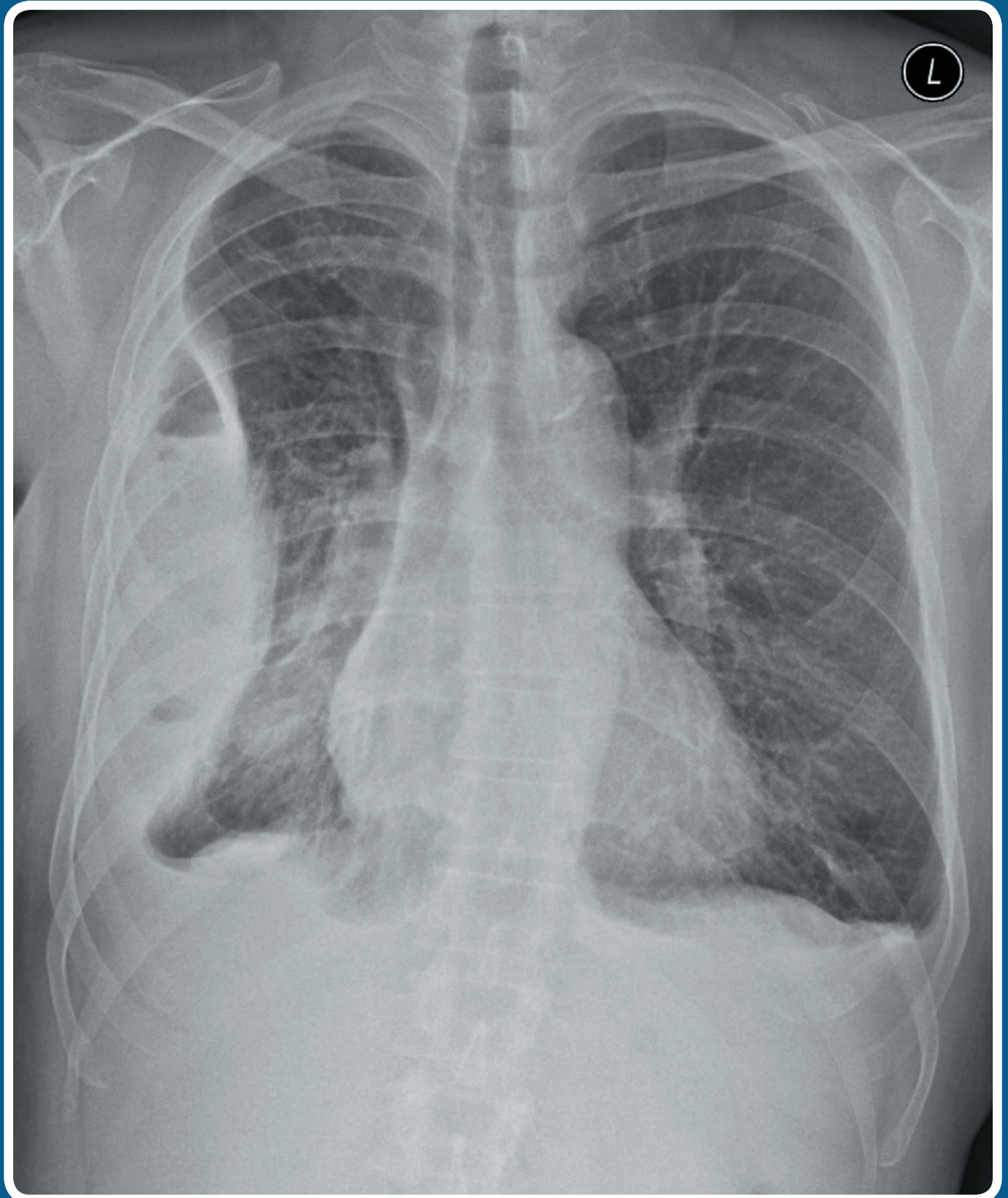
A staging CT chest, and abdomen with IV contrast should be performed.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patients' wishes.



CASE 94

A 75 year old male presents to ED feeling unwell with a productive cough. He was diagnosed with pneumonia 2 weeks earlier, but has not been taking his antibiotics. He is a non-smoker. On examination, he has saturations of 90% in air and is febrile, with a temperature of 38.2°C. There are crackles, reduced air entry and dullness to percussion in the right mid and lower zones. A chest X-ray is requested to assess for possible collapse, consolidation or effusion.



REPORT – LOCULATED PLEURAL COLLECTION

Patient ID: Anonymous
Projection: PA
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 9 anterior ribs visible
Rotation: The patient is slightly rotated to the right

AIRWAY

The trachea is central after factoring patient rotation.

BREATHING

Heterogeneous opacification is present in the right mid and lower zones. There is a loculated right-sided pleural collection tracking up to the right apex. It contains several pockets of gas and an air/fluid level superiorly. The adjacent pleura appears thickened.

The left lung is clear. The lungs are not hyperinflated.

A small left pleural effusion is present.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

The mediastinum is central, not widened, with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

The right hemidiaphragm is indistinct. Normal appearance and position of the left hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

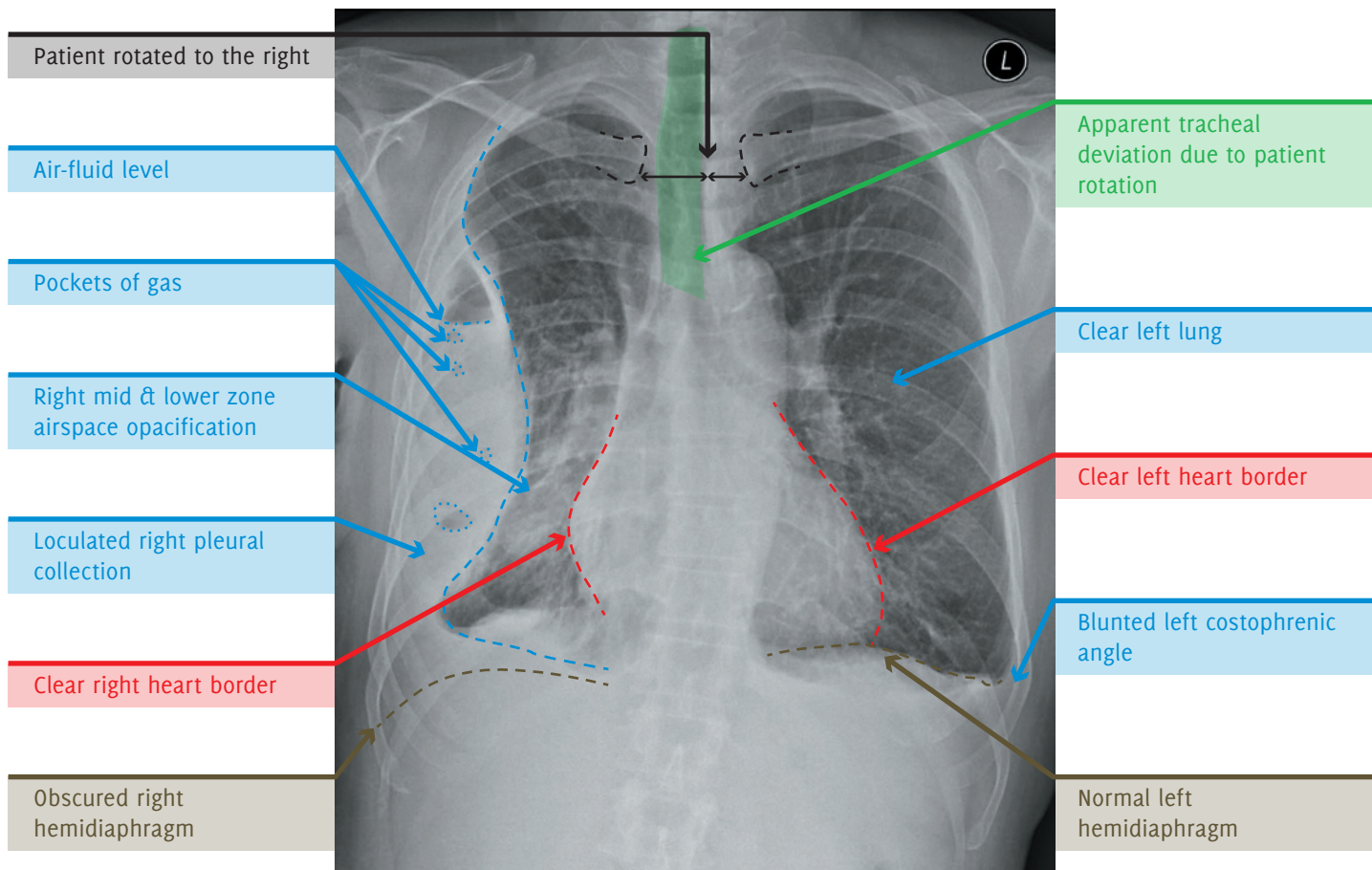
Lung Apices: Normal

Hila: Normal

Behind Heart: Increased right retrocardiac opacification

Costophrenic Angles: Blunt costophrenic angles bilaterally

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates a right-sided loculated pleural effusion with pleural thickening and an air-fluid level. There is associated heterogeneous opacification in the right mid and lower zones. The findings are consistent with an empyema and adjacent pneumonia. A small left pleural effusion is present.

Supplementary oxygen needs to be given.

Initial blood tests may include a FBC, U/Es, LFTs, CRP, coagulation, and blood cultures. Sputum cultures should also be obtained.

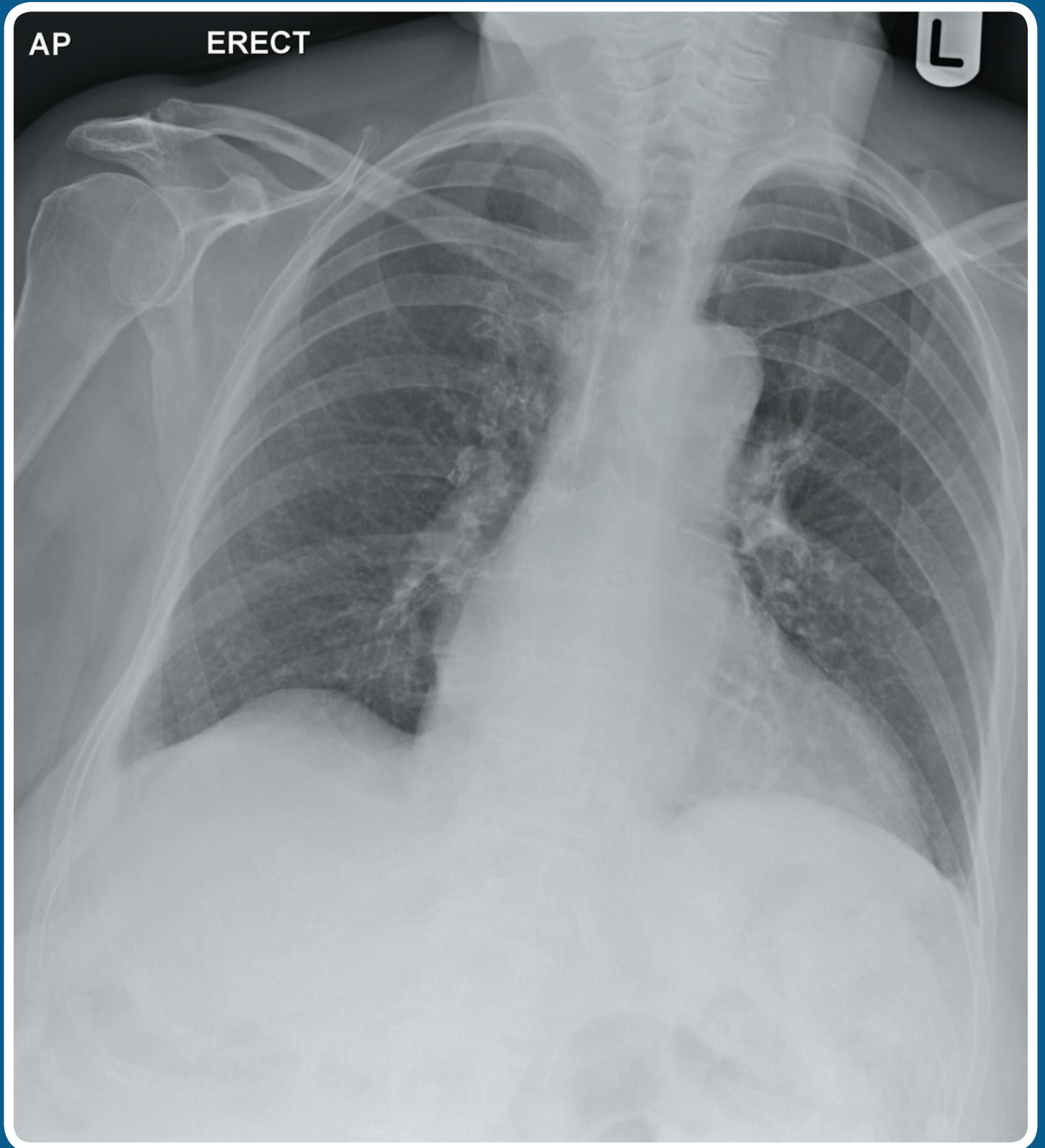
The patient should be discussed with respiratory and /or infectious diseases.

A chest CT with IV contrast would delineate the right-sided abnormalities more clearly. Additionally it could exclude associated lung abscesses. Ultrasound-guided drainage of the right pleural collection should be performed, and the patient should be started on appropriate intravenous antibiotics. Interval imaging to ensure resolution will be required.



CASE 95

A 79 year old female presents to ED with worsening shortness of breath. She has a background of mitral regurgitation. She is a non-smoker. On examination, she has saturations of 94% in air and is afebrile. Her RR is 22 with a HR of 90 bpm. There are scattered crackles in both the lung bases, in addition to bibasal dullness to percussion. A chest X-ray is requested to assess for possible pulmonary oedema.



REPORT – LEFT ATRIAL ENLARGEMENT

Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

There is minor blunting of the costophrenic angles. The pleural spaces are otherwise clear.

Normal pulmonary vascularity.

CIRCULATION

The cardiac size cannot be accurately assessed on this AP X-ray.

There is a double right heart border. The left heart border is clear.

The aorta appears normal.

The mediastinum is central, not widened with clear borders. The carina is splayed.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Minor blunting of the costophrenic angles which may represent pleural thickening or small effusions. Otherwise

normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

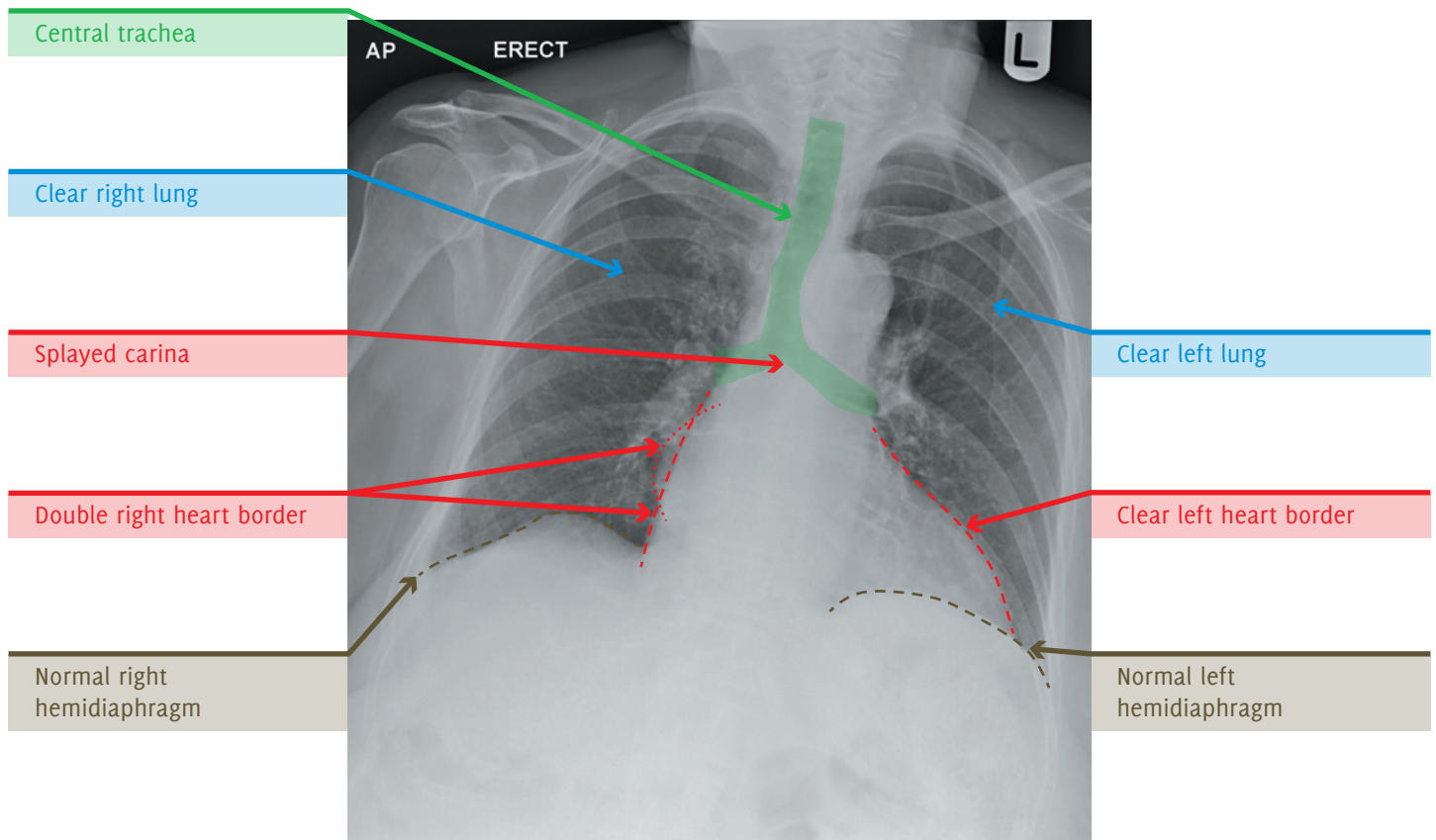
Lung Apices: Normal

Hila: Normal

Behind Heart: Double right heart border and splayed carina

Costophrenic Angles: Minor blunting

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a double right heart border associated with splayed carina, consistent with left atrial enlargement – this is compatible with the known history of mitral regurgitation. There is minor blunting of the costophrenic angles which may represent small effusions or pleural thickening. There is no evidence of pulmonary oedema.

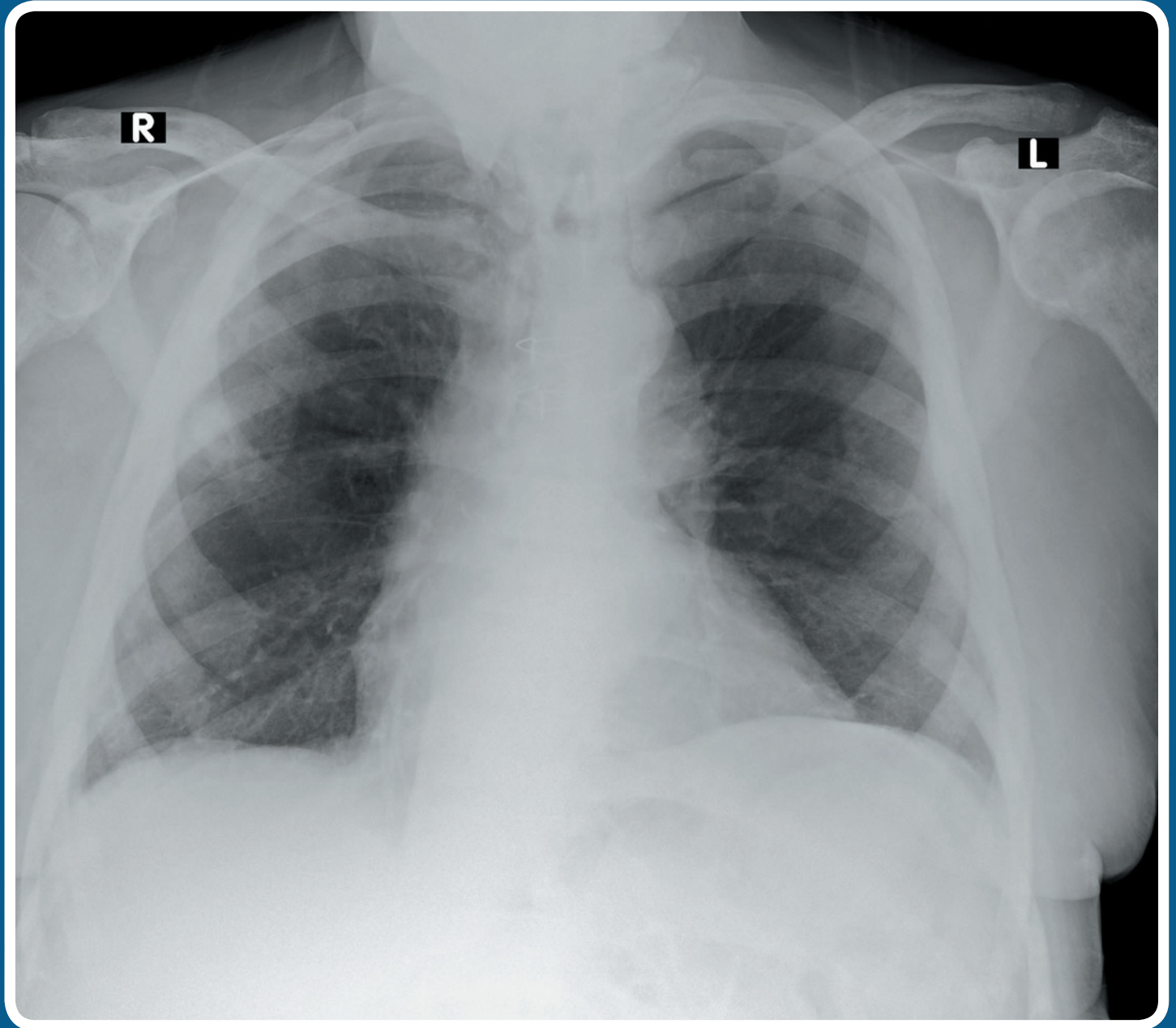
Initial blood tests may include FBC, U/Es and CRP. Previous X-rays should be reviewed to assess whether the findings are new or longstanding. An ECG should be performed. An ECHO would allow assessment of the cardiac function and the degree of any regurgitation. Depending on the results, medical

(diuretic) or surgical management may be needed for the valve disease.



CASE 96

A 79 year old male presents to ED with chest pain, a cough and fever. He has previously had a CABG. He is a non-smoker. On examination, he has saturations of 99% in air and is febrile with a temperature of 39.5°C. His RR is 22 with a HR of 95 bpm. Lungs are resonant throughout, with good bilateral air entry. A chest X-ray is requested to assess for possible pneumonia.



REPORT – SCLEROTIC BONE METASTASES

Patient ID: Anonymous
Projection: PA
Penetration: Slightly underpenetrated - vertebral bodies not clearly visible behind the heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The heart borders are clear.

There is unfolding of the thoracic aorta.

The mediastinum is central, not widened, with clear borders.

Normal size, shape, and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The bones have an abnormal texture, appearing diffusely sclerotic. The imaged skeleton is otherwise intact with no fracture or destructive bony lesion visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

Sternotomy wires in situ.

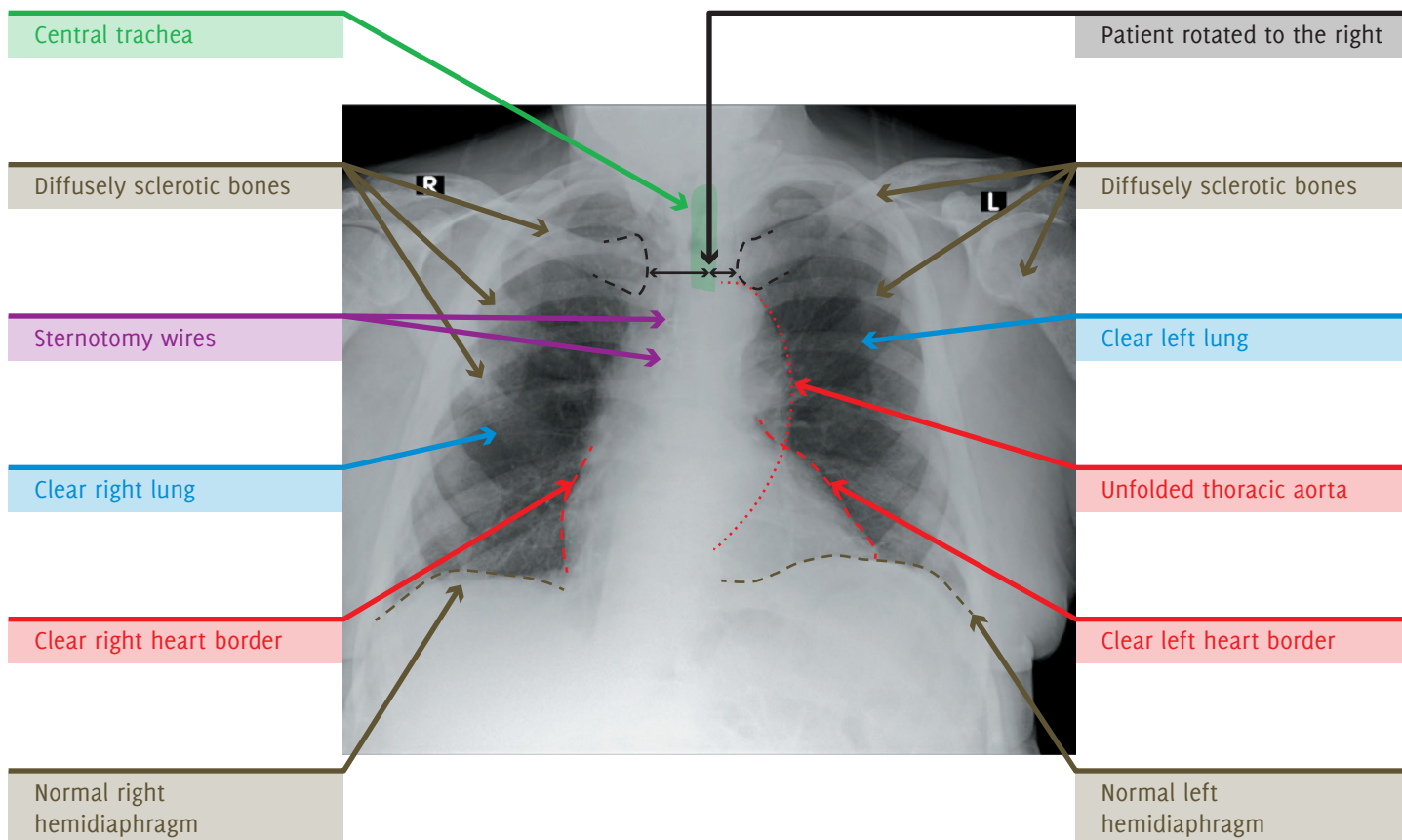
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

The X-ray demonstrates diffusely sclerotic bones. In a male patient of this age the most likely cause is sclerotic metastases from prostate cancer.

Previous imaging and medical notes should be reviewed to assess whether the patient is known to have an underlying malignancy, especially prostate cancer. Initial blood tests may include FBC, U/Es, PSA (prostate specific antigen), LFTs, and a bone profile. A digital rectal examination of the prostate should be performed. The patient should be discussed with urology and oncology for further management.



CASE 97

An 18 year old female presents to ED with acute shortness of breath and pleuritic chest pain. She has known sickle cell disease, with multiple recent hospital admissions. She is a non-smoker. On examination, she has saturations of 94% in air and is febrile with a temperature of 39°C. Her RR is 20 with a HR of 80 bpm. There are scattered crackles throughout the lungs. A chest X-ray is requested to assess for possible pneumonia, pneumothorax or an acute chest syndrome.



REPORT – SICKLE CELL ANAEMIA

Patient ID: Anonymous
Projection: PA
Penetration: Overpenetrated – vertebral bodies clearly visible behind heart
Inspiration: Adequate – 6 anterior ribs visible
Rotation: The patient is not rotated

AIRWAY

The trachea is central.

BREATHING

There is minor linear atelectasis in the left midzone. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The cardiothoracic ratio is 0.6, consistent with cardiomegaly.

The heart borders are clear.

The aorta appears normal.

The mediastinum is central, not widened with clear borders.

Normal size, shape and position of both hila.

DIAPHRAGM + DELICATES

Normal appearance and position of the hemidiaphragms. No pneumoperitoneum.

There are mixed sclerotic/lucent changes seen within the right humeral head. The ribs have a mottled bony texture. There

are biconcave vertebral endplate changes resulting in 'H' shaped vertebrae.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

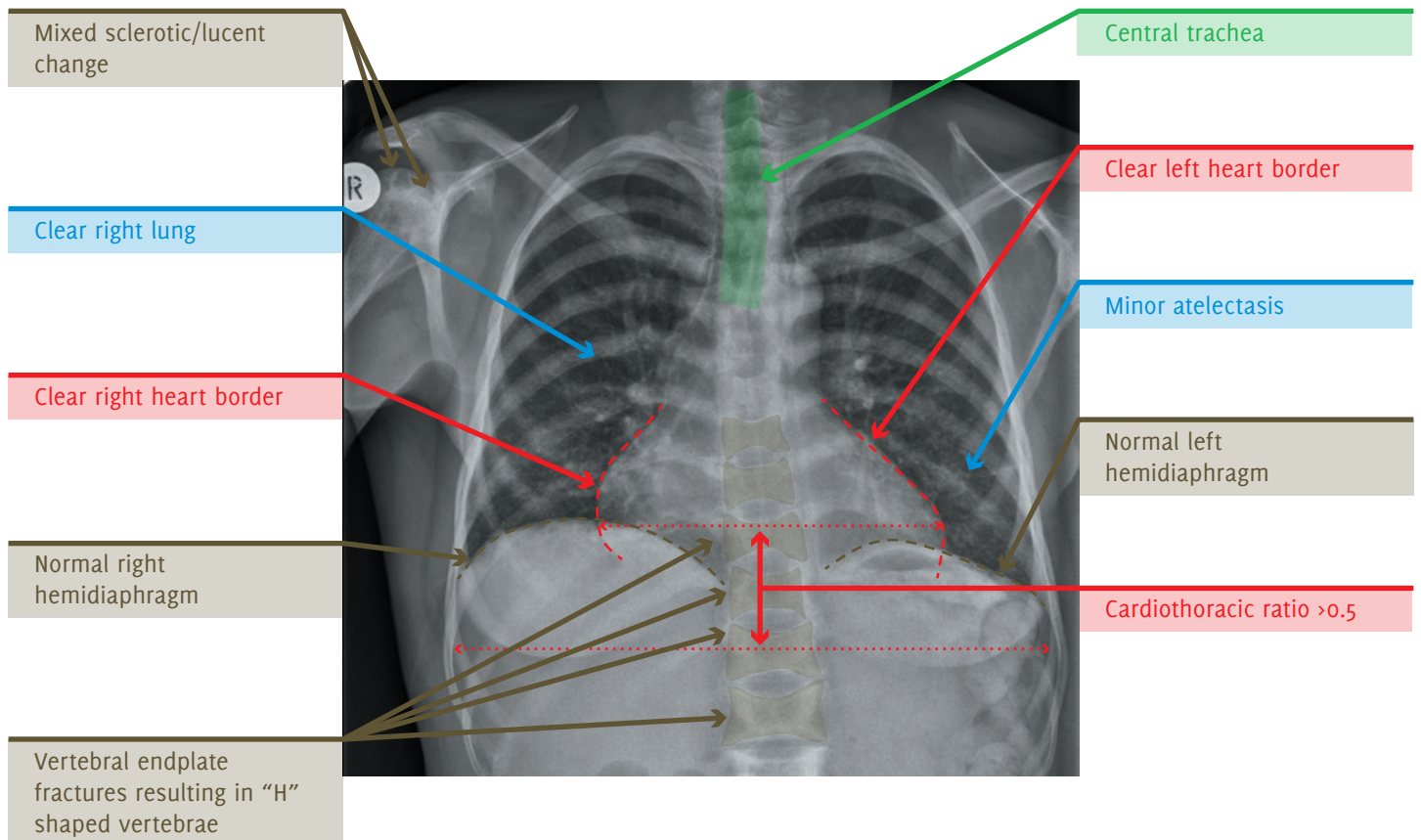
Lung Apices: Normal

Hila: Normal

Behind Heart: Normal

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates multiple chronic features of sickle cell anaemia. The 'H' shaped vertebrae are the result of endplate infarcts, while the changes in the right humeral head reflect avascular necrosis from a previous sickle cell crisis. The cardiomegaly is presumably related to severe anaemia. There is no consolidation, effusion or pneumothorax.

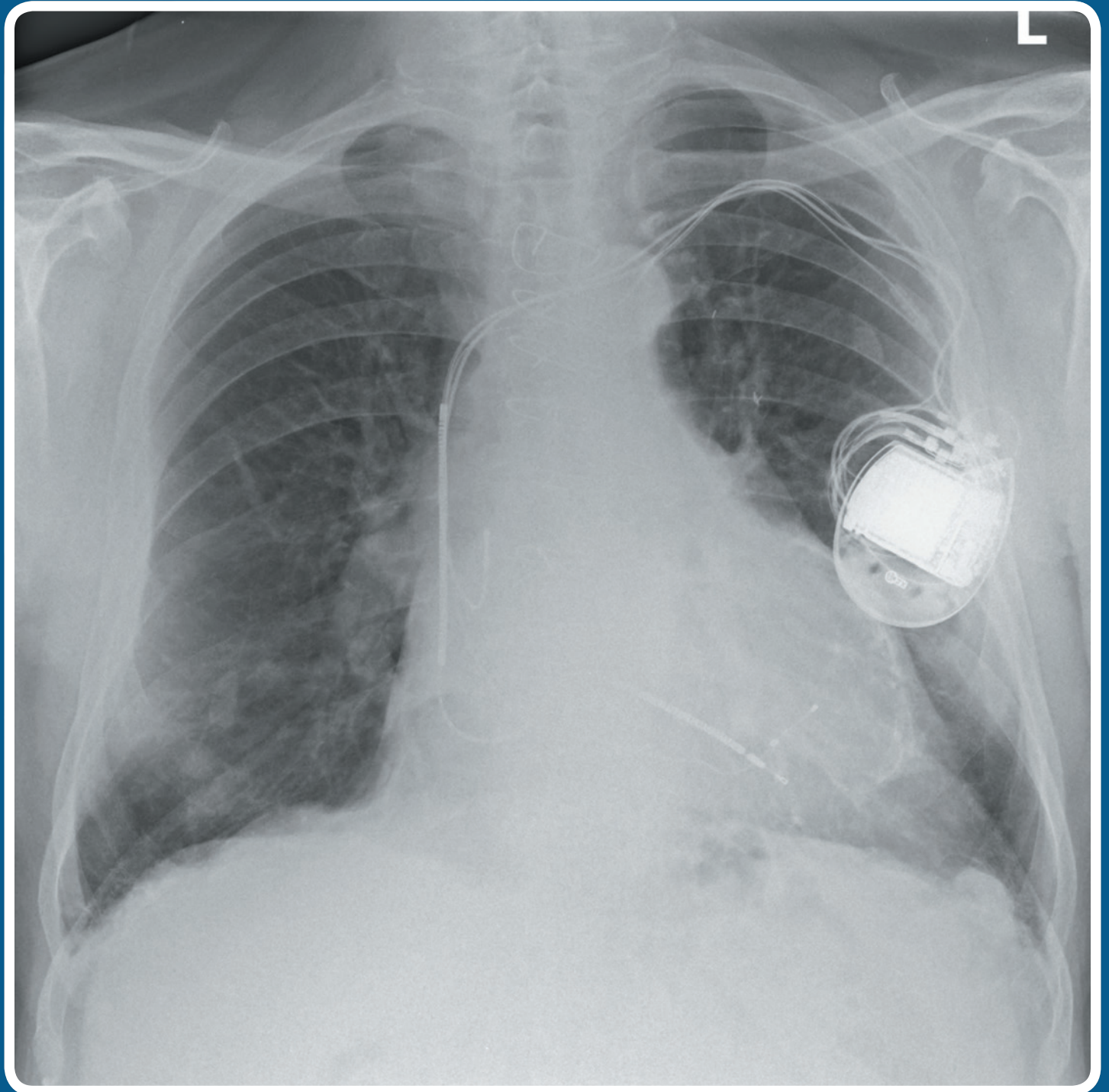
A clinical concern remains for a sickle cell acute chest syndrome. Initial blood tests may include FBC, U/Es, LFTs and CRP.

Analgesia and appropriate antibiotics should be administered. Depending on the haemoglobin, a transfusion may be required.



CASE 98

An 80 year old male presents to ED with increasing shortness of breath. He has a background of 2 previous MIs. He has a 50 pack year smoking history. On examination, he has saturations of 92% in air and is afebrile. His RR is 20 with a HR of 90 bpm. There are scattered crackles at the lung bases, with dullness to percussion. A chest X-ray is requested to assess for possible pulmonary oedema, collapse or pneumonia.



REPORT – CALCIFIED LEFT VENTRICULAR ANEURYSM

Patient ID: Anonymous
Projection: PA
Penetration: Underpenetrated – vertebral bodies not visible behind heart
Inspiration: Adequate – 7 anterior ribs visible
Rotation: The patient is slightly rotated to the left

AIRWAY

The trachea is central after factoring in patient rotation.

BREATHING

The lungs are clear, apart from prominent end-on vessels seen in the right lower zone.

The lungs are not hyperinflated.

There is minor blunting of the costophrenic angles, which may represent small effusions or pleural thickening.

CIRCULATION

The cardiothoracic ratio is 0.56 in keeping with cardiomegaly. There is a curvilinear calcification projected peripherally over the left side of the cardiac silhouette.

The aorta appears normal.

The heart borders are clear.

The mediastinum is central, not widened, with clear borders.

The left hilum is difficult to see due to the enlarged cardiac silhouette. The right hilum is bulky, which is likely due to vascular prominence.

DIAPHRAGM + DELICATES

There is mild blunting of the costophrenic angles bilaterally, which may represent pleural thickening or small effusions. Otherwise normal appearance and position of the hemidiaphragms.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

Triple chamber pacemaker in situ, with the tips of the leads appropriately projected over the right atrium, right ventricle and left ventricle. Midline sternotomy sutures and Coronary Artery Bypass Graft (CABG) clips.

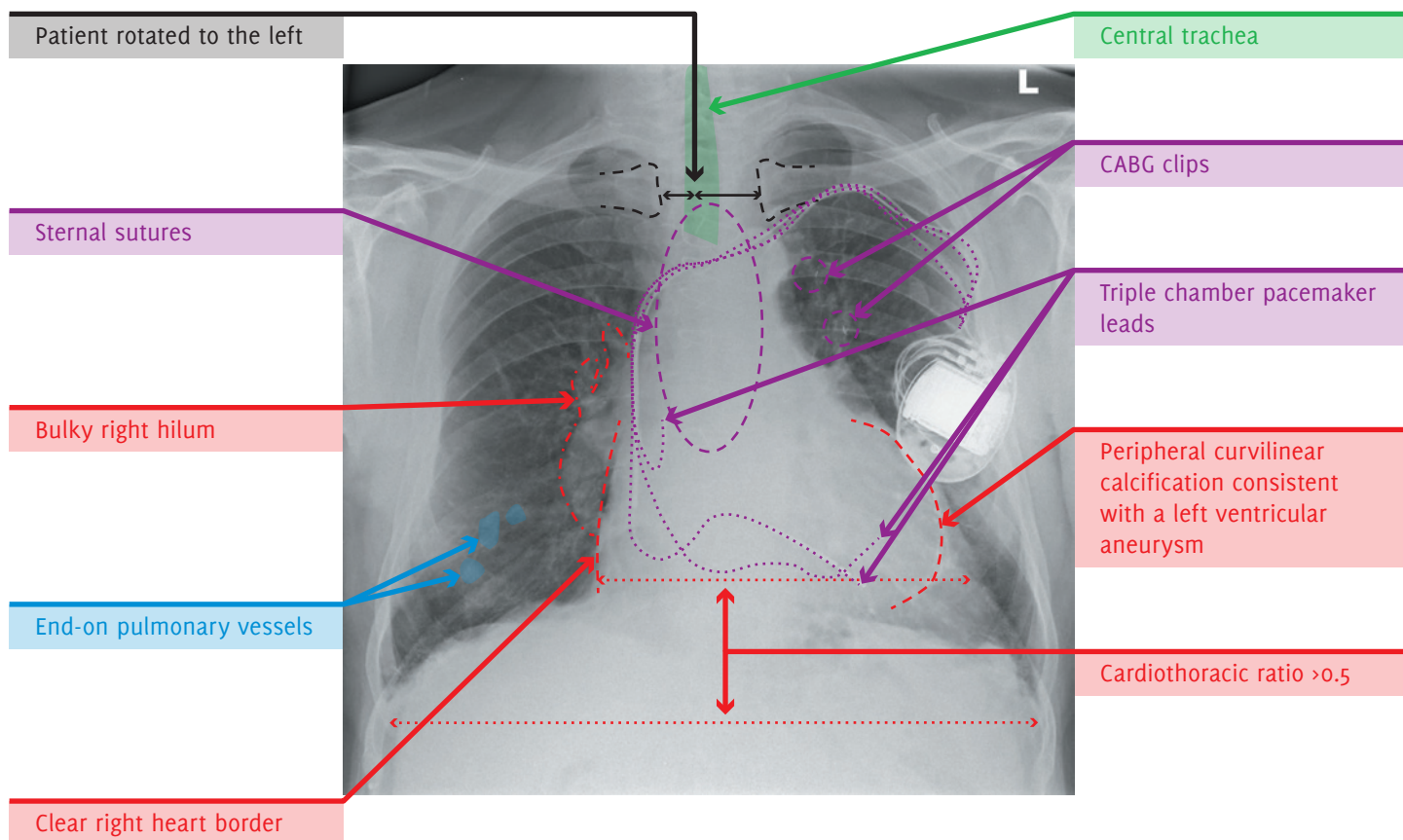
Lung Apices: Normal

Hila: Bulky right hilum due to vessels. The left is obscured.

Behind Heart: Calcified area projected over the left ventricle

Costophrenic Angles: Minor bilateral blunting

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates cardiomegaly with probable shallow pleural effusions in keeping with a degree of heart failure. The triple chamber pacemaker is consistent with a history of congestive heart failure. There is no pulmonary oedema visible.

The calcified area projected over the left ventricle is consistent with a calcified left ventricular aneurysm secondary to previous myocardial infarcts.

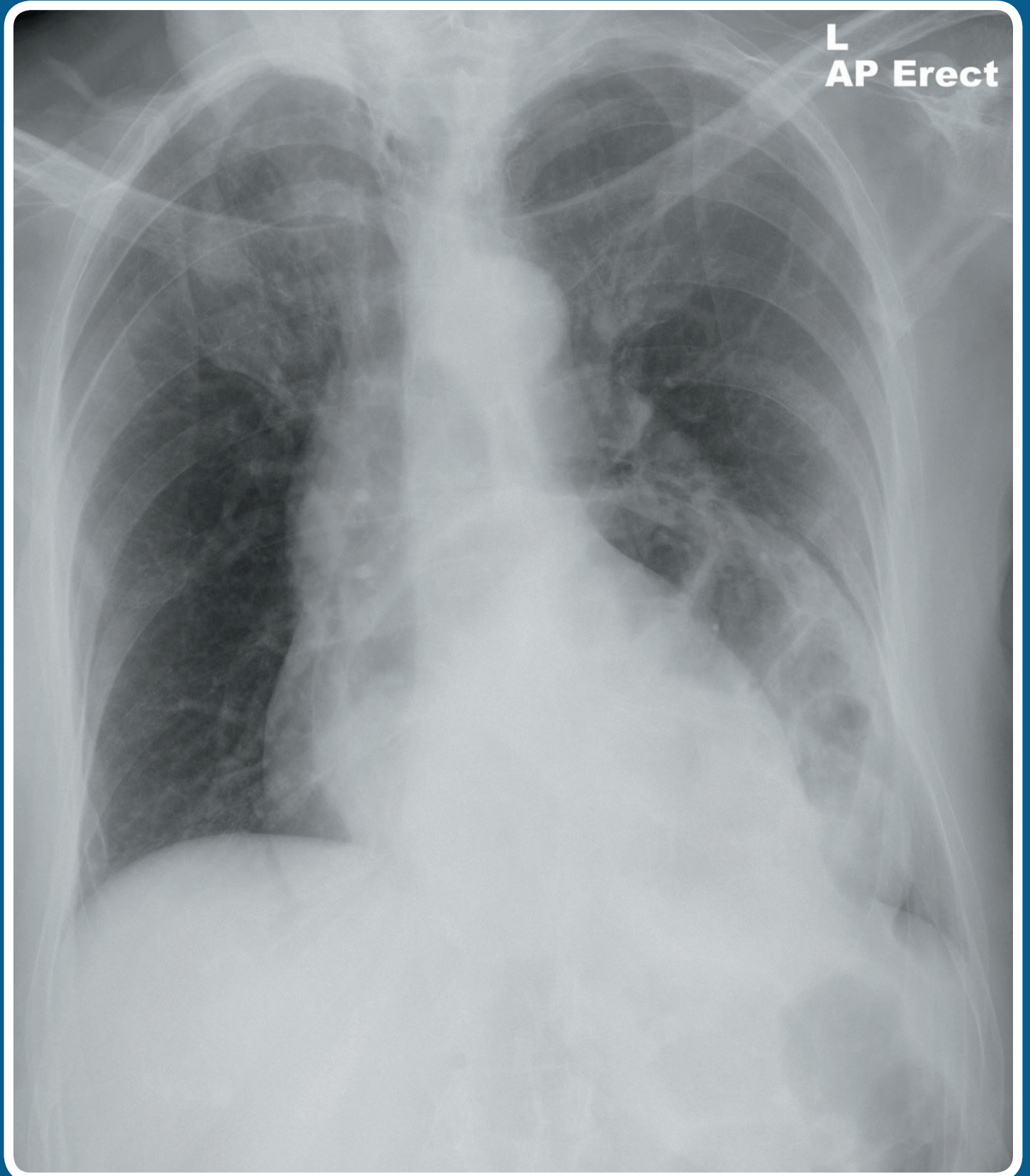
Initial blood tests may include FBC, U/Es, and CRP.

An ECG should be performed. An ECHO would allow assessment of the cardiac function and pacemaker testing may be appropriate. Previous X-rays should be reviewed to assess whether the costophrenic angle blunting is new (i.e. effusion) or longstanding (i.e. likely pleural thickening). Heart failure medication should be reviewed and optimised where possible.



CASE 99

An 85 year old female presents to ED with increasing confusion, pyrexia and a productive cough. There is no significant past medical history. She is a non-smoker. On examination, she has saturations of 93% in air and is febrile with a temperature of 38°C. There is dullness to percussion, reduced air entry, and crackles in the right upper zone. A chest X-ray is requested to assess for possible pneumonia.



Patient ID: Anonymous
Projection: AP Erect
Penetration: Adequate – vertebral bodies just visible behind heart
Inspiration: Inadequate – 5 anterior ribs visible
Rotation: The patient is rotated to the right

AIRWAY

The trachea is projected to the right of the midline, which may be related to patient rotation and/or right upper lobe volume loss.

BREATHING

There is increased air space opacification in the right upper lobe. It has a sharp concave inferior margin, which is in keeping with an elevated horizontal fissure. There is a large mass projected over the left lower zone, retrocardiac area, and lower mediastinum. The lungs are otherwise clear.

The lungs are not hyperinflated.

The pleural spaces are clear.

Normal pulmonary vascularity.

CIRCULATION

The heart does not appear enlarged, although its size cannot be accurately assessed on an AP X-ray.

The heart borders are clear.

The aorta appears normal.

There is a large mass projected over the heart/lower mediastinum. It contains gas and haustral folds within it, and is splaying the carina.

The mediastinum is displaced to the right, which is likely related to patient rotation and possibly volume loss in the right hemithorax. It has clear borders.

Normal size, and shape of both hila. The left hilum appears elevated relative to the right. No hilar mass.

DIAPHRAGM + DELICATES

The medial aspect of the left hemidiaphragm is obscured. Normal appearance and position of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The visible soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

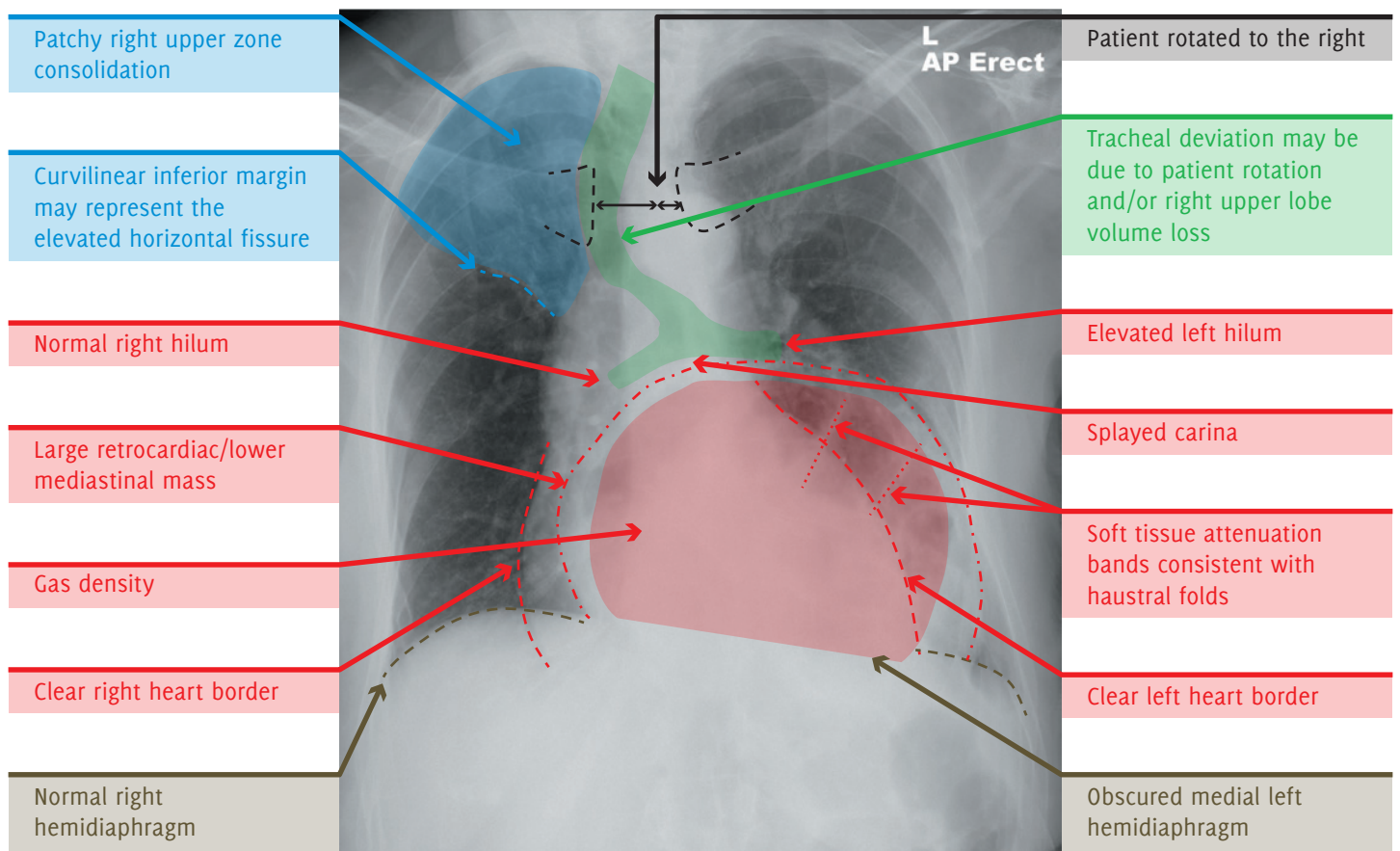
Lung Apices: Air space opacification in the right apex

Hila: Elevated left hilum

Behind Heart: Retrocardiac mass with areas of gas lucency. Splayed carina.

Costophrenic Angles: Normal

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates consolidation in the right upper lobe, in keeping with pneumonia. Additionally, there is the suggestion of right-sided volume loss, which may indicate partial collapse, although the patient rotation makes this difficult to confirm. The large mass projected over the lower mediastinum and left lower zone contains haustral folds, and is consistent with a large, hiatus hernia containing colon. The hernia is displacing the carina and left hilum.

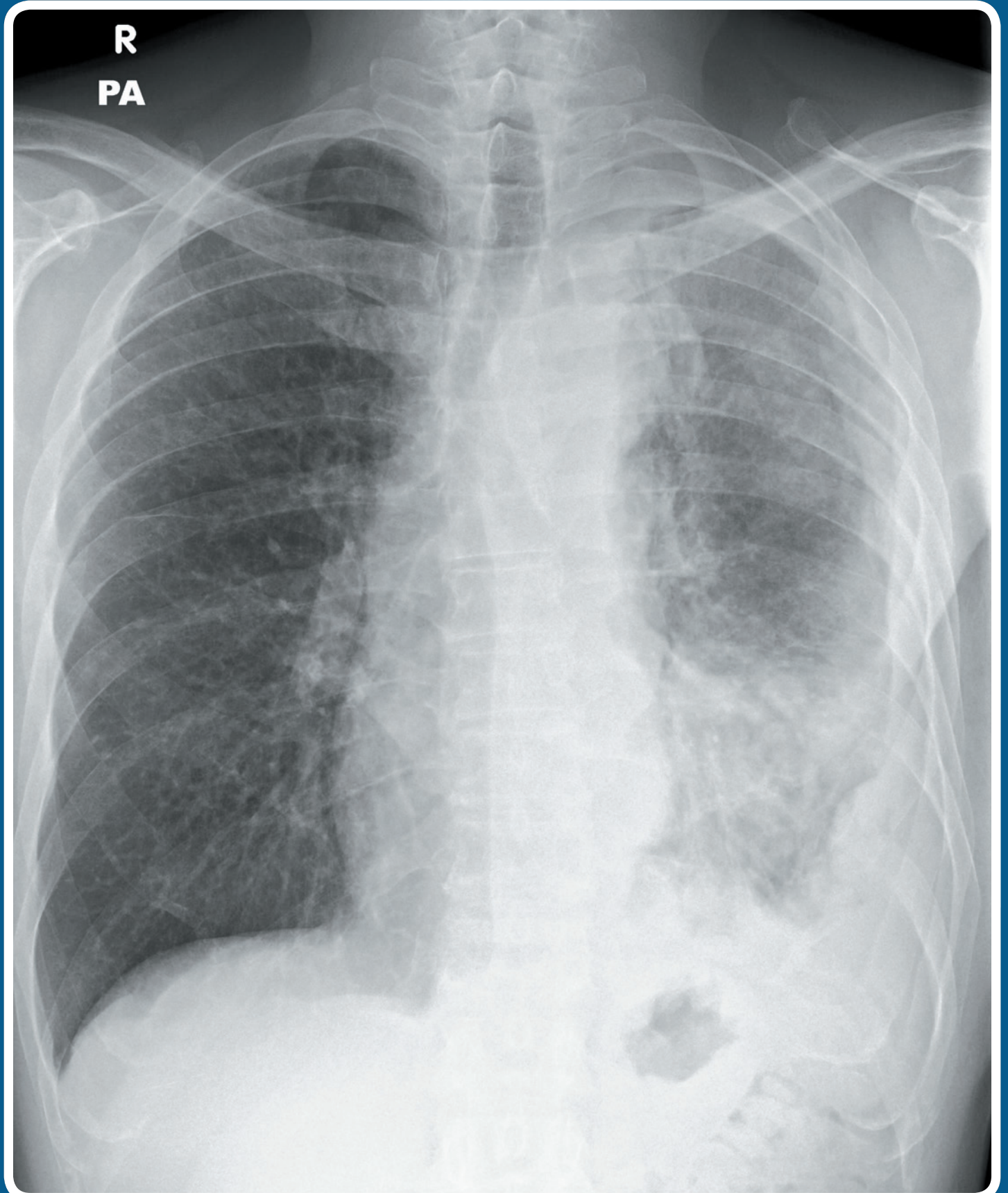
Initial blood tests may include FBC, U/Es, blood cultures, and CRP. A sputum culture may also be taken. The patient should be treated with appropriate antibiotics for community-acquired pneumonia and a follow-up chest X-ray performed to ensure resolution. The antibiotics may be oral or intravenous depending on the severity of pneumonia (CURB-65).

Review by surgeons may be useful to assess future management of large bowel containing hiatus hernia, although this is likely an incidental finding.



CASE 100

An 85 year old male presents to his GP with shortness of breath, haemoptysis and weight loss. He has a 50 pack year smoking history. He is a retired ship yard worker. On examination, he has saturations of 95% in air and is afebrile. There is reduced air entry throughout the left lung. Finger clubbing is also noted. A chest X-ray is requested to assess for possible malignancy, pleural effusion, collapse or pneumonia.



Patient ID: Anonymous
 Projection: PA
 Penetration: Adequate – vertebral bodies just visible behind heart
 Inspiration: Adequate – more than 7 anterior ribs are visible
 Rotation: Not rotated

AIRWAY

The trachea is displaced to the left of the midline.

BREATHING

The left hemithorax is diffusely abnormal. There is lobulated opacification within the pleural space, which is concerning for a solid mass. It extends to involve the mediastinal surface. The opacification visible in the left lower zone may represent consolidation or the pleural abnormality seen straight on (en face).

There is coarsening of the lung markings in the right lung in keeping with COPD. The right lung otherwise clear.

The lungs are not hyperinflated.

Normal pulmonary vascularity.

CIRCULATION

The heart is not enlarged.

The right heart border is clear, the left is obscured.

The aortic knuckle is obscured.

The mediastinum is central and not widened.

The left hilum is obscured by the pleural abnormality. Normal size, shape and position of the right hilum.

DIAPHRAGM + DELICATES

The left hemidiaphragm is obscured by the pleural abnormality. Normal appearance and position of the right hemidiaphragm.

No pneumoperitoneum.

The imaged skeleton is intact with no fractures or destructive bony lesions visible.

The soft tissues are unremarkable.

EXTRAS + REVIEW AREAS

No vascular lines, tubes, or surgical clips.

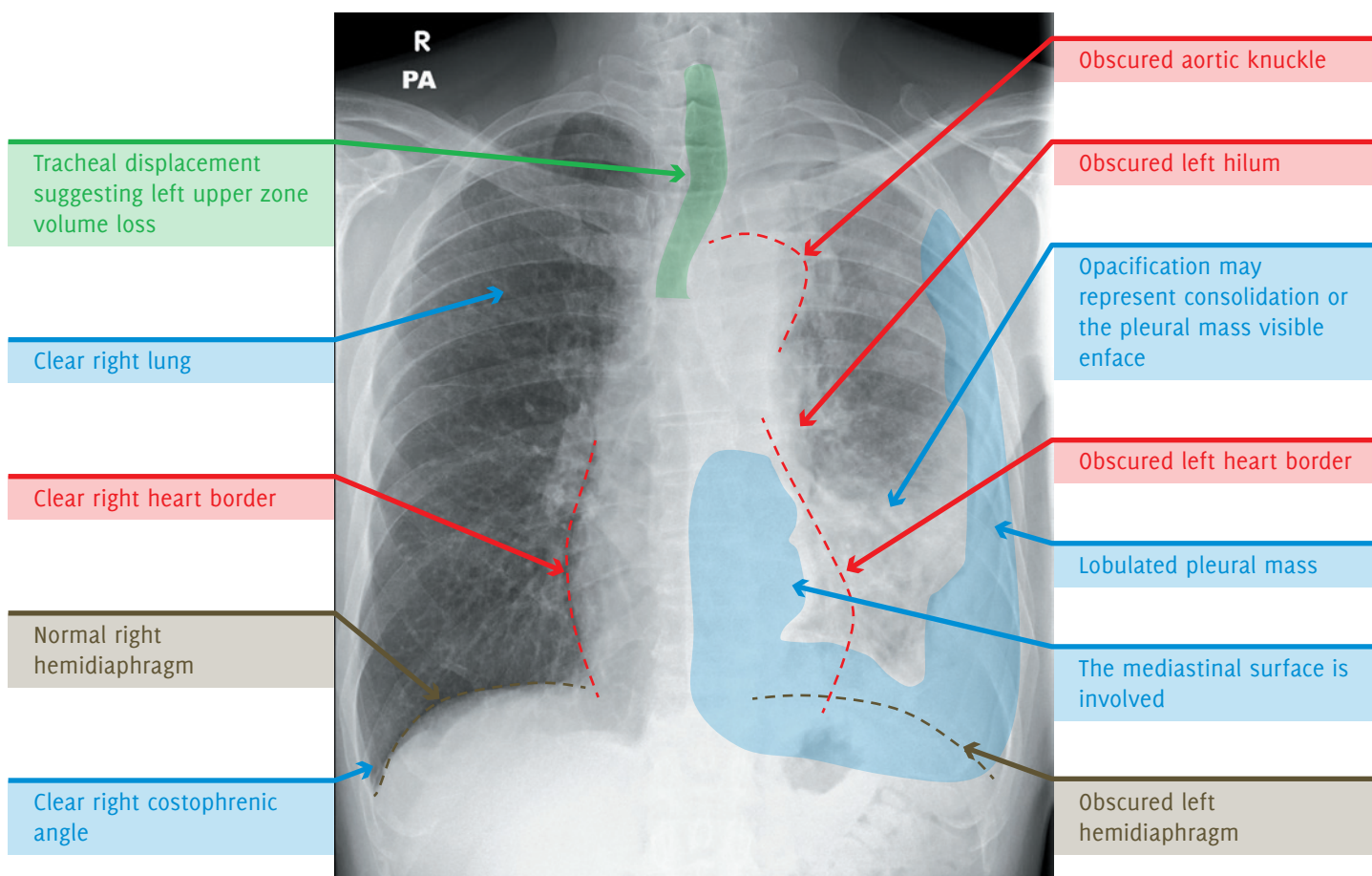
Lung Apices: Left apical opacification

Hila: Obscured left hilum, normal right hilum

Behind Heart: Lobulated pleural abnormality in the left retrocardiac location

Costophrenic Angles: Obliterated left costophrenic angle. Normal right costophrenic angle.

Below the Diaphragm: Normal



SUMMARY, INVESTIGATIONS & MANAGEMENT

This X-ray demonstrates a diffuse abnormality affecting the left hemithorax which appears to originate in the pleura. The abnormality has lobulated contours. There is volume loss in the left hemithorax as the trachea is displaced to the left. Given the clinical findings, this may represent a malignant process, most likely malignant mesothelioma.

Initial blood tests may include FBC, U/Es, CRP, LFTs, and bone profile.

A staging CT chest and abdomen with IV contrast should be performed.

The patient should be referred to respiratory/oncology services for further management, which may include biopsy and MDT discussion. Treatment, which may include surgery, radiotherapy, chemotherapy, or palliative treatment, will depend on the outcome of the MDT discussion, investigations, and the patient's wishes.

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