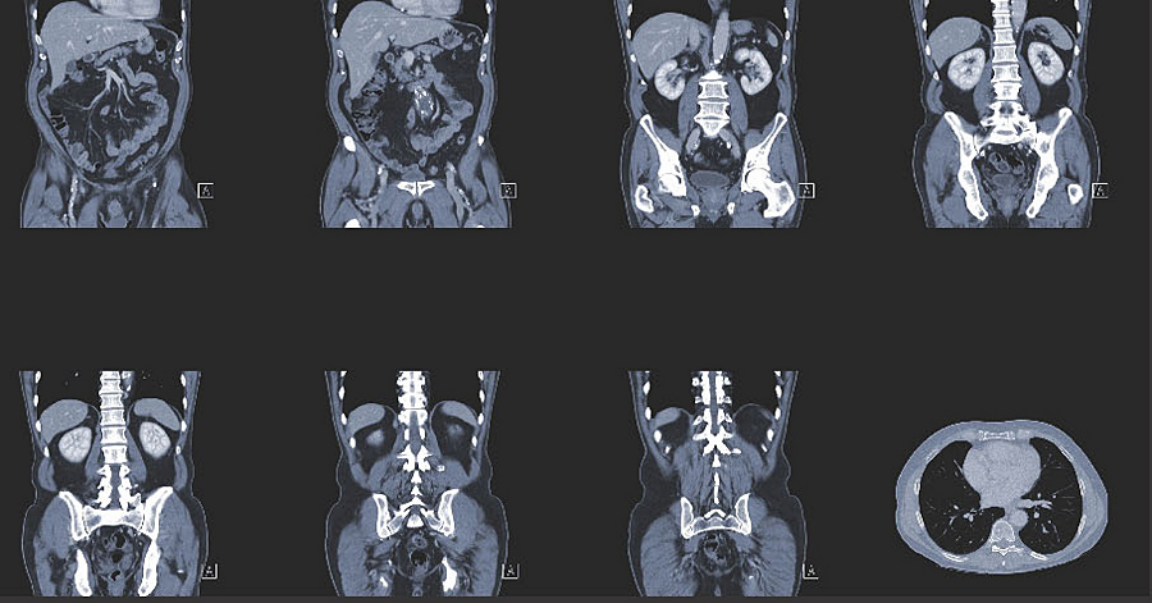

SUCCEEDING IN THE NEW FRCR PART 2A EXAM

ASIM AHMED AFAQ & EDWARD LEEN

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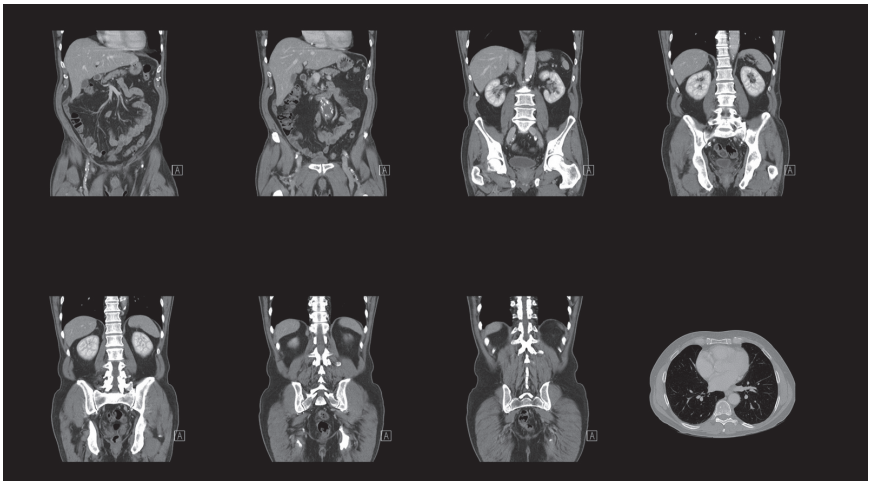

Succeeding in the new FRCR Part 2a Exam

Single Best Answer (SBA) revision questions for Modules 1–6

Asim Ahmed Afaq & Edward Leen

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Readers are therefore advised always to check the most up-to-date information relating to:

- The applicable drug manufacturer's product information and data sheets relating to recommended dose/formulation, administration and contraindications.
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About the Authors

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Dr Asim Ahmed Afaq carried out his radiology training at Imperial College Healthcare NHS Trust. He developed a subspecialty interest in cancer imaging and went on to train as a Fellow at the Royal Marsden Hospital in London. He is now further advancing his career in cancer imaging at Memorial Sloan-Kettering Cancer Center in New York.

Professor Edward Leen

Professor Edward Leen is Professor of Radiology in the Faculty of Medicine, Imaging Lead for the Biomedical Research Centre, Director of the clinical ultrasound research group at Imperial College London University and the Lead Clinician for interventional Ablative Therapy Service across the Imperial College NHS Trust Hospitals.

Foreword

The aim of any postgraduate examination is to assess knowledge. Knowledge and the ability to apply it to every day clinical practice is the best measure of competency in a physician. Previously multiple-choice questions (MCQs) were the assessment tool of choice in medical education. These questions are of a simple true or false format and often negatively marked. They facilitate the surveying of a wide breadth of topics in a relatively short amount of time, with no necessity for student interaction. Despite being cost effective, practical and reliable, with reproducible results, MCQs have their short-comings.

The validity of an MCQ exam can be highly variable. Validity is an indicator of how well a test measures what it is aiming to assess. Unfortunately the style of the MCQ examination, although covering a wide breadth of knowledge, lacks any depth of assessment. Drawing on rote memory and the ability to memorise isolated facts, it is unable to discriminate between a candidate who can apply knowledge and one that cannot. Chance and recognition of patterns of grammatical interpretation have also become significant influences on exam outcomes. In fact, it becomes possible to study the MCQ exam itself rather than the clinical subject matter.

Modern day medical training emphasises learning for life and rightly so. A sufficiently experienced clinician should be able to achieve exam success, just through application of their practical experiences. Single Best Answers (SBAs) have been designed to assess exactly this acumen.

The SBA is structured to include the stem. This can be lengthy; relating the clinical scenario, pathological data or radiological findings. The lead-in and options themselves are usually quite short.

All the options should be plausible and of approximately equal length and detail. This should ensure that selection of the right answer is less likely to be due to chance and more likely an indication of the depth of the candidate's knowledge and ability to discriminate.

This evolution in medical training assessment should result in specialty examinations that are valid and relevant to clinical practice. They will reward clinical competence and the ability to apply knowledge over rote memory.

Dr S. Jalali
Institute of Education, London UK

Tan LT and McAleer JJA. The Introduction of Single Best Answer Questions as a Test of Knowledge in the Final Examination for the Fellowship of the Royal College of Radiologists. *Clinical Oncology* 2008; 20: 571–576.

McCoubrie P and McKnight L. Single Best Answer MCQs: a new format for the FRCR Part 2a exam. *Clinical Radiology* 2008; 63: 506–510.

Dedication

Bism illāh ir-ra-mān ir-ra-hīm
Mum – Qamar Afaq (Rahmatullah Alayk)
Dad – Syed Mohammed Afaq,
Shazia, Umeedh
& all my teachers

About the exam and tips on passing it

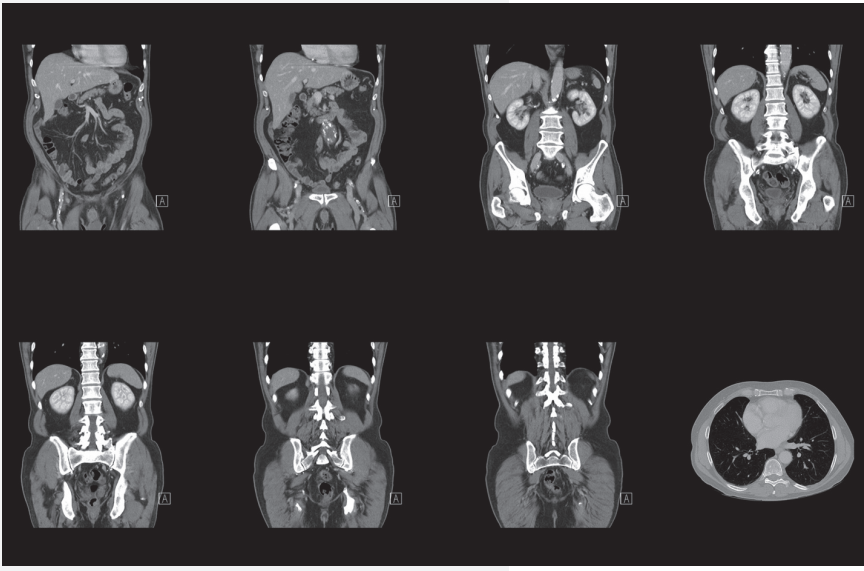
The FRCR 2a is a Single Best Answer exam, divided into 6 modules consisting of cardiothoracic/vascular, musculoskeletal/trauma, gastrointestinal, genitourinary, adrenal, obstetrics and gynaecology/breast, paediatrics and central nervous/head and neck. Questions have a clinical focus and cover a great depth and breadth of knowledge. Understanding the material from which questions are drawn will help in improving performance, and for this reason, many of the answers contain references to further reading. I would strongly advise using this book in combination with other resources to try and answer as many questions in this format as possible. I would also encourage reading related review articles or sections in text books, particularly for topics that are more challenging or unfamiliar.

I wish you every success with the exams.

Asim Ahmed Afaq

Module 1: Cardiothoracic and vascular

Question Bank



1. A 25-year-old man with a history of asthma presents with flu-like symptoms. He has peripheral blood eosinophilia and elevated serum IgE. Chest radiograph shows hyperinflation, lobar consolidation and 1-2cm ring shadows around the hilum and upper lobes. The peripheral bronchi are normal. Which of the following is the most likely diagnosis?
   A. Noninvasive aspergillosis
   B. Tuberculosis
   C. Invasive aspergillosis
   D. Hypersensitivity pneumonitis
   E. Allergic bronchopulmonary aspergillosis (ABPA)

2. With regards to imaging of primary extranodal lymphomas, in which of the following sites does extranodal Hodgkin's disease most commonly occur?
   A. Spleen
   B. Thymus
   C. Thyroid
   D. Small bowel
   E. Lung

3. Which is the most common cause for tree-in-bud appearance on chest CT?
   A. Tumour emboli
   B. Infection
   C. Connective tissue disease
   D. Aspiration pneumonitis
   E. ABPA

4. Which of the following features would be an indication for transarterial catheter ablation of a pulmonary Arteriovenous Malformation (AVM)?
   A. A feeding vessel diameter of 3mm
   B. The absence of a filtering capillary bed
   C. Patchy enhancement on CT
   D. Previous stroke
   E. Size of lesion on CXR greater than 1.5cm

5. A 76-year old man presents with newly diagnosed malignant mesothelioma. Which of the following findings would preclude resection of mesothelioma?
   A. Enhancement of interlobular fissures on MRI
   B. An area of chest wall invasion
   C. Subdiaphragmatic extension
   D. Stage T3 disease
   E. Enlarged ipsilateral mediastinal nodes

6. With regards to imaging techniques in the detection of hibernating myocardium, which has the greatest specificity?
   A. 2-[^{18}F]-fluoro-2-deoxy-d-glucose positron-emission tomography
   B. Thallium-201 rest-redistribution
   C. Technetium-99m perfusion imaging
   D. Dobutamine stress echocardiography
   E. Dobutamine stress magnetic resonance imaging

7. Which of the following has the greatest incidence of metastases to the lung?
   A. Choriocarcinoma
   B. Hypernephroma
   C. Ewing's sarcoma
   D. Rhabdomyosarcoma
   E. Testicular seminoma

8. Which of the following features is more likely to suggest extralobar rather than intralobar sequestration?
   A. Visceral pleural investment
   B. Greater association with congenital abnormalities
   C. Repeated infections
   D. Pulmonary venous drainage
   E. Presentation in adulthood

9. A 16-year-old boy presents with mild cough and dyspnoea that has persisted for several years. He is afebrile with normal WCC, but with an elevated LDH. Chest radiograph shows dense bilateral consolidation with relative sparing of the apices and costophrenic angles. No evidence of lymphadenopathy. Which is the most likely diagnosis?
   A. PCP pneumonia
   B. Alveolar proteinosis
   C. Infective exacerbation of asthma
   D. Lymphoma
   E. Pulmonary oedema

10. When considering a request for inferior vena cava (IVC) filter insertion, which of the following is an absolute rather than relative indication?
    A. Free-floating proximal DVT
    B. DVT/PE and limited cardiopulmonary reserve
    C. Massive PE treated with thrombolysis/thrombectomy
    D. Iliocaval DVT treated with thrombolysis/thrombectomy
    E. PE with inability to achieve or maintain therapeutic anticoagulation

11. Which is the most common primary tumor to metastasize to the pleura?
    A. Lung
    B. Breast
    C. Lymphoma
    D. Ovary
    E. Stomach

12. Which of the following is the strongest feature to support a diagnosis of a hamartoma on investigation of a pulmonary mass?
    A. A smooth, lobulated contour
    B. Chondroid calcification
    C. Slow growth
    D. The presence of an extra-adrenal paraganglioma
    E. Cavitation

13. A 67-year-old obese man develops a left groin swelling one day post-coronary intervention. Ultrasound (US) reveals a 3cm left femoral pseudoaneurysm. He is currently haemodynamically stable. Although he is being anticoagulated with heparin, Hb is stable. What is the most appropriate management option?
    A. Conservative management, recommending repeat US in 48 hours
    B. US-guided compression
    C. US-guided thrombin injection
    D. Percutaneous injection with the additional measure of inflating a balloon or across the pseudoaneurysm neck
    E. Surgical repair

14. The CT chest of a 35-year-old-patient reveals parenchymal nodules, emphysema and multiple thin-walled cysts. Some of these have a bizarre configuration and are predominantly located in the upper and middle zones, sparing the costophrenic recesses and tips of the middle lobe and lingual. What is the most likely diagnosis?
    A. Lymphangioleiomyomatosis
    B. Birt–Hogg–Dubé syndrome
    C. Lymphocytic interstitial pneumonia (LIP)
    D. Sarcoidosis
    E. Langerhans' cell histiocytosis (LCH)

15. The findings of a High Resolution Computed Tomography (HRCT) scan include irregular bronchovascular, interlobular septal and pleural thickening. There is beading along the bronchovascular bundles, traction bronchiectasis and areas of ground-glass opacification. There is also lymph node enlargement at both hilar nodes and some air trapping. Which is the most likely diagnosis?
    A. Tuberculosis
    B. Sarcoid
    C. Lymphoma
    D. Usual Interstitial Pneumonitis (UIP)
    E. Non-specific Interstitial Pneumonitis (NSIP)

16. Which of the following features most favours Hodgkin's rather than non-Hodgkin's lymphoma?
    A. Posterior mediastinal nodes
    B. Para-aortic lymphadenopathy
    C. Mesenteric adenopathy
    D. Contiguous spread
    E. Hepatomegaly

17. A 25-year-old man is investigated with a history of recurrent syncope. Which of the following imaging findings on cardiac multidetector computed tomography would most support a diagnosis of Hypertrophic Obstructive Cardiomyopathy (HOCM)?
    A. Asymmetric thickening of the right ventricular myocardium particularly affecting the intraventricular septum
    B. Posterior displacement of the papillary muscles and mitral valve leaflets
    C. Separation of the anterior mitral valve leaflet and the intraventricular septum during systolic contraction
    D. Patchy enhancement of the intraventricular septum, carrying a worse prognosis
    E. Left ventricular outflow obstruction usually occurring at the supraaortic level

18. A 40-year-old man with recurrent left lower lobe pneumonias presents with fever and cough. CT shows a well-defined area of low attenuation with fine enhancing septae within the area of consolidation. An anomalous vessel supplies the mass, apparently arising directly from the aorta. What is the most likely diagnosis?
    A. Intralobar sequestration
    B. Lymphoma
    C. Bronchoalvolar cell carcinoma
    D. Infected bronchogenic cyst
    E. Congenital cystic adenomatoid malformation

19. A small pericardial metastatic deposit on the Magnetic Resonance Imaging (MRI) of a 55-year-old female demonstrates high-signal intensity on T1-weighted images. Which of the following is the most likely primary tumour?
    A. Breast
    B. Renal cell carcinoma
    C. Colorectal
    D. Melanoma
    E. Lymphoma

20. Which of the following indicates T3 rather than T4 lung cancer?
    A. Invasion of the oesophagus
    B. Invasion of the trachea
    C. Invasion of the pericardium
    D. Malignant pleural effusion
    E. Invasion of the vertebral body

21. A 78-year-old male smoker with hospital admission 2 months ago for a dense left Middle Cerebral Artery (MCA) cerebral infarct presents. He has a 3 week history of low grade fevers and weight loss. Chest radiograph reveals new left lower lobe consolidation with areas of cavitation and air fluid levels, but no hilar lymphadenopathy. Which is the most likely diagnosis?
    A. Hospital acquired pneumonia with lung abscess
    B. Bronchogenic carcinoma
    C. Bronchoalveolar cell carcinoma
    D. Traumatic contusion with lung cysts
    E. Aspiration with anaerobic pneumonia

22. A 47-year-old female Caucasian smoker presents with persistent cough and haemoptysis. CT shows a 2.2cm soft tissue mass in the left lower lobe with coarse calcific foci and no mediastinal, hilar or axillary lymphadenopathy. A small endobronchial lesion is also seen in the left lower lobe bronchus. What is the most likely diagnosis?
    A. Bronchogenic carcinoma
    B. Pulmonary TB
    C. Lymphoma
    D. Fibrosing mediastinits
    E. Bronchial carcinoid

23. A 50-year-old builder undergoing CT of the chest has pleural thickening and calcification along the diaphragmatic pleura. Which is the most specific distinguishing feature to indicate malignant rather than benign pleural disease?
    A. Circumferential pleural thickening
    B. Nodularity of the pleural thickening
    C. Parietal pleural thickening greater than 1cm
    D. Mediastinal pleural involvement
    E. Pleural effusion

24. Which of the following features most favours melioidosis rather than tuberculosis?
    A. Lobar consolidation
    B. Cavitation
    C. Upper lobe predominance of nodular change
    D. Rapid progression of clinical features
    E. Lack of pleural involvement

25. A 40-year-old non-smoking female with a month-long history of shortness of breath has an HRCT which shows patchy ground glass opacities in a centrilobular distribution, air trapping, and some spared areas of normal parenchyma. Which is the most likely diagnosis?
    A. Centrilobular emphysema
    B. Paraseptal emphysema
    C. NSIP
    D. Sarcoidosis
    E. Hypersensitivity pneumonitis

26. A 48-year-old male smoker with a pulmonary mass on CXR is investigated with CT. This shows a well-defined right upper lobe lesion measuring 3cm with attenuation of 156 Hounsfield Units (HU). Which is the most likely diagnosis?
    A. Tuberculoma
    B. Mestastasis from colorectal cancer
    C. Histoplasmosis
    D. Hamartoma
    E. Pulmonary AVM

27. A 30-year-old male being investigated for progressive intermittent left calf claudication presents. Doppler waveforms of the popliteal artery are noted to be diminished during muscle contraction. Angiography reveals medial deviation of the popliteal artery, popliteal stenosis and post-stenotic dilatiation. Which is the most likely diagnosis?
    A. Popliteal aneurysm with thrombosis
    B. Ruptured Baker's cyst
    C. Popliteal artery entrapment syndrome
    D. Buerger's disease
    E. Cystic adventitial disease of the popliteal artery

28. A 65-year-old woman presents with palpitations and a heart murmur. Which of the following features are more in keeping with an atrial myxoma rather than thrombus as demonstrated on CT?
    A. Prolapse through the mitral valve on CT
    B. The presence of calcification
    C. The low attenuation of the lesion
    D. A lack of enhancement
    E. A smooth surface of the lesion

29. Plain radiographs of a previously well 60-year-old man with lower limb pain show lamellar periosteal reaction in the diametaphyseal regions. Bone scintigraphy demonstrates symmetrical increased uptake along the cortical margins in the diametaphyseal regions. What is the most likely underlying thoracic cause?
    A. Pulmonary haemangioma
    B. Pleural fibroma
    C. TB
    D. Blastomycosis
    E. Malignant mesothelioma

30. The chest radiograph of a 35-year-old male smoker, performed for immigration purposes, shows hyperlucency of the entire right lung, with a small ipsilateral hilum. Lung markings are seen to the periphery. An expiratory film performed immediately after reveals air trapping. Which is the most likely diagnosis?
    A. Hypogenetic lung syndrome
    B. MacLeod syndrome
    C. Unilateral proximal obstruction of the right pulmonary artery
    D. Bronchial obstruction
    E. Unilateral bullae

31. Which of the following most suggests active disease in an adult male with TB?
    A. Mediastinal lymph nodes more than 1cm in short axis diameter
    B. Right-sided paratracheal lymphadenopathy
    C. A Ghon focus
    D. Ranke complex
    E. Enlarged lymph nodes with low attenuation centres

32. Which of the following features is most strongly associated with active alveolitis on HRCT in a 40-year-old woman with a diagnosis of systemic sclerosis?
    A. Ground glass opacification without traction bronchiectasis in the middle lobe
    B. Basal ground glass opacification
    C. Lower lobar consolidation
    D. Interlobular septal thickening
    E. Pleural effusion

33. MRI of the pericardium of an adult male shows a pericardial effusion, low signal on T1-weighted spin-echo images and high intensity on GRE cine images. There is an irregular thickened pericardium, with nodularity. What is the most likely underlying cause?
    A. Hypothyroidism
    B. Traumatic injury
    C. Purulent infection
    D. Cardiac failure
    E. Malignancy

34. Which of the following features is most likely to indicate malignancy in a solitary pulmonary nodule?
    A. Size > 3cm
    B. Malignant growth rate
    C. Spiculated margin
    D. Age > 70
    E. Smoking

35. Which of the following most strongly indicates post-primary rather than primary TB?
    A. The absence of lymphadenopathy
    B. Consolidation in the mid zones
    C. Self-limiting course
    D. Pleural effusion
    E. Atelectasis

36. Which of the following is the most common feature of Pneumocystis jiroveci infection on the CT of a 50-year-old man, 4 months post-bone marrow transplant?
    A. Diffuse bilateral ground-glass opacification
    B. Pneumatoceles
    C. Focal areas of consolidation
    D. Pleural effusions
    E. Mediastinal lymphadenopathy

37. A CT chest scan of a young female reveals a pericardial mass. This is contiguous with the heart border, elliptical, thin walled and contains no internal septae. The average attenuation of its contents is 17HU and does not enhance post-contrast. The most likely diagnosis is:
    A. Tuberculous pericarditis
    B. Pericardial cyst
    C. Constrictive pericarditis
    D. Pericardial mesothelioma
    E. Pericardial metastasis

38. Which of the following features is most likely to indicate a benign solitary pulmonary nodule?
    A. Age 30-39
    B. Upper lobe location
    C. Size < 1cm
    D. Smooth margin
    E. Age > 70

39. The following finding is more in keeping with chronic eosinophilic pneumonia rather than Churg-Strauss:
    A. Centrilobular nodules within areas of ground-glass change
    B. Peripheral consolidation with tendency towards lobular distribution
    C. Transient opacities, shifting over days
    D. Homogenous peripheral airspace consolidation
    E. Interlobular septal thickening

40. A young girl with known sickle cell disease presents with chest pain, fever, leucocytosis and hypoxia. Which of the following statements is most appropriate?
    A. Consolidation is found more commonly than ground-glass opacification on HRCT
    B. Ground-glass change typically has a lobar distribution
    C. The lower lobes are more frequently affected in adults
    D. Infarction results in linear scarring
    E. There is a correlation between severity of a chest crisis and extent of radiological findings

41. Which of the following favours Hughes-Stovin syndrome rather than Behçet's syndrome?
    A. Diffuse airspace nodularity
    B. Pulmonary consolidation
    C. Pulmonary artery aneurysm
    D. A lack of oral/genital ulcers
    E. Mosaic perfusion on CT

42. On reviewing 4 chamber views of the heart on steady state free precession cine MR, a left ventricular aneurysm is noted. The contour of the left ventricle is normal but there is marked apical thinning. No thrombus is seen. No viable myocardium is seen as evidenced by full thickness gadolinium enhancement of the aneurysm wall. Which is the most common cause of a true left ventricular aneurysm?
    A. Dominant right coronary artery occlusion
    B. Acute left anterior descending artery occlusion
    C. Trauma
    D. Idiopathic endomyocardial dysplasia
    E. Sarcoidosis

43. Which of the following features detected on HRCT would most favour NSIP rather than USIP?
    A. Predominant ground-glass opacification
    B. Honeycombing
    C. Predominant lower zone disease
    D. Traction bronchiectasis
    E. Subpleural predominance

44. A 53-year-old male smoker is under evaluation for a thoracic aortic aneurysm. Whilst reviewing pre- and post-contrast CT images of the chest, a 2.4cm lesion is seen in the left lower lobe, with a mural nodule. Which of the following features most favours a diagnosis of cavitating lung cancer rather than an intracavitatory apergilloma?
    A. Size of lesion
    B. Contrast enhancement > 10HU
    C. Wall thickness
    D. Adjacent bronchiectasis
    E. Volume loss in involved lobe

45. On reviewing a chest radiograph of a 26-year-old male, multiple small pulmonary nodules and a right-sided pneumothorax are identified. Which is the most likely diagnosis?
    A. Wegener's granulomatosis
    B. Septic emboli
    C. TB
    D. Alveolar cell carcinoma
    E. Histiocytosis

46. Which of the following is most likely to show peripheral reverse bats wings infiltrates on a chest radiograph?
    A. Eosinophilic pneumonia
    B. Pulmonary oedema
    C. Proeteinosis
    D. Lymphoma
    E. Goodpasture's syndrome

47. On reviewing a CT of a patient with extensive metastatic disease, a tumour is seen to extend from the IVC into the right atrium. Which of the following tumours is the most likely to cause such an appearance?
    A. Hepatocellular carcinoma
    B. Lymphoma
    C. Colorectal carcinoma
    D. Pancreatic adenocarcinoma
    E. Gastrointestinal stromal tumour

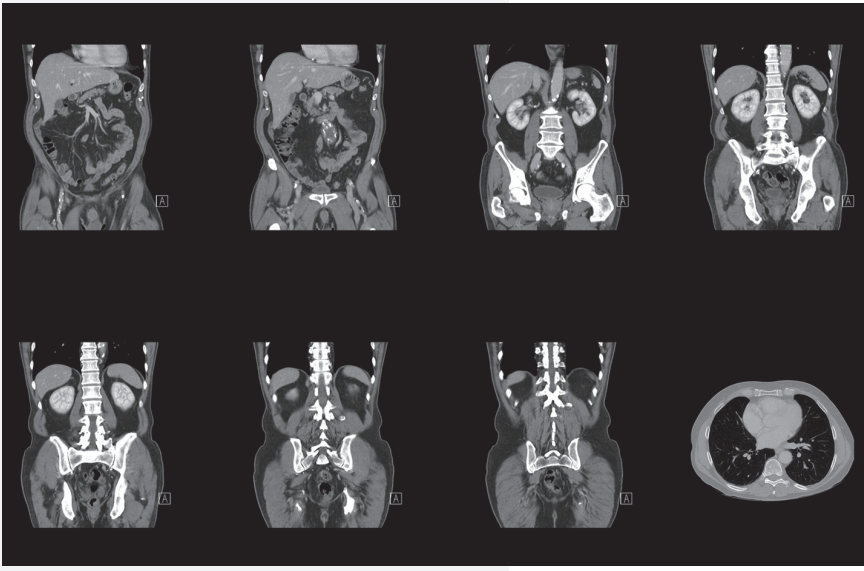
48. Which of the following features distinguishes coarctation from pseudocoarctation of the aorta?
    A. Associated hypertension
    B. Bicuspid aortic valve
    C. Asymptomatic history
    D. Indentation of the left lateral margin of the aortic arch in the region of the aortopulmonary window
    E. Rib notching

49. Which of the following is most likely to present as a haemorrhagic rather than a calcified pulmonary metastases?
    A. Breast cancer
    B. Chondrosarcoma
    C. Testicular cancer
    D. Choriocarcinoma
    E. Mucinous adenocarcinoma of the colon

50. Which of the following features distinguishes hypersensitivity pneumonitis from lymphocytic interstitial pneumonia?
    A. Ill-defined centrilobular nodules
    B. Ground glass opacification
    C. Diffuse lung involvement
    D. Subpleural small nodules
    E. Cystic spaces

Module 1: Cardiothoracic and vascular

Answers



1. E

In an asthmatic patient, ABPA is strongly suggested by the presence of randomly distributed, central, moderate to severe bronchiectasis predominantly involving the upper lungs, bronchial wall thickening and centrilobular nodules.

Ref:

Jeong YJ *et al*. Eosinophilic lung diseases: a clinical, radiologic, and pathologic overview. *Radiographics* 2007; 27(3): 617–639.

2. B

When the main bulk of disease at an extranodal site, a lymphoma should be classified as the extranodal type, as these have distinctive pathological, radiological and clinical features from nodal lymphomas. The thymus is the only extranodal site where Hodgkin's lymphoma commonly occurs, and almost all cases are of the nodular sclerosing subtype.

Ref:

Chua SC *et al*. Imaging features of primary extranodal lymphomas. *Clinical Radiology* 2009; 64(6): 574–588.

3. B

Bacterial causes include mycobacterium tuberculosis, mycobacterium avium intracellulare complex, staph aureus. Viral causes include Cytomegalovirus (CMV) and respiratory syncytial virus. Fungal causes include invasive aspergillosis.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 423.

4. A

CT angiography is an accurate means of diagnosis, with PAVMs appearing as enhancing nodules or serpiginous masses connected with blood vessels. A feeding vessel diameter of 3mm or more is considered an indication for transarterial embolization.

Ref:

Hoey ET *et al*. MDCT features of cardiothoracic sources of stroke. *Clinical Radiology* 2009; 64(5): 550–559.

5. C

Imaging findings of deep myocardial invasion, multifocal chest wall invasion or subdiaphragmatic extension are contraindications to surgery. Patients with stage 1-3 may be surgical candidates but not necessarily cured. MRI findings of focal thickening and enhancement of the interlobular fissures are useful signs in the detection of early malignant pleural disease.

Ref:

Benamore RE *et al*. Use of imaging in the management of malignant pleural mesothelioma. *Clinical Radiology* 2005; 60(12): 1237–1247.

6. E

Dobutamine stress MRI is a well-validated method for the assessment of myocardial hibernation (using a low-dose protocol) and ischaemia (using a high-dose protocol). MRI provides superior spatial resolution when compared with echocardiography, and improvement in resting wall motion abnormality is considered a sign of myocardial hibernation.

Ref:

Hoey ET *et al*. Chronic left ventricular failure: the role of imaging in diagnosis and planning of conventional and novel therapies. *Clinical Radiology* 2009; 64(3): 238–249.

7. A

In order of decreasing frequency, pulmonary metastases arise from choriocarcinoma, hypernephroma/Wilms' tumour, Ewing's/rhabdomyosarcoma and testicular tumours.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 514.

8. B

The association with congenital abnormalities is greater in extralobar (50%) than intralobar sequestration (15%). Other features of extralobar sequestration include systemic venous drainage, having its own plural investment, and being symptomatic in the first 6 months of life.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 480.

9. B

The typical chest radiographic findings are of bilateral central and symmetric lung opacities with relative sparing of the apices. A range of findings are possible however, including asymmetric opacities and diffuse consolidation. The most common elevated serologic marker is LDH, although this is non-specific. There can be a marked disparity between the often moderate symptoms and extensive radiologic findings.

CT demonstrates areas of ground-glass opacification with areas of sparing and prominent septal lines (a crazy paving pattern).

Ref:

Frazier AA *et al*. From the archives of the AFIP: pulmonary alveolar proteinosis. *Radiographics* 2008; 28(3): 883–899; 915.

10. E

Other absolute indications include PE/DVT with contraindication to anticoagulation, PE/DVT and complications of anticoagulation and recurrent DVT/PE despite anticoagulation.

Ref:

Hammond CJ *et al*. Audit of the use of IVC filters in the UK: experience from three centres over 12 years. *Clinical Radiology* 2009; 64(5): 502–510.

11. A

In order of decreasing frequency, metastases to the pleura arise from lung, breast, lymphoma, ovary and stomach cancers.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 515.

12. B

Calcification occurs in approximately 20% of cases and is almost pathognomonic if of the chondroid 'popcorn' type.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 497.

13. C

There are several advantages of ultrasound-guided thrombin injection over ultrasound-guided compression. These include the technique being effective in patients on heparin or warfarin, greater technical success, shorter procedure duration and suitability for pseudoaneurysms arising above the inguinal ligament.

Balloon inflation may have a potential role when the aneurysm neck is unfavourably short or wide to prevent escape of thrombin and downstream thrombosis, but has not gained wider acceptance due to increased complexity and invasiveness.

Ref:

Ahmad F *et al*. Iatrogenic femoral artery pseudoaneurysms; a review of current methods of diagnosis and treatment. *Clinical Radiology* 2008; 63(12): 1310–1316.

14. E

Early findings include interstitial infiltrate centred on the small airways, leading to the development of small parenchymal nodules. These are typically irregular, of soft-tissue density, and measure 1-5mm in diameter, although some may be over 1cm in size.

Ref:

Grant LA *et al*. Cysts, cavities, and honeycombing in multisystem disorders: differential diagnosis and findings on thin-section CT. *Clinical Radiology* 2009; 64(4): 439–448.

15. B

These are characteristic features of sarcoid on HRCT. Perilymphatic nodules (beading along the fissures) and architectural distortion are commonly found.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 531.

16. D

Contiguous spread is a feature of Hodgkin's disease, compared with non-contiguous spread in non-Hodgkin's disease. Other differences include greater thoracic involvement and less abdominal involvement in Hodgkin's disease.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 510.

17. D

Patchy enhancement of the asymmetrically thickened interventricular septal region is thought to represent intramyocardial scarring and confers a worse prognosis.

Asymmetric thickening of the left ventricular myocardium particularly affects the interventricular septum with obstruction of the left ventricular outflow tract.

The apposition of the anterior mitral valve leaflet and the interventricular septum during systolic contraction (systolic anterior motion) results in the onset of mitral regurgitation.

The left ventricular outflow obstruction usually occurs at the subaortic level and is caused by ventricular septal hypertrophy with anterior displacement of the papillary muscles and the mitral valve leaflets.

Ref:

Williams TJ *et al*. Cardiomyopathy: appearances on ECG-gated 64-detector row computed tomography. *Clinical Radiology* 2008; 63(4): 464–474.

18. A

The presence of systemic vascular supply to the infected segment and the history of recurrent infections makes intralobar sequestration the most likely diagnosis.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagosis, and Discussion*. 1st edition. Philadelphia: Lippincott Williams & Wilkins.

19. D

Pericardial effusion, thickening or mass may indicate metastatic involvement of the pericardium. Most neoplasms have a low-signal intensity on T1-weighted images and a high-signal intensity on T2-weighted images, with the exception of metastatic melanoma. The most common tumors to metastasize to the pericardium are breast and lung, followed by lymphomas and melanomas.

Ref:

Kim JS *et al*. Imaging of pericardial diseases. *Clinical Radiology* 2007; 62(7): 626–631.

20. C

T3 disease features include a tumour of any size less than 2cm from the carina, invasion of the parietal pleura, chest wall, diaphragm, mediastinal pleura, pericardium, pleural effusion or satellite nodule in the same lobe.

T4 disease is characterised by invasion of the heart, great vessels, trachea, oesophagus, vertebral body, carina or the presence of a malignant pleural effusion.

The TNM staging system was updated in 2009 (AJR, 2010).

Ref:

Kligerman S *et al*. A radiologic review of the new TNM classification for lung cancer. *AJR Am J Roentgenol* 2010; 194(3): 562–573.

21. E

The superior segments of the lower lobes and posterior segments of the upper lobes are most commonly affected in aspiration pneumonia. Thick walled cavitation, frequently with air-fluid levels, can develop within weeks, mimicking post-primary TB.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagosis, and Discussion*. 1st edition. Philadelphia: Lippincott Williams & Wilkins.

22. E

A typical carcinoid is a small mass (< 2.5cm) with no associated lymphadenopathy. Calcifications are seen in up to 26% of cases on CT. The iceberg phenomenon is the presence of a small endobronchial component associated with a larger extrabronchial component.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagosis, and Discussion*. 1st edition. Philadelphia: Lippincott Williams & Wilkins.

23. A

On multivariate analysis, the CT findings of rind-like pleural involvement, mediastinal pleural involvement and pleural thickness > 1 cm were independent findings in differentiating malignant pleural mesothelioma from other malignant pleural disease, with specificity values of 0.85, 0.67 and 0.82, respectively.

Ref:

Benamore RE *et al*. Use of imaging in the management of malignant pleural mesothelioma. *Clinical Radiology* 2005; 60(12): 1237–1247.

24. E

There is significant overlap between the features of melioidosis, pneumonia and TB. However, in melioidosis, simultaneous involvement of other organs is common. Pleural involvement such as effusion, empyema, mediastinal or hilar adenopathy are rare, making them useful differentiating features from TB.

Ref:

Lim KS *et al*. Radiological manifestations of melioidosis. *Clinical Radiology* 2010; 65(1): 66–72.

25. E

Characteristic HRCT features in hypersensitivity pneumonitis include ground glass opacity, air trapping and centrilobular ground glass opacities.

Ref:

Hirschmann JV *et al*. Hypersensitivity pneumonitis: a historical, clinical, and radiologic review. *Radiographics* 2009; 29(7): 1921–1938.

26. D

Hamartomas are usually well-defined solitary lesions < 4cm. The presence of fat in the lesion is a diagnostic feature, although may not be present in a hamartomatous nodule in up to ⅓ of cases. The lesions may grow slowly over time.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagosis, and Discussion*. 1st edition. Philadelphia: Lippincott Williams & Wilkins.

27. C

Stress angiography shows a normal arterial lumen with the foot in the relaxed position, with narrowing of the lumen during stress manoeuvres.

Ref:

Wright LB *et al*. Popliteal artery disease: diagnosis and treatment. *Radiographics* 2004; 24(2): 467–479.

28. A

On CT, prolapse through the mitral valve orifice is the only reliable discriminatory finding indicating myxoma. There is overlap in the features of calcification, mobility, attenuation characteristics, and location between myxoma and thrombus.

29. B

Hypertrophic osteoarthropathy is commonly associated with primary bronchogenic carcinoma, typically non-small-cell lung cancer (NSCLC). HOA is also seen in patients with pulmonary metastases from extrathoracic malignancies such as breast carcinoma, nasopharyngeal tumours, renal cell carcinoma, melanoma and osteosarcoma. Benign associations include pleural fibroma and bronchiectasis.

Ref:

Rutherford GC *et al*. Imaging in the investigation of paraneoplastic syndromes. *Clinical Radiology* 2007; 62(11): 1021–1035.

30. B

MacLeod or Swyer-James syndrome manifests as hyperlucency with features of air trapping. The affected lung in proximal interruption of a pulmonary artery is often as opaque, or slightly more opaque, than the contralateral lung and there is no evidence of air trapping.

Ref:

Castañer E *et al*. Congenital and acquired pulmonary artery anomalies in the adult: radiologic overview. *Radiographics* 2006; 26(2): 349–371.

31. E

Enlarged nodes greater than 2cm often have low attenuation centres on CT due to necrotic change, and are highly suggestive of active disease.

Ref:

Burrill J *et al*. Tuberculosis: a radiologic review. *Radiographics* 2007; 27(5): 1255–1273.

32. A

The presence of ground glass opacification (without evidence of traction bronchiectasis) in the middle lobe and lingula is strongly associated with active alveolitis. Basal ground glass shadowing is a non-specific finding and a poor predictor of alveolitis.

Ref:

Madani G *et al*. The role of radiology in the management of systemic sclerosis. *Clinical Radiology* 2008; 63(9): 959–967.

33. E

An effusion is the most common manifestation of metastatic pericardial disease. On MRI images, most neoplasms have a low-signal intensity on T1-weighted images and a high-signal intensity on T2-weighted images, with the exception of metastatic melanoma, which may have high-signal intensity on T1-weighted images.

Ref:

Kim JS *et al*. Imaging of pericardial diseases. *Clinical Radiology* 2007; 62(7): 626–631.

34. C

In order of decreasing likelihood, the following are features suggestive of malignancy in an indeterminate pulmonary nodule:

- Spiculated margin
- Size > 3cm
- Age > 70 years
- Malignant growth rate
- Smoker
- Upper lobe location

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 427.

35. A

Although there may be overlap of features of primary and post-primary TB, the distinguishing features of post-primary TB include predilection for the upper lobes, the absence of lymphadenopathy and cavitation.

Ref:

Burrill J *et al*. Tuberculosis: a radiologic review. *Radiographics* 2007; 27(5): 1255–1273.

36. A

There are often diffuse bilateral ground-glass opacities and less often, focal areas of consolidation, pleural effusions, and mediastinal lymphadenopathy. Approximately ⅓ of patients develop pneumatocoeles, usually in the upper lobes, which usually resolve spontaneously, although infrequently can cause a pneumothorax.

37. B

The characteristic features of pericardial cysts include: lack of enhancement, water attenuation, round or elliptical shape, thin walled, sharply defined and being without internal septa. The most common location is at the cardiophrenic angles. Bronchogenic and thymic cysts may be indistinguishable.

Ref:

Kim JS, Kim HH and Yoon Y. Imaging of pericardial diseases. *Clinical Radiology* 2007; 62(7): 626–631.

38. A

Benign growth rate, benign calcification, age < 39 and a non-smoking history are the features most likely to favour a benign nodule.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 427.

39. D

Chronic eosinophilic pneumonia is characterised by the presence of homogenous peripheral airspace consolidation on CT, whereas the peripheral consolidation in Churg-Strauss has a tendency towards lobular distribution and is often associated with centrilobular nodules within the ground glass opacity.

Ref:

Jeong YJ *et al*. Eosinophilic lung diseases: a clinical, radiologic, and pathologic overview. *Radiographics* 2007; 27(3):617–639.

40. D

HRCT often reveals ground-glass opacification, which does not have a lobar distribution and may have a scattered or mosaic pattern. Adults tend to have lower lobe or multilobar involvement, compared to the upper lobe pattern more often seen in children. Microvascular occlusion causes a reduction in the vascular markings and infarction results in linear scarring.

Ref:

Madani G *et al*. The radiological manifestations of sickle cell disease. *Clinical Radiology* 2007; 62(6): 528–538.

41. D

Hughes-Stovin syndrome, also known as incomplete Behçet's disease, overlaps in radiologic and histopathologic findings, but there is an absence of oral and genital ulcerations.

42. B

Although each of the stems are possible causes, a transmural infarct secondary to LAD occlusion is the most common cause.

Ref:

Shambrook JS *et al*. Cross-sectional imaging appearances of cardiac aneurysms. *Clinical Radiology* 2010; 65(5): 349–357.

43. A

Although Ground glass opacification (GGO) can be commonly seen in USIP, it is found in 75-100% of cases of NSIP, where it is usually bilateral, symmetrical and subpleural in two-thirds of patients and has a lower zone predominance on over 50%. Honeycombing is not a major feature, although it can occur in up to 50%. Typical HRCT features of USIP include reticulation, honeycombing and traction bronchiectasis with basal and subpleural predominance.

Ref:

Dixon S *et al*. The idiopathic interstitial pneumonias: understanding key radiological features. *Clinical Radiology* 2010; 65(10): 823–831.

44. B

Degree of contrast enhancement is much higher in cavitating lung tumours. Adjacent bronchiectasis is more often seen in aspergillomas.

Ref:

Park Y *et al*. Pulmonary cavitary mass containing a mural nodule: differential diagnosis between intracavitary aspergilloma and cavitating lung cancer on contrast-enhanced computed tomography. *Clinical Radiology* 2007; 62(3): 227–232.

45. E

Osteosarcoma, Wilms' tumour and histiocytosis are causes of pulmonary nodules with pneumothorax.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 429

46. A

Eosinophilic pneumonia, resolving pulmonary oedema, desquamative interstitial pneumonia and sarcoidosis are causes of reverse bats wings peripheral infiltrates.

Causes of perihilar bats wings infiltrates include pulmonary oedema, proteinosis, sarcoidosis, lymphoma, Goodpasture's syndrome and alveolar cell carcinoma.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 433.

47. A

The differential diagnosis for tumours extending from the IVC to the right atrium include leiomyosarcoma of the IVC, renal cell carcinoma and hepatocellular carcinoma.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 643.

48. E

The following features are not present in pseuocoarctation: rib notching, dilatation of the brachiocephalic arteries, LV enlargement and post-stenotic dilatation.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 651.

49. D

Choriocarcinoma, renal carcinoma, and melanoma are causes of haemorrhagic pulmonary metastases.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 515.

50. E

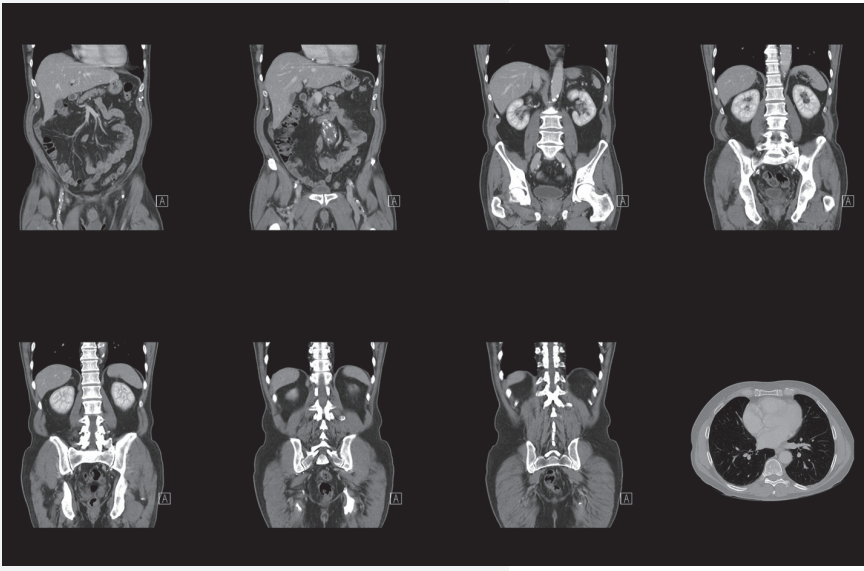
Although ground glass changes and small centrilobular nodules are present in hypersensitivity pneumonitis, there are no cystic spaces, or thickening of the bronchovascular bundles.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 511.

Module 2: Musculoskeletal and trauma

Question Bank



1. An ultrasound scan of a patient's left shoulder suggests subacromial impingement. Which is the single best answer?
   A. Type 2 concave pattern is the most common morphology
   B. Type 2 is the most common type to be associated with rotator cuff tears
   C. ACJ degeneration increases the supraspinatus outlet
   D. Significant subacromial subdeltoid bursitis is diagnosed with thickness > 10mm
   E. Is associated with the presence of bursal fluid lateral to the Acromio clavicular joint (ACJ)

2. A 32-year-old keen tennis player has had shoulder pain for 6 weeks. An MRI confirms a superior labral tear from anterior to posterior (SLAP) lesion. Regarding these lesions, which of the following is the single best answer?
   A. Are isolated tears of glenoid labrum with superior and inferior components
   B. Tears are classically located at the biceps anchor
   C. Occur with repetitive underarm activity
   D. Is often diagnosed clinically alone
   E. Begins in the anterior aspect of superior labrum and extends posteriorly

3. A 20-year-old man sustains a knee injury after playing football. Regarding imaging of the infrapatellar tendon, which is the best answer?
   A. Normal infrapatellar tendon appears high signal on all sequences
   B. A triangular area of high signal at the patellar enthesis when imaged on gradient echo indicates tendon rupture
   C. In infrapatellar tendnopathy, the tendon may be swollen and contain focal areas of reduced echogenicity
   D. The paratenon is more commonly the primary site of acute inflammation in infrapatellar tendon than the Achilles tendon
   E. An echo-rich halo around the tendon is seen in paratenonitis on US

4. Considering the radiological features of thalassemia of the skull:
   A. Dipolic space widening occurs first in the occipital region
   B. Thickening of the outer table and thinning of the inner table
   C. Hair-on-end appearance is common
   D. There is reduced pneumatisation of the air spaces within the skull
   E. Marrow hyperplasia in the maxilla causes medial displacement of the orbits and ventral displacement of the incisors

5. A 55-year-old woman with breast cancer and back pain undergoes investigation with MRI. Which of the following indicates a malignant rather than osteoporotic vertebral fracture?
   A. Convex posterior cortex
   B. Normal Signal Intensity (SI) on all sequences
   C. Retropulsion of a posterior bone fragment
   D. Band-like low SI adjacent to the fracture
   E. Homogenous 'return to normal' SI after contrast

6. A 60-year-old woman undergoing follow-up CT under the care of the oncologist develops a new expansile lytic lesion. Which of the following primary tumours usually causes an expansile lytic metastasis?
   A. Cervix
   B. Uterus
   C. Ovary
   D. Thyroid
   E. Rectum

7. Which of the following causes parallel spiculated (hair-on-end) rather than divergent speculated (sunray) periosteal reaction?
   A. Osteosarcoma
   B. Ewing's sarcoma
   C. Sigmoid colon cancer metastasis
   D. Hemangioma
   E. Meningioma

8. During reporting of a series of GP plain film, a chest radiograph shows superior rib notching. Which of the following is a cause of superior rather than inferior rib notching?
   A. Aortic thrombosis
   B. Subclavian obstruction
   C. Pulmonary AVM
   D. Rheumatoid arthritis
   E. Superior Vena Cava (SVC) obstruction

9. Which of the following is a cause of increased rather than decreased uptake on bone scan?
   A. Cysts
   B. Haemangioma
   C. Leukemia
   D. Spina bifida
   E. Recent tooth extraction

10. A 65-year-old Asian man with a long history of back pain is investigated with MRI. Which is a feature of tuberculosis rather than pyogenic vertebral collapse?
   A. Rapid progression
   B. Marked osteoblastic response
   C. Less sclerosis
   D. Less collapse
   E. Small or no paravertebral abscess

11. A plain radiograph of an adult pelvis shows a widened pubic symphysis. Which of the following is a cause of widening rather than fusion of the symphysis pubis?
    A. Hyperparathyroidism
    B. Osteoarthritis
    C. Late ankylosing spondylitis
    D. Alkaptonuria
    E. Fluorosis

12. Which of the following is a cause of a mixed sclerotic/lytic lesion with a button sequestrum?
    A. TB
    B. Ewing's sarcoma
    C. Eosinophilic granuloma
    D. Metastases
    E. Osteosarcoma

13. Which of the following is a cause of acroosteosclerosis rather than acroosteolysis?
    A. Psoriasis
    B. Diabetes
    C. Polyvinylchloride work
    D. Hodgkin's
    E. Hyperparathyroidism

14. A 40-year-old man with short stature and normal intelligence has features including a large head, and an injury to his left leg whilst playing football. On review of the plain film, no acute bony injury is demonstrated. However, he is noted to have a disproportionately large fibula, a champagne glass pelvic inlet and horizontal acetabulae. Which is the underlying diagnosis?
    A. Achondrogenesis
    B. Homozygous achondroplasia
    C. Heterozygous achondroplasia
    D. Pseudoachondroplasia
    E. Metatrophic dwarfism

15. In a 50-year-old man with joint pains, involvement of which of the following indicates ochranosis rather than calcium pyrophosphate dihydrate crystal deposition disease (CPDD)?
    A. Annulus fibrosis of lumbar intervertebral discs
    B. Nucleus pulposis of the lumbar intervertebral discs
    C. Sacroiliac joints
    D. Triangular fibrocartilage in the distal radioulnar joints
    E. Glenohumeral joint

16. Which of the following indicates grade 4 chondromalacia patellae on T1 MRI?
    A. Loss of sharp dark margin between articular cartilage of the patella and trochlea
    B. Focal hypointense areas extending to the articular surface but not down to the osseous surface
    C. Focal hypointense areas extending from subchondral bone to cartilage surface
    D. Focal hypointense areas extending to the cartilage surface with preservation of sharp cartilage margins
    E. Focal hypointense areas not extending to cartilage surface

17. A 20-year-old man is referred for suspected malignant transformation of an osteochondroma. Which of the following is a cause for concern in an osteochondroma?
    A. New lucency
    B. Reduced scintigraphic activity
    C. Growth plate before physeal closure
    D. Asymptomatic nature
    E. Cartilagenous cap > 0.5cm

18. Which is the most common location for giant cell tumour?
    A. Proximal tibia
    B. Proximal femur
    C. Distal femur
    D. Proximal fibula
    E. Patella

19. Which is the most characteristic feature in haemachromatosis?
    A. Chondrocalcinosis
    B. Small subchondral cysts with a fine rim of sclerosis
    C. Symmetric joint space narrowing
    D. Generalised osteopenia
    E. Hook-like osteophytes on the radial aspects of the metacarpal heads

20. On reviewing a knee radiograph of a 17-year-old boy with knee pain, squaring of the patella, widening of the intercondylar notch, flattening of the condylar surface and medial slanting of the tibiotalar joint are noted. There is also patelalofemoral joint space narrowing and a joint effusion. Which of the following is most likely?
    A. Psoriatic arthropathy
    B. Haemophilic arthorpathy
    C. Juvenile idiopathic arthritis
    D. TB arthritis
    E. Rheumatoid arthritis

21. Which of the following is associated with anteromedial ankle impingement syndrome?
    A. Usually occurs from eversion injury only
    B. Well-defined signal intensity on T1 and T2 in the deep deltoid ligament related to scarring
    C. Large corticated ossicles are seen
    D. Lateral displacement of the tibialis posterior tendon
    E. Post-traumatic synovitis

22. An MRI of the ankle shows deep injury to the deltoid ligament. Which of the following belong to the deep components of the deltoid (medial collateral) ligament of the ankle?
    A. Tibiocalcaneal ligament
    B. Tibionavicular ligament
    C. Posterior superficial tibiotalar ligament
    D. Anterior tibiotalar ligament (ATTL)
    E. Tibiospring ligament

23. An osteoid osteoma is thought to be the cause of painful scoliosis in a 20-year-old man. Which of the following is the single best answer regarding osteoid osteomas?
    A. The nidus appears sclerotic with surrounding lucency on CT
    B. Most commonly found in long bones of the lower limbs
    C. The nidus does not enhance on CT
    D. Reactive sclerosis around the nidus is uncommon
    E. The nidus demonstrates decreased activity on bone scintigraphy

24. Plain film, CT and MRI are performed for the investigation of suspected chordoma. Which is the best answer?
    A. Radiographic appearances show sacral osteosclerosis
    B. Coarse calcification often present with associated soft tissue
    C. Areas of low attenuation within a mass on CT
    D. Intermediate SI on T2
    E. Arise from the spinal canal

25. A 60-year-old man with several months' history of back pain, worse when sitting, and with no bowel or bladder symptoms, undergoes evaluation with MRI. This shows a lobulated presacral mass, low SI on T1 with several areas of high SI within it, most likely to represent areas of calcification and haemorrhage. Which is the most probable diagnosis?
    A. Chordoma
    B. Chondrosarcoma
    C. Myxopapillary ependymoma
    D. Metastasis
    E. Giant cell tumour

26. Which of the following indicates telangiectatic osteosarcoma (TOS) rather than an aneurismal bone cyst (ABC)?
    A. Enhancing septa without nodularity on MR
    B. Marked expansile remodelling of bone
    C. Cortical thinning
    D. Presence of osteoid matrix with septal regions on CT
    E. Presence of haemorrhagic spaces

27. Considering post-radiotherapy changes of soft tissue tumours on MRI:
    A. Earliest radiation change is demonstrated by increased SI in marrow between 6-12 weeks
    B. SI changes are due to replacement of marrow by fat
    C. In most cases, complete replacement occurs in 12-14 weeks
    D. Regeneration of normal marrow is common
    E. Radiation field is usually poorly defined on MR

28. Considering soft tissue response to chemotherapy:
    A. Neoadjuvant chemotherapy increases recurrence-free survival but not overall survival in high grade soft tissue sarcoma
    B. Chemotherapy may cause a substantial increase in tumour size initially
    C. Tumour size is the most accurate predictor of biologic response to tumour treatment
    D. Contrast enhancement limits interpretation of intralesional necrosis
    E. Intralesional haemorrhage post-chemotherapy is very rare

29. Considering the imaging features of extraarticular Pigmented Villonodular Synovitis (PVNS):
    A. Typically manifests as a soft tissue mass in 20% of cases
    B. Osseous abnormalities are present in the vast majority
    C. Extrinsic erosion is the most common osseous abnormality
    D. Radiographs are normal in 80% of cases
    E. Extensive erosions are more common in the knee

30. A 16-year-old girl who has recently moved from India to the UK has back pain. Considering tuberculous spondylitis:
    A. 10% of skeletal TB involves the spine
    B. Infection usually begins in the posterior part of the vertebral body
    C. Medial bowing of the psoas shadow on plain film may indicate an abscess
    D. The upper thoracic spine is most commonly affected
    E. Calcification within a psoas abscess is highly likely to represent TB

31. A 42-year-old man with Type 1 diabetic nephropathy, neuropathy and retinopathy develops sudden onset pain in the thighs. A diagnosis of diabetic myopathy is considered. Which is the single best answer?
    A. Fever is present in most cases
    B. Both lower limbs are affected in most cases
    C. Low signal on unenhanced T1 indicated haemorrhagic infarction
    D. SI is usually low on T2
    E. A focus of central low SI surrounded by a rim of high SI on contrast enhanced T1 indicates muscle infarction and necrosis

32. Which of the following favours a diagnosis of rheumatoid arthritis rather than tuberculous arthritis?
    A. Periarticular osteopenia
    B. Marginal erosion
    C. Relatively late sparing of joint space
    D. Joint effusion
    E. Uneven and thick synovial proliferation

33. A 27-year-old man presents with posterior instability of the shoulder. Transaxial ts T1 MR arthrogram shows posterioinferior labrum tear and tear of the posterior scapular periosteum. Which is the diagnosis?
    A. Reverse Bankart lesion
    B. Bankart lesion
    C. Bennett lesion
    D. Posterior labrocapsular periosteal sleeve avulsion
    E. Humeral avulsion of the posterior glenohumeral ligament

34. Which of the following favours chondroma rather than chondrosarcoma?
    A. Size > 3cm
    B. Pain
    C. Age > 30
    D. Location in hands and feet
    E. Permeation into soft tissues

35. A 20-year-old long-distance runner has a several week history of right lower leg pain. A plain film was reported as normal but CT showed multiple areas of osteopenia and cavities of the anterior tibial cortex. Which is the diagnosis?
    A. Stress fracture
    B. Chronic external compartment syndrome
    C. Medial tibial stress syndrome
    D. Periostitis
    E. Interosseous membrane injury

36. A 27-year-old athlete develops groin pain. A pelvic radiograph suggests osteitis pubis. Which is the single best answer?
    A. Osteitis pubis usually demonstrates rapid radiographic changes
    B. Is due to a single traumatic insult in most cases
    C. Is associated with inflammatory mediated inappropriate osteoblsatic activity
    D. Is associated with pubic or perineal pain with resisted hip abduction
    E. Radiographic changes include alternating osteopenia and sclerosis

37. A 37-year-old female with generalised bone pain and a chronic disease has plain films of the thoracic spine showing diffuse sclerosis and band-like areas of sclerosis involving the upper and lower endplates. Anterior erosions are noted in the vertebral bodies. A small lytic lesion is seen in the pedicle. Which is the diagnosis?
    A. Fluorosis
    B. Osteopetrosis
    C. Systemic mastocytosis
    D. Renal osteodystrophy and secondary hyperparathyroidism
    E. Myelofibrosis

38. A 68-year-old man has a pelvic radiograph showing an enlarged right iliac bone with mixed lucency and areas of increased density. There are coarsened trabeculae and cortical thickening. There is thickening of the right ileopectineal line. Intense uptake is seen in this region on bone scan. He is known to have prostate cancer, currently on active surveillance. Prostate Specific Antigen (PSA) is stable at 1.7. Which is the diagnosis?
    A. Melorheostosis
    B. Metastatic prostate cancer
    C. Post-radiotherapy changes from treated bony metastases
    D. Mixed phase Paget's disease
    E. Myelofibrosis

39. In a 19-year-old male with painful scoliosis, a well-defined 3cm geographic osteolytic lesion is seen in the right posterior seventh rib with slight expansion and sharp sclerotic margins. CT is performed and shows punctate calcification within the lesion and adjacent sclerotic bone. MRI shows low-intermediate T1 and intermediate-high T2 signal with bone marrow oedema. Which is the most likely diagnosis?
    A. Giant cell tumour
    B. Fibrous dysplasia
    C. Enchondroma
    D. Osteoblastoma
    E. Aneurysmal bone cyst

40. A 35-year-old woman with bilateral forefoot pain is investigated for Morton's neuromas. Which is the single best answer?
    A. Low on T1 and high on T2
    B. Do not enhance with contrast
    C. Associated proximal fluid-filled bursae are seen
    D. Occur most commonly between the heads of the first and second metatarsals
    E. Occur most commonly between the heads of the second and third metatarsals

41. Regarding malignant fibrous histiocytoma:
    A. Central mineralisation is common
    B. Occur more often in bone than in soft tissue
    C. Is the main primary malignant tumour of fibrous origin affecting bone
    D. Most cases arise in Paget's disease
    E. Reactive changes are common

42. Considering imaging features of plasmocytomas:
    A. Are commonly sclerotic
    B. Arise in the cortex
    C. Usually has a poorly defined margin
    D. Peripheral lesions are common
    E. A soap bubble appearance is common

43. A 28-year-old female with severe pain in both hips has a plain radiograph which demonstrates marked periarticular loss of cancellous bone. Considering transient regional osteoporosis, which of the following is most correct?
    A. Radiographic changes occur before bone scan changes
    B. Slowly developing osteoporosis
    C. Usually resolves in 4-6 weeks
    D. Joint space narrowing occurs late
    E. Acetabulum is usually involved

44. Which of the following demonstrates the most uptake on PET/CT?
    A. Primary bone lymphoma
    B. Osteosarcoma
    C. Chondrosarcoma
    D. Enchondroma
    E. Osteochondroma

45. Which of the following is a characteristic of plantar fasciitis?
    A. Calibre of plantar fascia > 2mm
    B. Increased reflectivity of ligament
    C. Enthesal new bone formation
    D. Low SI T1, high SI T2
    E. Pain typically worse with progressive exercise

46. Which of the following favours primary rather than secondary hyperparathyroidism?
    A. Brown tumour
    B. Osteosclerosis
    C. Rugger-jersey spine
    D. Soft tissue calcification
    E. Vascular calcification

47. On review of a casualty film of a patient involved in a road traffic accident, which of the following is an unstable cervical spine fracture?
    A. Unilateral facet dislocation
    B. Clay shovellers
    C. Jefferson
    D. Burst
    E. Extension tear drop

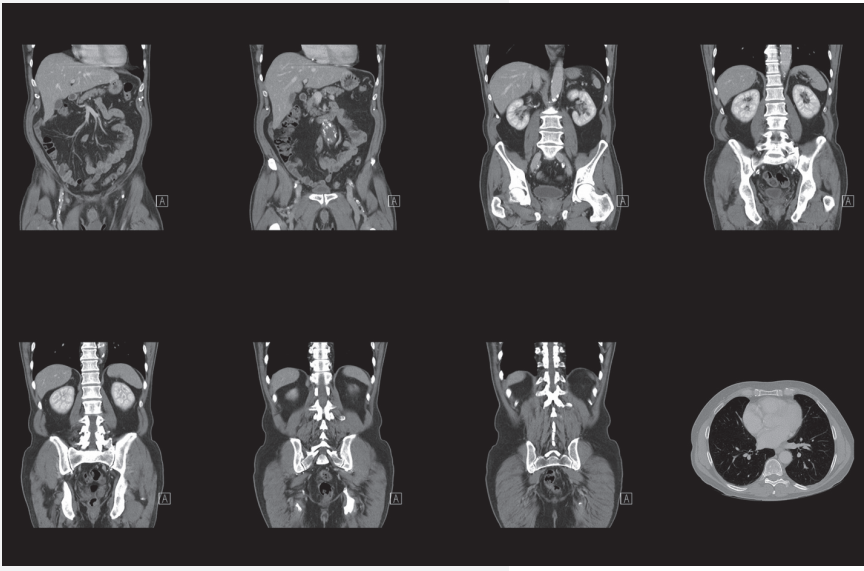
48. In a 50-year-old woman with arthralgia, which of the following favours rheumatoid arthritis over Systemic Lupus Erythematosus (SLE)?
    A. Prominent subluxation of metacarpal phalyngeal joints (MCPJ)
    B. Usually bilateral and symmetrical
    C. Absence of erosion
    D. Radiographically similar to Jaccoud's arthropathy
    E. Hyperextension of Distal Interphalyngeal (DIP) and flexion of Proximal Interphalyngeal (PIP) joints

49. Ivory phalanx, tuft resorption, and pencil-in-cup deformity of the middle phalynx in a patient with asymmetric arthritis are most likely to represent:
    A. Psoriatic arthritis
    B. Haemachromatosis
    C. Rheumatoid arthritis
    D. Reiter syndrome
    E. Scleroderma

50. A patient under joint care of cardiology and nephrology has bulky soft tissue nodules, well-marginated erosion, preserved joint spaces involving the wrists, elbows, shoulder and hip joints. Which is the most likely diagnosis?
    A. Multicentric reticulohistiocytosis
    B. Amyloidosis
    C. Ochranosis
    D. Wilson's disease
    E. Haemachromatosis

Module 2: Musculoskeletal and trauma

Answers



1. A

Type 1-flat (12%)
Type 2-concave (56%)
Type 3-hooked (29%)
Type 4-inferior convex (3%)

Type 3 more than Type 2 is associated with increased incidence of rotator cuff tears. ACJ degeneration can narrow the supraspinatus outlet. Significant subacromial subdeltoid (SASD) bursitis include thickness > 3mm, presence of bursal fluid medial to the ACJ and presence of fluid in the anterior aspect of the bursa.

Ref:

Mulyadi E *et al*. MRI of impingement syndromes of the shoulder *Clinical Radiology* 2009; 64(3): 307–318.

2. B

SLAP lesions are isolated tears of the glenoid labrum with anterior and posterior components. These lesions occur with repetitive over-arm activity, begin in the posterior aspect of the superior labrum and extend posteriorly.

Ref:

Robinson G. Normal anatomy and common labral lesions at MR arthrography of the shoulder. *Clinical Radiology* 2006; 61(10): 805–821.

3. C

The normal infrapatellar tendon is homogenously low SI on all sequences. A triangular area of high signal at the patellar enthesis when imaged on gradient echo is of no clinical significance. The paratenon is more commonly the primary

site of acute inflammation in the Achilles tendon than the infrapatellar tendon. An echo-poor halo around the tendon is seen in paratenonitis on US.

Ref:

Peace KA *et al.* Imaging the infrapatellar tendon in the elite athlete. *Clinical Radiology* 2006; 61(7): 570–578.

4. D

Hair-on-end appearance is recognised but is relatively uncommon. Increased haematopoesis is associated with thinning of the outer table and thickening of the inner table. Characteristic facies are produced by lateral displacement of the orbits.

Ref:

Tyler PA. The radiological appearances of thalassaemia. *Clinical Radiology* 2006; 61(1): 40–52.

5. A

B-E are osteoporotic features. Other malignant features include diffuse low SI on T1, high/heterogeneous SI on T2, and involvement of the posterior elements.

Ref:

Winterbottom AP *et al.* Imaging patients with myeloma. *Clinical Radiology* 2009; 64(1): 1–11.

6. D

Renal cell carcinoma also causes expansile lytic metastases.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis* 4th edition. London: Saunders Ltd.

7. B

Other causes include syphilis and infantile cortical hyperostosis.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis* 4th edition. London: Saunders Ltd.

8. D

Other causes of superior rib notching include SLE, scleroderma, Sjögren's syndrome, hyperparathyroidism, Marfan's syndrome and osteogenesis imperfecta. NF can cause superior and inferior rib notching.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis* 4th edition. London: Saunders Ltd.

9. E.

Haemangioma and leukaemia as well as myeloma can show increased uptake as well.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis* 4th edition. London: Saunders Ltd.

10. C.

Other features of tuberculosis include slow progression, marked collapse and a large paravertebral abscess, with or without calcification.

11. A

Hyperparathyroidism is a cause of widening of the pubic symphysis. Other causes of widening include pregnancy, trauma, osteitis pubis, osteolytic metastases, infection, early ankylosing spondylitis, rheumatoid arthritis.

12. C

Eosinophilic granuloma is a cause of a mixed sclerotic/lytic lesion with a button sequestrum.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 9.

13. D

Acrosteolysis is a lytic destructive process involving the distal and middle phalanges with no periosteal reaction.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 21.

14. C

Patients with pseudoachondroplasia have a normal skull and medial beaking of the proximal femoral neck. Achondrogenesis is lethal in utero/neonatal period, as is homozygous achondroplasia. In metatrophic dwarfism, dumbbell shaped long bones and flattened vertebra may be found.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 43.

15. B

CPDD never involves nucleus pulposis, unlike ochranosis.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 55.

16. C

Grade 1: focal hypointense areas not extending to cartilage surface

Grade 2: focal hypointense areas extending to the cartilage surface with preservation of sharp cartilage margins

Grade 3: loss of sharp dark margin between articular cartilage of the patella and trochlea and focal hypointense areas extending to the articular surface but not down to the osseous surface.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 58.

17. A

Concerning features for malignant transformation include new lucency, increased scintigraphic activity, growth after skeletal maturation, pain after puberty, cortical destruction and a cartilaginous cap > 1.5cm.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 134.

18. C.

50-65% occur around the knee, but are rare in the patella.

Ref:

Dahnert W (2007) *Radiology Review Manual*, 6th Edition. Philadelphia: Lippincott, Williams & Wilkins p. 95.

19. E.

Although all of the answers are features, hook-like osteopohytes are the most characteristic. Arthropathy is seen in 50%, and chrondrocalinosis in more than 60%, with knees being most commonly affected.

20. B.

Although all are causes of a widened intercondylar notch, the radiographic features are of haemophilic arthropathy. MRI shows low SI of hypertrophied synovial membrane on all pulse sequences due to haemosiderin.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis* 4th edition. London: Saunders Ltd. p. 107.

21. E.

Anteromedial ankle impingement syndrome was previously thought to be from eversion injury but recent studies are showing inversion is the causative injury. There is associated amporphous SI in ATTL with heterotopic bone formation and small corticated ossicles. Post-traumatic synovitis and fibrosis are recognised. The tibialis posterior tendon may be displaced medially.

Ref:

Chhabra A *et al.* MR imaging of deltoid ligament pathologic findings and associated impingement syndromes. *Radiographics* 2010; 30(3): 751–761.

22. D

The other answers all belong to the superficial components. The posterior deep tibiotalar ligament is also deep. The superficial and deep components function almost synergistically and stabilise against valgus and pronation as well as rotational force against the talus.

Ref:

Chhabra A *et al.* MR imaging of deltoid ligament pathologic findings and associated impingement syndromes. *Radiographics* 2010; 30(3): 751–761.

23. B

Although osteoid osteomas can occur in any bone, they are most common in the metadiaphyseal femur and tibia. The nidus appears lucent on radiographs, intensely active on bone scan – with surrounding well-defined luceny (double doughnut sign), isointense to muscle on T1 and variable SI on T2.

Ref:

Motamedi D *et al.* Thermal ablation of osteoid osteoma: overview and step-by-step guide. *Radiographics* 2009; 29(7): 2127–2141.

24. C

Chordoma usually appears as a low attenuation mass on CT.

25. A

This is the most common primary malignant tumour of the sacrum. Giant cell tumours are the second most common cause and are indistinguishable from chordomas on MRI.

Ref:

Farsad K *et al.* Sacral chordoma. *Radiographics* 2009; 29(5): 1525–1530.

26. D

Thick peripheral septa with nodularity, presence of an osteoid matrix within nodular or septal regions, and aggressive growth features such as cortical destruction indicate TOS rather than ABC.

Ref:

Discepola F *et al*. Telangiectatic osteosarcoma: radiologic and pathologic findings. *Radiographics* 2009; 29(2): 380–383.

27. B

The earliest changes occur 1-6 weeks after therapy is initiated and is due to replacement of marrow by fat. Complete replacement occurs within 6-8 weeks. Due to high radiation doses used in soft tissue tumour treatment, regeneration of normal marrow is rare, but can occur in young patients. The radiation field is usually well-defined.

Ref:

Garner HW *et al*. Benign and malignant soft-tissue tumors: posttreatment MR imaging. *Radiographics* 2009; 29(1): 119–134.

28. B

Treatment induced necrosis is a more accurate predictor of tumour response than size. Tumour size can indeed increase initially due to intralesional haemorrhage. The degree of necrosis is best evaluated with gadolinium enhanced T1 fat suppressed sequences. Neoadjuvant chemotherapy increases both recurrence-free and overall survival.

29. C

Manifests as a soft tissue mass in 50-70% of cases, with normal radiographs in 20% and osseous abnormalities in 5-25%. The most common osseous abnormality are extrinsic erosions which are more often present in the ankle and foot.

Ref:

Murphey MD *et al.* Pigmented villonodular synovitis: radiologic-pathologic correlation. *Radiographics* 2008; 28(5): 1493–1518.

30. E

50% of skeletal TB involves the spine, with the lower thoracic and upper lumbar regions being most commonly affected. It usually begins at the anterior vertebral body. A psoas abscess may cause lateral bowing of the psoas shadow on plain film.

Ref:

Burrill J *et al.* Tuberculosis: a radiologic review. *Radiographics* 2007; 27(5): 1255–1273.

31. E

Diabetic myopathy typically presents with sudden onset pain and swelling of the affected muscles and a palpable painful mass in ⅓ of cases. Fever is present in 10%. Other complications of diabetes are usually present. Myopathy affects bilateral lower limbs in 18%. It usually demonstrates diffusely high SI on T2 with areas of high SI on T1 indicating haemorrhagic infarction.

Ref:

Huang BK *et al.* Diabetic myopathy: MRI patterns and current trends. *AJR Am J Roentgenol* 2010; 195(1): 198–204.

32. E

The remaining answers are also seen in TB arthritis. Even and thin synovium, large bone erosions, rim enhancement around bone erosion and extra-articular cystic masses are more frequently seen in TB arthritis.

Ref:

Choi JA *et al.* Rheumatoid arthritis and tuberculous arthritis: differentiating MRI features. *AJR Am J Roentgenol* 2009; 193(5): 1347–1353.

33. A

The posterior inferior labrum is detected from glenohumeral attachment and there is an avulsion tear of the posterior scapular periosteum.

Ref:

Shah N *et al.* Imaging signs of posterior glenohumeral instability. *AJR Am J Roentgenol* 2009; 192(3): 730–735.

34. D

Chondromas are usually < 3cm, painless and in younger patients in the peripheral skeleton.

Ref:

Chaabane S *et al.* Periosteal chondrosarcoma. *AJR Am J Roentgenol* 2009; 192(1): 1-6.

35. C

A spectrum of lesions can occur from repetitive stress. These include periostitis, cortical osteopenia, cancellous bone and cortical fractures. Injuries are most frequently in the cortex of the distal ⅔ of the tibia and known as medial tibial stress syndrome.

Ref:

Gaeta M *et al*. Diagnostic imaging in athletes with chronic lower leg pain. *AJR Am J Roentgenol* 2008; 191(5): 1412–1419.

36. E

This is a self-limiting but often protracted condition secondary to repetitive microtrauma with osteoclastic activity and osseous resorption. Radiographs show irregularity of subchondral bone plate, erosions, fragmentation and alternating osteopenia and sclerosis. It may lead to joint space widening.

Ref:

Koulouris G. Imaging review of groin pain in elite athletes: an anatomic approach to imaging findings. *AJR Am J Roentgenol* 2008; 191(4): 962–972.

37. D

A rugger-jersey spine is described with subligamentous resorption and lytic brown tumour.

38. D

Lytic, mixed and sclerotic phases are recognised in Paget's, in which the lytic and mixed types show increased activity, and a variable pattern in the sclerotic type.

39. D

Osteoblastomas share clinical and histological features with osteoid osteomas and 3-12% occur in ribs.

Ref:

Hughes EK *et al.* Benign primary tumours of the ribs. *Clinical Radiology* 2006; 61(4): 314–322.

40. C

Most commonly between third and fourth metatarsal heads.

Ref:

Goodwin RW *et al.* MRI appearances of common benign soft-tissue tumours. *Clinical Radiology* 2007; 62(9): 843–853.

41. C

Occur much more commonly in soft tissue than bone. 25% occur in pre-existing conditions such as Paget's. They usually present with insidious onset pain and swelling, and central mineralisation and reactive changes are uncommon.

42. E

Plasmocytomas arise from the medulla in sites of persistent red marrow, frequently producing a soft tissue mass. Other imaging features of plasmocytomas include destructive lytic lesions with well-defined margins, cortical thinning with expansion and apparent trabeculae or a soap bubble appearance.

43. D

MR shows marrow oedema of the femoral heads, but does not usually involve the acetabulum.

44. A

Greatest FDG uptake occurs in primary bone lymphoma and Ewing's sarcoma. Osteosarcoma demonstrates moderate uptake. Most benign bone lesions are non-FDG avid, with the exception of high giant cell containing tumours (Giant Cell Tumors (GCT), osteoblastomas, aneurysmal bone cysts) and fibrous lesions (fibrous dysplasia).

45. C

Most common type of plantar fascia injury. Sharp pain, worse after rest, lessening with exercise. US shows increased calibre > 4mm, loss of reflectivity of the ligament, specifically within the central bundle. MR shows high to intermediate T1 and high T2 SI.

Ref:

Jeswani T *et al.* Getting to the heel of the problem: plantar fascia lesions. *Clinical Radiology* 2009; 64(9): 931–939.

46. A

Brown tumours and chondrocalcinosis are features of primary hyperparathyroidism.

47. C

Unstable fractures include bilateral facet dislocation, flexion teardrop, hangman's, hyperextension dislocation, Jefferson, odontoid and atlanto-occipital dislocation.

48. E

A-D are features seen in SLE.

49. A.

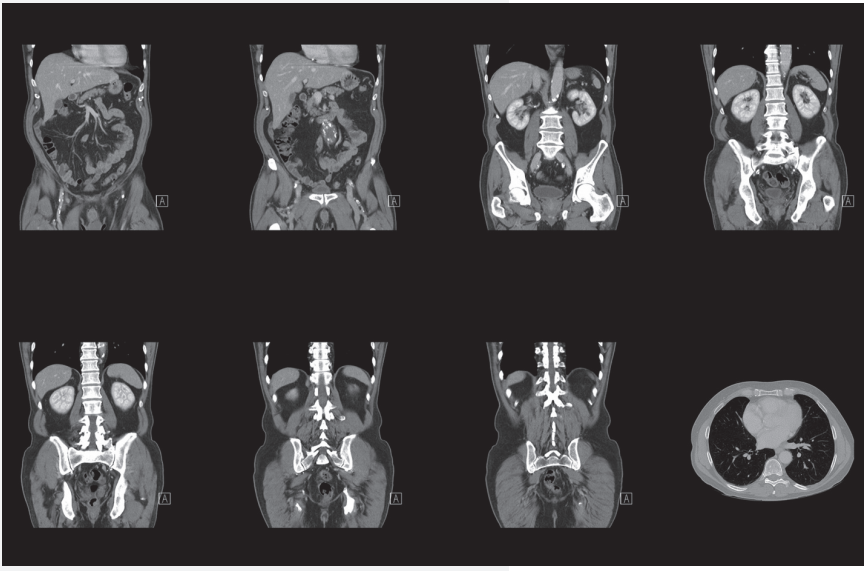
Hands are more commonly affected in psoriatic arthropathy, whereas feet are more commonly affected in Reiter's.

50. B.

Multiple sites can be involved and there is characteristic preservation of joint spaces.

Module 3: Gastrointestinal

Question Bank



1. Which of the following is the hallmark of sclerosing mesenteritis on CT?
   A. Increased density of mesenteric fat to 40-60 HU
   B. Collateral vessel formation
   C. Fatty nectrotic cystic mass formation
   D. Calcification within fat necrosis
   E. Mesenteric lymph node enlargement > 10mm

2. The CT of a 50-year-old man with abdominal pain shows a stellate enhancing mesenteric mass with a radiology pattern of linear densities emanating from the mass. Adjacent small bowel loops show tethering and thickening. Which is the most likely diagnosis?
   A. Metastatic carcinoid tumour
   B. Primary mesenteric mesothelioma
   C. Desmoid tumour
   D. Non Hodgkin's Lymphoma (NHL)
   E. Abdominal TB

3. Which of the following favours appendical carcinoid over appendical adenocarcinoma?
   A. Bulbous swelling involving the distal third of the appendix
   B. Slow growth
   C. Direct extension into caecum
   D. Ileocaecal lymph node enlargement
   E. Periappendical fat standing

4. Which of the following favours pseudomyxoma peritonitis over sclerosing encapsulating peritonitis?
   A. Scalloping of the liver edge
   B. Loculated fluid collection
   C. Peritoneal calcification
   D. Tethering of small bowel loops
   E. Peritoneal enhancement

5. A 60-year-old woman presents with abdominal pain and diarrhoea six weeks post-hip replacement surgery, with her recovery being complicated by a hospital-acquired pneumonia. CT is performed. When considering a diagnosis of pseudomembranous colitis (PMC) which is the most common finding?
   A. Intense mucosal enhancement
   B. Enlarged peri-colic blood vessels
   C. An irregular or discontinuous mucosal lining
   D. Pericolonic fat stranding
   E. Colonic wall thickening

6. Which of the following most favours Crohn's versus psudomembranous colitis?
   A. Ascites
   B. Absence of small bowel involvement
   C. Fibro fatty mesenteric proliferation around involved colon
   D. Colonic wall thickening of 11mm
   E. Low attenuation mural thickening (accordion sign)

7. Which of the following frequencies would most help in the differentiation between recurrent tumour and fibrosis in a 62-year-old with prior chemoradiotherapy for low rectal cancer?
   A. Axial and coronal balanced gradient echo
   B. Saggital T2 fat suppressed fat-spin echo (FSE)
   C. Axial TIW fat suppressed FSE before and after gadolinium
   D. Saggital TIW fat suppressed FSE post gadolinium
   E. Coronal TIW fat suppressed FSE post gadolinium

8. A 25-year-old male presents following blunt abdominal trauma following a motor vehicle accident. Which is the most common CT finding in the 'shock bowel'?
   A. Increased small bowel mucosal enhancement
   B. Small bowel luminal dilation
   C. Fluid-filled loops of small bowel
   D. Colonic involvement greater than small bowel
   E. Focal involvement of the small bowel

9. A 48-year-old presents with a right upper quadrant mass. He has a history of episodes of constipation with no weight loss. CT shows a 6cm mass in the left lobe of the liver, with peripheral globular cloud-like enhancement. Delayed phase images show the mass 'has filled in' with contrast, with minimal low attenuation central remaining. T2 MRI shows a well-defined high signal mass in the left lobe of the liver. Which is the most likely diagnosis?
   A. Cavernous haemangioma
   B. Hypervascular liver metastasis
   C. Focal Nodular Hyperplasia (FNH)
   D. Hepatocellular Carcinoma (HCC)
   E. Metastatic colon cancer

10. A 40-year-old woman presents with some poorly localising abdominal pain and is investigated with CT. A non-contrast study shows a 4cm isoattenuated mass in the left lobe. Arterial phase images show the mass to enhance with a small lower attenuation focus centrally. On the PV phase, the mass is isoattenuating but the central low attenuated focus persists. What is the diagnosis?
    A. FNH
    B. Regional nodule
    C. HCC
    D. Hypervascular metastasis
    E. Cavernous haemangioma

11. Which of the following causes of diffuse hepatic surface nodularity can be most difficult to distinguish from cirrhosis?
    A. Treated breast cancer metastases to the liver
    B. Chronic Budd-Chiari syndrome
    C. Chronic portal vein thrombosis
    D. Pseudomyxoma peritonei
    E. Miliary metastases

12. 13 months post-Roux-en-Y bariatric gastric bypass surgery a 45-year-old woman presents with abdominal pain, vomiting and constipation. Abdominal X-ray shows Small Bowel Obstruction (SBO) on CT. Which is the most likely cause of the SBO if the site of the obstruction is in the alimentary limb?
    A. Internal hernia
    B. Jejenojejunostomy stricture
    C. Intussuseption of the Roux limb
    D. Intraluminal haematoma
    E. Mesocolic haematoma

13. A 70-year-old man with sudden onset left-sided abdominal pain underwent evaluation with CT. Fat stranding and colonic wall thickening is noted in the distal descending/proximal sigmoid colon. Diverticulae are noted. Which feature is most likely to represent a colonic tumour rather than diverticulitis?
    A. Colonic wall thickening
    B. Pericolonic fat stranding
    C. Fluid in the sigmoid mesentery
    D. Engorgement of the mesenteric vessels
    E. Increased permeability on CT perfusion

14. A usually fit and well 30-year-old female presents with left-sided abdominal pain. Normal uterus and ovaries are identified. In the left iliac fossa there is a 4cm hyperechoic mass which is non-compressible between the colon and abdominal wall. No colonic wall changes are identified. There is no free fluid. The lesion is surrounded by a hyperechoic border with no Doppler flow. Which is the most likely diagnosis?
    A. Epiploic appendigitis
    B. Diverticulitis
    C. Omental infarction
    D. Omental metastases
    E. Mesenteric panniculitis

15. Which is the most typical finding of serous cystadenoma of the pancreas?
    A. Multiple cysts < 2cm separated by a fibrous septa coalescing into a central scar
    B. Numerous sub centimetre cysts forming a homogenous pattern
    C. A few large cysts > 2cm with septae in the head of the pancreas
    D. Multicystic tumour larger than 10cm
    E. Hypervascular solid tumour

16. Which is the most commonly affected site in systemic sclerosis after the oesophagus?
    A. Anorectal
    B. Small bowel
    C. Colon
    D. Stomach
    E. Oropharynx

17. US of a 44-year-old man shows a 7cm cystic lesion in segment 8 of the liver. There is some dependent debris and an apparent cyst within cyst appearance. Which is the most likely diagnosis?
    A. Haemangioma
    B. Abscess
    C. Hydatid disease
    D. Hepatic cyst
    E. Cystic metastasis

18. A 40-year-old woman has an ultrasound for investigation of gallstones. She is otherwise fit and well. A large lesion is found in the left lobe of the liver. CT is performed for further characterisation pre-contrast, arterial and portovenous phases. The 8cm lesion appears isointense to liver parenchyma on the non-contrast CT uniformly avidly enhancing in the arterial phase and again isointense to liver parenchyma on the portal phase. A low attenuated central scar is noted within the lesion. Which is the most likely diagnosis?
    A. FNH
    B. Hepatic adenoma
    C. Atypical haemangioma
    D. Focal fat
    E. Fibrolamella carcinoma (FLC)

19. Which of the following is most likely to deem a cholangiocarcinoma irresectible?
    A. Right portal vein invasion
    B. Left hepatic artery invasion
    C. PV branch to one lobe and hepatic artery to other lobe invaded
    D. Size > 2cm
    E. Biliary duct dilatation

20. Which of the following is not a feature of Mirrizzi sign?
    A. Jaundice
    B. Gall stone impacted in gall bladder neck
    C. Dilatation of bile ducts above level of cystic duct
    D. Smooth curved segmental stenosis of Common Hepatic Duct (CHD)
    E. Dilated Common Bile Duct (CBD) below level of impacted stone

21. A 40-year-old with a Multiple Endocrine Neoplasia (MEN) syndrome has parathyroid hyperplasia with hyperparathyroidism recently diagnosed. Which of the following is a feature of MEN II rather than MEN I?
    A. Phaeochromocytoma
    B. Pancreatic islet cell tumour
    C. Pituitary gland tumour
    D. Adenocortical adenoma
    E. Carcinoid tumour

22. Which is the most likely source of a metastatic deposit to the pancreas?
    A. Renal Cell Carcinoma (RCC)
    B. Bronchogenic carcinoma
    C. Breast cancer
    D. Soft tissue sarcoma
    E. Colon carcinoma

23. Which of the following favour a diagnosis of glucagonoma rather than somatostatinoma?
    A. Predilection for body / tail of pancreas
    B. Arrange size > 4cm
    C. Hypervascular
    D. Duodenal obstruction
    E. Association with Neurofibromatosis Type 1 (NFI)

24. A 35-year-old woman presents with severe watery diarrhoea. She is hypokalaemic. A neuroendocrine tumour is diagnosed in the pancreatic body measuring 5cm. This is mildly hypervascular. Which of the following is the most likely diagnosis?
    A. VIPoma (Verner Morrison Syndrome)
    B. Somatostatinoma
    C. Non functional islet cell tumour
    D. Glucagonoma
    E. Gastrinoma

25. During discussion with a patient due for Radio-frequency Ablation (RFA) treatment of HCC, she asks you about potential increased risk of tumour seeding along needle track, which she has read about on the internet. Which of the following statements is most true?
    A. 0.5% risk of tumour seeding down needle track
    B. Lesions with a subscapular location are at lower risk
    C. Mortality rates range from 1.5-2%
    D. Major complication rates range from 5-10%
    E. Minor complication rates typically 10-15%

26. Which is most correct regarding internal hernia after bariatric laparoscopic Roux-en-Y gastric bypass?
    A. Incidence of SBO secondary to internal lesions 0.2-5%
    B. Occur more frequently in open than laparoscopic procedures
    C. The obstruction commonly occurs in the efferent limb
    D. Physical examination detects the problem with high sensitivity
    E. Following Roux-en-Y gastric bypass, the stomach should be relatively distended/fluid filled

27. Regarding laparoscopic adjustable gastric banding:
    A. Is connected by tubing to a port anterior to the rectus sheath
    B. On scout films, the band should be parallel to the Gastro Oesophageal Junction (GOJ)
    C. When patient ingests contrast, position of band best assessed on lateral decubitus projection
    D. With band slippage, the pouch is narrowed
    E. Perforation rates are typically 1-2%

28. A duodenal diverticulum is noted on CT as an incidental finding. Which is the single best answer?
    A. Reported in up to 5% of upper Gastrointestinal (GI) fluoroscopic studies
    B. Commonly symptomatic with high risk of inflammation
    C. Mostly located on the lateral wall of the duodenum
    D. Mostly arise from the third or fourth part of the duodenum
    E. If perforated is easy to distinguish from a perforated duodenal ulcer

29. A 40-year-old male presents with an indeterminate liver lesion. He is Hep C positive with previous history of Intravenous Drug Use (IVDU) and was successfully treated for T2NO colorectal cancer last year. Ultrasound demonstrates a 1.5cm slightly hypoechoic lesion in segment 8. This lesion takes up contrast inhomogenously in the arterial phase and demonstrates washout in the portovenous and delayed phases, becoming hypoechoic with regards to surrounding liver parenchyma. Which is the most likely diagnosis?
    A. Metastasis
    B. Focal fatty sparing
    C. Capillary haemangioma
    D. Hepatic abscess
    E. Regenerate nodule

30. Which of the following are CT criteria for T3 rather than T2 oesophageal cancers?
    A. Depth of 11mm
    B. Transmural enhancement
    C. Focal wall thickening measuring 14mm
    D. A few < ⅓ small linear strands of soft tissue extending in to fat planes
    E. Slight stenosis

31. Which is the most common MR feature of autoimmune hepatitis?
    A. MR is diagnostic test for AIH
    B. Surface nodules rarely present
    C. PV thrombosis is frequently present
    D. Fibrosis better evaluated on CT than MR
    E. Enlarged preportal space is a recognised finding

32. Which of the following most favours a diagnosis of an infected rather than a sterile post-necrotic fluid collection, following acute pancreatitis?
    A. Presence of gas bubbles
    B. Size of collection > 5cm
    C. Association with extrapancreatic necrosis
    D. Association with organised pancreatic necrosis
    E. Association with central gland necrosis

33. Which is the most common source of false positives in cathartically prepared CT colonography by Computer aided detection (CAD)?
    A. Haustral folds
    B. Untagged/poorly tagged stool
    C. Ileocaecal valve
    D. Electronic cleansing and tagging artefact
    E. Extrinsic compression

34. Regarding Wilson's disease:
    A. Is autosomal dominant in inheritance
    B. Hyperdense nodules on non-enhanced CT is the most common finding
    C. Honeycomb pattern is most evident on the pre-contrast study
    D. The honeycomb pattern is more evident on T1 than T2
    E. Occurs due to overproduction of copper

35. Regarding intraductal papillary mucinous tumours (IPMT):
    A. Can range from hypoplasia to invasive carcinoma
    B. Is more common in females than mucinous cystic tumours
    C. Has a higher incidence of malignancy in branch than main ducts
    D. Focal wall thickening indicates malignancy with very high sensitivity and specificity
    E. Parietal nodules indicate malignancy with very high sensitivity and specificity

36. Which of the following is a cause of smooth, regular and thickened folds in non-dilated small bowel?
    A. Intraluminal haematoma
    B. Crohn's
    C. Zollinger-Ellison
    D. Tuberculosis
    E. Carcinoid

37. Which of the following represent a case of oesophageal pouch in the lower ⅓ of the oesophagus?
    A. Mucosal tear/Mallory-Weiss
    B. Intraluminal diverticulosis
    C. Defect through Killian-Jamieson space
    D. Zenker's diverticulosis
    E. Traction following treatment for TB

38. Which of the following is a case of decreased / absent duodenal folds:
    A. Scleroderma
    B. Pancreatitis
    C. Lymphoma
    D. Melanoma metastases
    E. Whipples disease

39. On review of a pelvic MRI of a patient who has previously received radiotherapy, high signal intensity change is noted on the lumbar spine and sacrum. On the T2 images, which of the following would also be expected to be demonstrated post-radiotherapy?
    A. Bladder wall thickened
    B. Ovaries increased SI
    C. Rectum decreased SI
    D. Granulation tissue with decreased SI
    E. Fibrous tissue with decreased SI

40. Which of the following is a cause of generalised increase in density pre-iv contrast on CT?
    A. Amiodarone treatment
    B. Fatty infiltration
    C. Malignant infiltration
    D. Budd-Chiari
    E. Amyloidosis

41. Which of the following is a cause of non-visualisation of the gall bladder with trimethylbromo-im–indolacetic acid (TBIDA) and no bowel activity?
    A. Opiate usage
    B. Acute cholecystitis
    C. IV feeding
    D. Biliary pancreatitis
    E. Severe diffuse hepatocellular disease

42. A 37-year-old man on the intensive care unit, 3 weeks post-operatively for complicated small bowel resection for Crohn's disease, is noted to have an oozing from a site on his anterior abdominal wall. His renal function remains normal and inflammatory markers are persistently elevated with White Cell Count (WCC) 15.9 and C-reactive Protein (CRP) 124. On a CT of the abdomen 5 days ago, no collection was demonstrated. CT fistulography is being considered. Which is the best answer with regards to CT fistulography?
    A. Conventional fistulography has a higher spatial resolution
    B. Iodinated contrast should be used, diluted 1 in 100
    C. Oral contrast is helpful in most cases
    D. Intravenous (IV) contrast should be avoided
    E. CT fistulography has a greater temporal resolution

43. A 42-year-old woman is being investigated following a new diagnosis of hepatitis C. Which of the following would have the highest accuracy in the characterization of a focal liver lesion in this patient?
    A. Ultrasound
    B. Doppler ultrasound
    C. Microbubble contrast enhanced ultrasound (CEUS)
    D. Combined US and AFP
    E. Combined US and Doppler US

44. With regards to MRI in patients being investigated for Crohn's disease, which of the following is the least desirable characteristic of ultrafast sequences based on steady state precession?
    A. A high sensitivity to motion artefact
    B. The time taken to acquire an image
    C. The degree of contrast between bowel wall and lumen
    D. Degree of soft-tissue differentiation when compared to other sequences
    E. A black boundary effect

45. Which of the following favours gastric lymphoma rather than other gastric malignancies?
    A. Preservation of the fat plane around the stomach
    B. Luminal narrowing
    C. Involvement of the proximal half of the stomach
    D. Heterogenous gastric wall thickening
    E. A single site of disease within the stomach

46. Which of the following is the most correct statement with regards to Gastrointestinal Stromal tumor (GIST) of the stomach?
    A. Most patients present below the age of 50
    B. GISTS of the stomach tend to have a more aggressive histology when compared with GISTS from other sites
    C. Mural calcification is a common feature
    D. Larger lesions tend to be more homogenous in enhancement
    E. Central fluid attenuation/necrosis is common

47. A child with a subacute history of vague abdominal pain is being investigated with ultrasound. Inflammatory markers are normal and there is no clinical indication of an appendicitis. During the study, an abnormality is detected in the right iliac fossa. Which of the following sonographic features favours a duplication cyst rather than a Meckel's diverticulum?
    A. A double layered wall
    B. Non-compressibility
    C. Teardrop shape
    D. A greater degree of irregular mucosa
    E. An elongated tubular shape

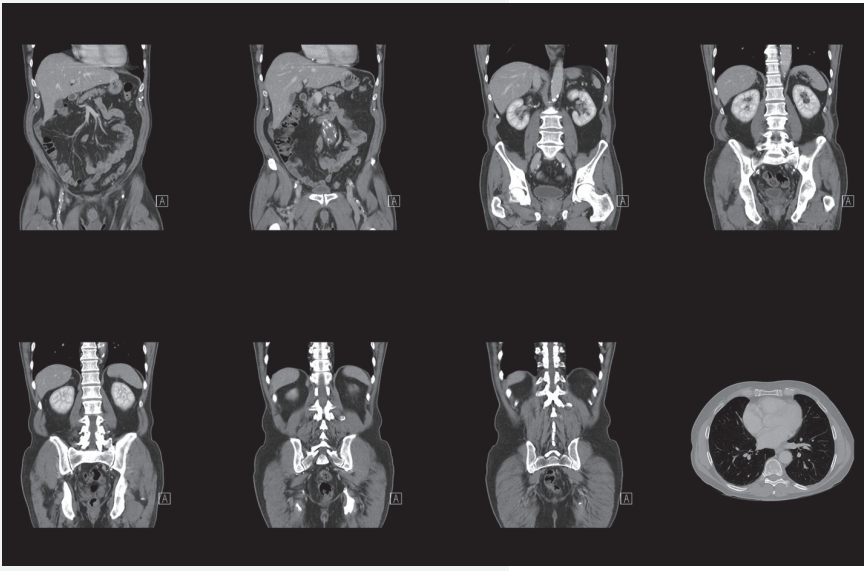
48. A 45-year-old man 3 weeks post-op for liver transplantation, develops non-specific abdominal pain with a slight rise in liver function tests. A Doppler ultrasound is requested. Which is the most common vascular complication of orthoptic liver transplantation?
    A. Hepatic artery thrombosis
    B. Hepatic vein thrombosis
    C. Portal vein thrombosis
    D. IVC thrombosis
    E. Hepatic artery stenosis

49. In the MR staging of rectal tumours, which of the following is the single best answer?
    A. A distance of less than 3mm from the mesorectal fascia is most likely to reflect circumferential resection margin (CRM)
    B. There is a prognostic difference between different types of T3 tumours depending on tumour size
    C. Untreated mucinous and non-mucinous tumours are difficult to distinguish on T2 sequences
    D. Untreated tumour signal is similar to muscle on T2
    E. Nonmucinous tumour signal intensity is similar to fat

50. A 34-year-old male visitor to the United Kingdom under the care of the medical team has abnormal liver function tests. US reveals periportal hyperechogenicity and gallbladder wall thickening but no biliary dilatation. The patient has a liver MRI study. T2 images show high signal intensity bands along the portal tracts and note is made of splenomegaly with siderotic nodules. Gadolinium enhanced T1 images confirm enhanced periportal bands. Which of the following is the most likely causative organism?
    A. Strongyloides
    B. Shistosomiasis
    C. Fasciola hepatica flatworm
    D. Ascariasis
    E. Echinococcus

Module 3: Gastrointestinal

Answers



1. A

An increased attenuation of mesenteric fat (typically 40-60HU) is typical in sclerosing mesenteritis on CT.

Ref:

Wat SY. The CT appearances of sclerosing mesenteritis and associated diseases. *Clinical Radiology* 2006; 61(8): 652-658.

2. A

The stellate pattern is characteristic for carcinoid tumor.

Ref:

Wat SY. The CT appearances of sclerosing mesenteritis and associated diseases. *Clinical Radiology* 2006; 61(8): 652-658.

3. A

Carcinoid often appears as a bulbous swelling of the distal third of the appendix, in contrast to adenoc arcinoma which tends to involve the proximal third and causes diffuse thickening of the appendiceal wall.

Ref:

Whitley S *et al*. The Appendix on CT. *Clinical Radiology* 2009; 64(2):190-199.

4. A

Pseudomyxoma peritonei is indicated by ascites and low attenuation masses. The ascites contain septae, which are the margins of mucinous nodules, typically scalloping the

liver edge. Solid non-mucin-producing components cause soft tissue thickening of the peritoneal surface.

Ref:

George C *et al*. Computed tomography appearances of sclerosing encapsulating peritonitis. *Clinical Radiology* 2007; 62(8): 732-737.

5. E

Although all of the above are recognised findings in PMC, colonic wall thickening from minor to gross thickening is the most common feature. The relatively mild pericolonic stranding with marked colonic wall thickening may help to distinguish PMC from other colonic pathologies.

6. C

Fibro fatty mesenteric proliferation around involved colon is more likely to indicate Crohn's disease.

Ref:

Ramachandran I *et al*. Pseudomembranous colitis revisited: spectrum of imaging findings. *Clinical Radiology* 2006; 61(7): 535-544.

7. C

May help differentiate tumour from fibrosis and improves destruction of tumour spread to adjacent structures/vessels. Axial and coronal balanced gradient echo are rapidly acquired breath hold sequences providing anatomical overviews. Granulation tissue, haematoma and radiation-induced

inflammatory change can all display SI similar to tumour. Peripheral enhancement with central necrosis is commonly seen in recurrent disease.

Ref:

Messiou C *et al*. Surgery for recurrent rectal carcinoma: the role of preoperative magnetic resonance imaging. *Clinical Radiology* 2006; 61(3): 250-258.

8. A

Increased small bowel mucosal enhancement (HU > psoas) and mural thickening > 3mm are the most common signs. Colon involvement is infrequent and the small bowel is typically diffusely involved.

Ref:

Tarrant AM *et al*. A pictorial review of hypovolaemic shock in adults. *Br J Radiol* 2008; 81(963): 252-257.

9. A

Peripheral nodular enhancement with central fill-in is characteristic.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagnosis, and Discussion*. 1st edition. Philadelphia: Lippincott Williams & Wilkins. p. 145.

10. A

Typically iso on non-contrast, hyperdense on arterial phase and isodense on portovenous phase. Presence of a central low attenuation scar can be seen in 50% but can also present in adeno and hepatocellular carcinoma.

Ref:

Hussain SM *et al*. Focal nodular hyperplasia: findings at state-of-the-art MR imaging, US, CT, and pathologic analysis. *Radiographics* 2004; 24(1): 3-17.

11. A.

Post-chemotherapy changes to hepatic metastases from breast cancer can cause fine diffuse nodularity resembling cirrhosis known as 'pseudocirrhosis.' B-D cause coarse nodularity rather than fine and diffuse nodules in cirrhosis. Mets is unlikely to mimic cirrhosis.

Ref:

Jha P *et al*. Radiologic mimics of cirrhosis. *AJR Am J Roentgenol* 2010; 194(4): 993-999.

12. A

B-D occur < 12 months, whereas internal hernias and mesocolic constriction of the Roux limb are more chronic complications. Chronic complications with obstruction at the biliopancreatic limb, internal hernias and anastomotic strictures at the common channel are internal hernias and adhesions.

Ref:

Sunnapwar A *et al*. Taxonomy and imaging spectrum of small bowel obstruction after Roux-en-Y gastric bypass surgery. *AJR Am J Roentgenol* 2010; 194(1): 120-128.

13. E

Increased blood volume, increased blood flow, decreased mean transit time and increased permeability are parameters on CT perfusion which have been shown to favour a diagnosis of cancer rather than diverticulitis. C and D have high positive predictive values in diagnosing diverticulitis and A and B occur in both.

Ref:

Goh V *et al*. Differentiation between diverticulitis and colorectal cancer: quantitative CT perfusion measurements versus morphologic criteria--initial experience. *Radiology* 2007; 242(2): 456-462.

14. A

Self-limiting condition with fat density mass 1-4cm between colon and abdominal wall. The absence of blood flow on Doppler due to torsion helps distinguish from acute diverticulitis. Omental infarcts are usually large, right-sided and cake-like in appearance.

Ref:

Almeida AT *et al*. Epiploic appendagitis: an entity frequently unknown to clinicians- diagnostic imaging, pitfalls, and look-alikes. *AJR Am J Roentgenol* 2009; 193(5): 1243-1251.

15. A

In serous cystadenoma of the pancreas, the polycystic pattern with cysts < 2cm represents 70% of cases. The honeycomb pattern occurs in 20% and macro/oligocytic type in 10%. Giant subcutaneous serous cystic change with intraluminal

haemorrhage and solid serous cystadenoma are atypical manifestations.

Ref:

Choi JY *et al*. Typical and atypical manifestations of serous cystadenoma of the pancreas: imaging findings with pathologic correlation. *AJR Am J Roentgenol* 2009; 193(1): 136-142.

16. A

Oesophagus is most frequently affected (75-90%) followed by anorectum (50-70%), small bowel (40%) and colon (10-50%). The stomach is the least affected in the GIT.

Ref:

Madani G *et al*. The role of radiology in the management of systemic sclerosis. *Clinical Radiology* 2008; 63(9): 959-967.

17. C

The cyst within cyst appearance represents daughter cyst. Other features include wall calcification.

18. A

FLC is usually a solidly lobulated well-defined turn, usually low attenuation on unenhanced CT and an even lower attenuation central scar, often with punctate calcification. Delayed enhancement of the scar can occur in both FNH and FLC. However, the scar does not calcify in FNH.

19. C

Irresectable tumours include those with main PV or main HA invasion, those with both right and left PV or both right and left HA involvement, or involvement of a PV branch to one lobe and a HA branch to other lobe.

20. E

In Mirrizzi's sign, the CBD below the level of the impacted gallstone is not dilated.

21. A

Features of MEN2A include parathyroid hyperplasia, medullary T cell carcinoma of the thyroid, and phaeochromocytoma. MEN2A may also be associated with carcinoid and Cushing's.

22. A

The most likely primary tumor leading to a metastatic deposit to the pancreas is renal cell carcinoma. These metastases are usually solitary and heterogeneously enhancing masses with increased attenuation relative to the pancreas.

23. A

Glucagonomas are predominantly in pancreatic body/tail, mean size 6.4cm and hypervascular. Somatostatinomas are predominantly in pancreatic head/duodenum of ampulla of Vater.

24. A

VIPOMA are usually in the pancreatic body/tail (75%). Extrapancreatic locations include retroperitoneal ganglioblastoma, phaeochromocytoma, lung, neuroblastoma (in children). 50-80% of VIPOMAs undergo malignant transformation.

25. A

Uncommon and late complication of RFA. In patients with HCC, tumour seeding occurred in 8/1610 cases in a multicentre study and 1/187 in a single series lesions with subcapsular location. Invasive tumour pattern/poorly differentiated are at higher risk. Mortality rates are typically 0.1-0.5%, major complications 2.2-3.1%, and minor complications 5-8.9%.

Ref:

Lencioni R. Percutaneous image-guided radiofrequency ablation of liver tumors. *Abdom Imaging* 2009; 34(5): 547-556.

26. A

Hernia more common in laparoscopic approaches occur in the mesocolic, Peterson's and mesomesenteric defects. Obstruction commonly occurs in the afferent (biliopancreatic) limb causing distension of the very proximal jejunum, duodenum and remnant stomach. Remnant stomach should be relatively decompressed.

Ref:

Kendrick ML. Partial small bowel obstruction: clinical issues and recent technical advances. *Abdom Imaging* 2009; 34(3): 329-334.

27. A

Band should be perpendicular to GOJ on scout film. Position is best assessed straight AP or slightly RPO. Band slipping leads to eccentric pouch dilation. Perforation typically < 0.5%

Ref:

Trenkner SW. Imaging of morbid obesity procedures and their complications. *Abdom Imaging* 2009; 34(3): 335-344.

28. A

Common acquired outpouchings of the mucosa and submucosa located along the medial wall of the duodenum within 2cm of the ampulla of Vater. 25% arise from D3/4. Reported in 1-5% of upper GI fluoroscopic studies.

Ref:

Ames JT *et al*. Perforated duodenal diverticulum: clinical and imaging findings in eight patients. *Abdom Imaging* 2009; 34(2): 135-139.

29. A

Rapid washout and residual hypoechoic lesions are features of metastatic deposit.

Ref:

Bartolotta TV *et al*. Focal liver lesions: contrast-enhanced ultrasound. *Abdom Imaging* 2009; 34(2): 193-209.

30. A

T3 disease usually involves a large tumour more than 10mm in depth where > ⅓ tumour extension or a blurred fat plane around the lesion is associated with moderate/severe stenosis. Focal wall thickening of 5-15mm is still T2 disease.

Ref:

Ba-Ssalamah A *et al*. Dedicated multi-detector CT of the esophagus: spectrum of diseases. *Abdom Imaging* 2009; 34(1): 3-18.

31. E

Although AIH has a wide variability in imaging appearances, from normal to end-stage chronic liver disease, the most common feature on CT and MR in one series is surface nodularity.

Ref:

Sahni VA *et al*. Autoimmune hepatitis: CT and MR imaging features with histopathological correlation. *Abdom Imaging* 2010; 35(1): 75-84.

32. A

The only reliable feature on imaging indicating an infected collection is the presence of gas bubbles. All three types of pancreatic necrosis, organised central gland and extrapancreatic are associated with post-necrotic fluid collection. Necrotic pancreatitis becomes infected in 40-70%, most often with gram negative enteric bacteria.

Ref:

Delrue LJ *et al*. Acute pancreatitis: radiologic scores in predicting severity and outcome. *Abdom Imaging* 2010; 35(3): 349-61.

33. A

Most common source of FP in CAD in cathartically prepared CT colonography. Untagged/poorly tagged stool is the second most common FP in cathartically prepared and most common source of FP in non-cathartically prepared CT colonography.

34. B

Most cases demonstrate hyperdense nodules on the non-contrast study, some of which became isodense with contrast. A honeycomb appearance is seen in portal and parenchymal phases and on T2 sequences on MR.

35. A

Parietal nodules and focal wall thickening are useful indicators in detecting malignant branch IPMT but there is a high incidence of false positive errors. IPMT has a slightly higher incidence in males.

36. A.

B-D are cases of irregular and thickened distal folds in non-dilated small bowel.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 248.

37. A

Mucosal tears from Mallory-Weiss syndrome or post-endoscopy are typically in the lower ⅓ of the oesophagus.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 226.

38. A

Scleroderma, strongyloides, and cystic fibrosis are causes of decreased/absent folds. Crohn's and amyloidosis can cause decreased or increased folds.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p.241.

39. A

The urinary bladder and rectum are thickened and oedematous and can show increased T2 and SI. Post-radiotherapy, the ovaries tend to atrophy and therefore decrease in SI but bone marrow, fibrous, glandular tissue can also show increased SI.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd.

40. A

Fatty infiltration, malignant infiltration, Budd-Chiari and amyloidosis all demonstrate generalized low density on pre-contrast CT.

41. A

Opiates, severe hepatitis and CBD obstruction are causes of non-visualisation and no bowel activity. B-D cause bowel activity.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 1306.

42. A

CTF helps to delineate fistulous tracks in critically ill patients where prolonged contrast studies are not feasible. Iodinated contrast (300mg iodine/ml) should be diluted 1 in 10, with a volume based on an estimate of the length of bowel or volume of cavity being investigated. Oral contrast can confuse the origin of intraluminal contrast and is best avoided, whereas IV contrast is helpful. Conventional fistulography has a higher spatial and temporal resolution.

Ref:

Davidson J *et al*. Adult intestinal failure. *Clinical Radiology* 2010; 65(5): 395-402.

43. C

CEUS can be used to characterise focal liver lesions with 96.6% accuracy. Small HCC (1-2cm) can be diagnosed due to arterial phase hypervascularity and washout characteristics.

Ref:

Goyal N *et al*. Non-invasive evaluation of liver cirrhosis using ultrasound. *Clinical Radiology* 2009; 64(11): 1056-1066.

44. E

These sequences have become the main MR technique for imaging small and large bowel in Crohns disease in recent years. Uniform luminal opacification is obtained with high contrast between bowel wall, lumen and mesentery. The sequences are relatively insensitive to motion artefact. Black boundary artefact can obscure small lesions on the bowel wall, although fat-suppression can reduce the artefact.

Ref:

Sinha R *et al*. Role of MRI in Crohnís disease. *Clinical Radiology* 2009; 64(4): 341-52.

45. A

Preservation of the fat plane around the stomach, diffuse and homogenous wall thickening, multifocal disease within the stomach, nodal disease either side of the mesenteric vessels, nodal disease extending below the level of the renal veins and a propensity for the distal half of the stomach are all features of gastric lymphoma.

Ref:

Hargunani R *et al*. Cross-sectional imaging of gastric neoplasia. *Clinical Radiology* 2009; 64(4): 420-429.

46. E

Stomach GISTs tend to present in patients over 50. CT usually shows a well-defined heterogeneously enhancing, round, exophytic mass, commonly with central necrosis. Mural calcification is recognised but not common. Stomach GISTs tend to be less aggressive histologically than GISTs at other sites.

Ref:

Hargunani R *et al*. Cross-sectional imaging of gastric neoplasia. *Clinical Radiology* 2009; 64(4): 420-429

47. A

An inflamed Meckel's diverticulum can be difficult to distinguish from a duplication cyst in the terminal ileum. However, a characteristic double-layered wall is seen in duplication cysts, whereas the other features are more often found in an inflamed Meckel's diverticulum.

Ref:

Thurley PD *et al*. Radiological features of Meckel's diverticulum and its complications. *Clinical Radiology* 2009; 64(2): 109-118.

48. A

Hepatic artery thrombosis occurs in 2-12% of cases, usually between 15-132 days post-operatively. The donor celiac axis is anastmosed to the recipient hepatic artery in orthoptic liver transplants. This can be either at the bifurcation of the hepatic into the right and left hepatic arteries, or at the takeoff of the gastroduodenal artery. As the hepatic artery

is the only vascular supply to the bile ducts, hepatic artery thrombosis and stenosis can lead to biliary ischemia.

Ref:

Singh AK *et al*. Postoperative imaging in liver transplantation: what radiologists should know. *Radiographics* 2010; 30(2): 339-351.

49. B

The MERCURY Trial showed patients with T3 disease with more than 5mm of extramural spread have a markedly worse prognosis than those with less than 5mm spread beyond the outer muscle layer. A distance less than 2mm from mesorectal fascia indicated CRM involvement. Tumour signal is usually in between SI of muscle and fat. Mucinous tumour is higher signal than non-mucinous which is higher than fat on T2.

Ref:

Barbaro B *et al*. Restaging locally advanced rectal cancer with MR imaging after chemoradiation therapy. *Radiographics* 2010; 30(3): 699-716.

50. B

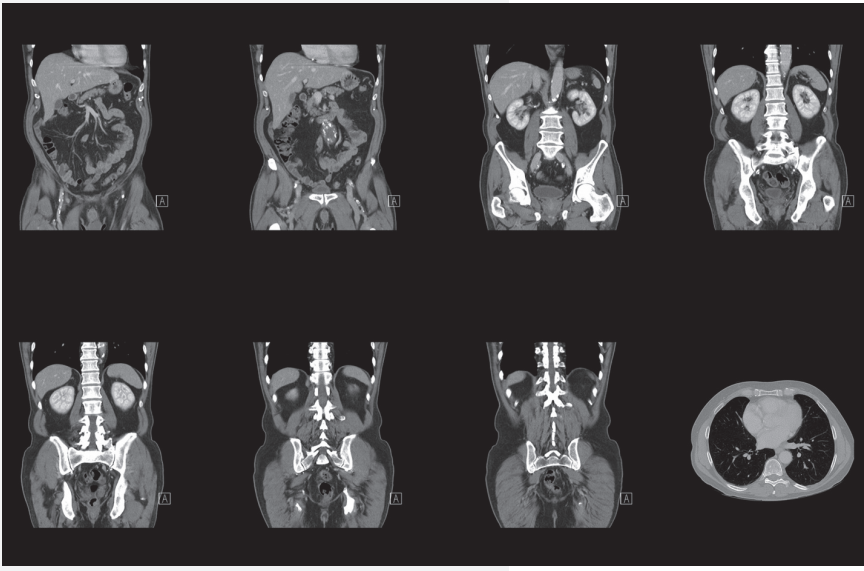
Schistosomiasis is the most likely cause. Periportal fibrosis with signs of portal hypertension, splenomegaly and siderotic nodules are typical features of hepatosplenic schistosomiasis.

Ref:

Ortega CD *et al*. Helminthic diseases in the abdomen: an epidemiologic and radiologic overview. *Radiographics* 2010; 30(1): 253-67.

Module 4: Genitourinary, adrenal, obstetrics & gynaecology and breast

Question Bank



1. A 55-year-old man begins to feel unwell after RFA to his right kidney. Considering post-RFA syndrome, which is the single best answer?
   A. Flu-like symptoms and myalgia 10 days post-procedure
   B. Haemorrhage is the most common major complication
   C. Urinomas from urine leaks are common
   D. Cell death occurs at temperatures higher than 40 °C with complete tumour necrosis at 50-60°C
   E. Involves conversion of high-pressure argon gas to cold low-pressure liquid by using the Joule-Thomson effect

2. Which of the following favour chronic rather than acute/subacute torsion of the spermatic cord?
   A. Enlarged testis with spherical morphology
   B. Good identification of the lobular architecture of the affected testis
   C. Thickened mediastinum, less echogenic than contralateral
   D. Enlarged and more spherical epididymis
   E. Hypoechoic small and harder testis

3. Oncocytosis is considered in a 50-year-old man with bilateral renal masses. Which is the single best answer regarding oncocytosis?
   A. Account for 2% of all renal cortical tumours
   B. Multifocality bilateralism and metachronous tumours occur together in 4-6%
   C. In multifocal cases co-existent RCC is present in 50% of cases
   D. Often have preserved renal function
   E. The final diagnosis can be made on MR above

4. Infiltrating papillary TCC is diagnosed from a mass at the renal pelvis. Which is the single best answer?
   A. 50% of TCC are infiltrating papillary tumours
   B. Have a broad base and frond-like morphology
   C. On CT have a density lower than urine and higher than renal parenchyma
   D. CT value of TCC is around 50-60 HU
   E. Demonstrate avid enhancement post-contrast

5. Which of the following favours a diagnosis of infiltrating papillary TCC rather than ureteral endometriosis?
   A. Location in proximal third of ureter
   B. Age 35 years
   C. An intramural nodule
   D. Soft tissue component outside ureter larger than in it
   E. High signal intensity on T1 and 'shading' on T2

6. Regarding yolk sac tumours of ovary:
   A. Are the most common malignant germ cell tumour of the ovary
   B. Account for 5% of all ovarian malignancy
   C. Carry a poorer prognosis than any other ovarian germ cell tumour
   D. Haemorrhagic change is very rare
   E. Are slow growing tumours

7. A 60-year-old man with elevated PSA and a Gleason 4+3 tumour undergoes investigation with MRI of the prostate. Which is the single best answer?
   A. Tumour of the gland is low signal on T2
   B. Tumour appears bright on the Apparent Diffusion Coefficient (ADC)
   C. Tumour appears dark on high b-value DWI images
   D. Seminal vesicle involvement indicates T2 disease
   E. The inguinal nodes are the first to enlarge with disease progression

8. Which of the following indicates T3 disease in a 66-year-old man with bladder cancer?
   A. Invasion of perivisical fat
   B. Tumour size 2.5cm
   C. Tumour invading inner half or superficial muscle
   D. Tumour invading deep muscle
   E. Invasion of the rectum

9. In a 40-year-old woman with seizures and bilateral renal masses, with the appearance of multiple angiomyolipomas, which is the single best answer?
   A. Sporadic solitary Angiomyolipoma (AML) have a female preponderance
   B. Account for 50% of all renal AMLs
   C. Are associated with tuberous sclerosis
   D. Warrant treatment due to risk of bleeding when > 2cm
   E. Are typically hypoechoic on US

10. Granulosa cell ovarian tumour is diagnosed following removal of a complex pelvic mass. Which is the single best answer?
    A. Account for 15% of ovarian tumours
    B. The juvenile subtype is more common
    C. Has a rapid rate of growth
    D. Recurrent disease is almost always in the first two years after treatment
    E. Variable imaging appearances are recognised from uniloculated cystic masses to solid masses

11. Which is a cause of dilated calyx with wide infundibuli?
    A. Post-obstructive uropathy
    B. Structure secondary to calculus
    C. Structure secondary to TB
    D. Extrinsic compression by an artery
    E. Hydrocalycosis

12. During MR of the spine a 2cm renal lesion is identified at the upper pole cortex of the RK. The lesion is well-defined and is of high SI on T1 and T2 images. Ultrasound shows normal Doppler flow in the renal vein which is separate from the lesion, which is echogenic on US. The findings are most likely to represent which of the following?
    A. AML
    B. Atypical cyst
    C. Abscess
    D. RCC
    E. Lymphoma

13. Which of the following causes immediate faint persistent nephrogram on Intravenous Urogram (IVU)?
    A. Renal vein thrombosis (RVT)
    B. Acute obstruction
    C. Acute hypotension
    D. Acute tubular necrosis
    E. Chronic obstruction

14. Which is the cause of rim nephrogram?
    A. Acute complete arterial occlusion
    B. Acute ureteric obstruction
    C. Polycystic kidney disease
    D. Medullary sponge kidney
    E. Acute pyelonephritis

15. Regarding molar pregnancy ultrasound:
    A. High velocity, low impedance waveforms on Doppler occur for later in a molar pregnancy than in a normal pregnancy
    B. The uterine artery Pulsatility Index (PI) is proportional to arterovenous shunting
    C. Patients with a low P1 are more likely to become resistant to single drug therapy with methotrexate
    D. Low impedance waveforms with high diastolic velocities are findings in a normal pregnancy
    E. A minimum normal UAPI is > 2.5

16. A 45-year-old female with a six-month history of urinary tract symptoms undergoes CT showing an enlarged right kidney with a large staghorn calculus and hydronephrosis. The renal parenchyma is replaced by multiple confluent fluid-filled masses. Open nephrectomy histology from the right kidney reveals lipid laden foamy macrophages in combination with an inflammatory granuloma and a lymphoplasmocytic infiltrate. What is the most likely diagnosis?
    A. Xanthogranulomatous pyelonephritis
    B. Renal lymphoma
    C. Renal TB
    D. Malakoplakia
    E. Nephrocalcinosis

17. Non seminomatous Germ Cell Tumour is diagnosed in a 30-year-old man. Which is the single best answer?
    A. Non seminomatous Gem Cell Tumour from the majority of testicular Gem Cell Tumour
    B. Left-sided tumours frequently metastasize to left PA nodes just above level of left renal vein
    C. Right-sided tumours spread initially to aortocaval lymph nodes
    D. Echelon nodes are usually left-sided nodes lateral to PA nodes
    E. Imaging appearances of nodal disease at late relapse is often more predictable than at initial presentation

18. Involvement of which of the following indicates the poorest prognosis in recurrent endometrial cancer?
    A. Spleen
    B. Vagina
    C. Lung
    D. Bladder
    E. Well-differentiated tumour at original surgery

19. Which of the following most favours a diagnosis of adult prostate sarcoma rather than adenocarcinoma?
    A. Age of patient: 50
    B. Size of tumour: 2.3cm
    C. Absence of calcification
    D. Solid and cystic components
    E. Invasion of the bladder wall

20. Considering solid lesions of the paratesticular space, which is the most common benign tumour?
    A. Adenocarcinoid tumour
    B. Lipoma
    C. Haemangioma
    D. Leiomyomas
    E. Papillary cystadenomas

21. In a patient who had a right nephrectomy ten years ago for RCC, a 3cm lesion in the cortex of the lower pole of the left kidney is evaluated with MRI. This appears isointense on the in-phase sequence and low SI on the opposed phase sequence. No other renal lesions are demonstrated. The renal veins appear normal. What is the most likely diagnosis?
    A. AML
    B. Simple cyst
    C. Oncocytoma
    D. RCC
    E. Metastatic deposit

22. In prostate cancer, which best describes changes in Magnetic Resonance Spectroscopy (MRS)?
    A. Elevated choline
    B. Reduced citrate
    C. Elevated choline:citrate ratio
    D. Elevated citrate:choline ratio
    E. Combining MRI with MRS has no increased accuracy in diagnosis of prostate cancer

23. A patient informs you she has a medical condition prior to pelvic MRI for evaluation of a pelvic malignancy. Which of the following would contraindicate buscopan injection?
    A. Hypertension
    B. Angina
    C. CABG 3 years ago
    D. Myasthenia gravis
    E. Multiple sclerosis

24. In dynamic renal imaging:
    A. The patient must not eat or drink for 6 hours prior to the test
    B. Provides information on total and divided function only
    C. Total divided renal function are evaluated in addition to rates of transit through parenchyma and outflow track
    D. Diethylene triamine pentaacetic acid (DTPA) has the advantage of higher renal concentration than inulin
    E. DTPA is excreted by glomerular filtration and tubular excretion

25. A 30-year-old man with known Hep B surface Antigen (HBsAg), abdominal pain, malaise and weight loss is diagnosed with Polyarteritis nodosa (PAN). Which of the following is true?
    A. Affects small arteries only
    B. Causes aneurysms which are usually 5-10mm in size
    C. Produces moth-eaten nephrograms after thrombosis of the microaneurysms
    D. Angiography has significantly higher sensitivity than specificity in diagnosis
    E. Angiography has a much higher positive predictive value (PPV) compared with negative predictive value (NPV)

26. A 29-year-old female with new onset hypertension has normal renal tract ultrasound. Magnetic resonance Angiography (MRA) is performed which demonstrates narrowing at the distal right main renal artery. Which is the most likely diagnosis?
    A. Renal artery stenosis
    B. Fibromuscular dysplasia
    C. Arteriosclerotic RA disease
    D. Neurofibromatosis
    E. Polyarteritis nodosa

27. A 3cm cystic lesion is seen on CT. Thickened septae are noted, with nodular areas of calcification, with solid non-enhancing areas. Which of the following Bosniak classification best describes the lesion?
    A. I
    B. II
    C. IIF
    D. III
    E. IV

28. Which of the following indicates T2 disease in renal cell carcinoma?
    A. Perinephric fat involvement
    B. Tumour size > 2.5cm
    C. Tumour involvement of renal vein
    D. Tumour involvement of adrenal gland
    E. IVC involvement

29. Regarding lymphoma of the kidneys:
    A. Multiple focal nodules appear hyperdense on CT
    B. Involved kidneys are usually atrophic
    C. Focal masses appear high signal on T1
    D. Focal masses appear hyperintense on T2
    E. CT may demonstrate sheet like diffuse infiltration of perirenal tissues

30. Regarding metastatic sites of disease to the kidney:
    A. Are frequently symptomatic
    B. Usually occur from direct invasion
    C. Haematogenous metastasis are usually > 3 cm
    D. Are usually hypovascular on CT
    E. Commonly calcify

31. Which of the following most favours RCC rather than TCC?
    A. A central hypoechoic lesion on US
    B. Intraluminal soft tissue mass in the calyx
    C. Renal vein invasion
    D. Infiltration of renal sinus
    E. Contrast outlining tumour in the pelvis

32. Considering Squamous Cell Carcinoma (SCC) of the kidney:
    A. Is the second most common tumour subtype affecting the kidney
    B. Usually carries a better prognosis than RCC
    C. Is usually indolent
    D. Acute infection is involved in the aetiology
    E. Renal calculi are present in most patients

33. Which is a cause of cortical rather than medullary nephrocalcinosis?
    A. Acute cortical necrosis
    B. Hyperoxaluria
    C. Hypervitamosis D
    D. Sarcoidosis
    E. Renal tubular acidosis

34. Regarding hydronephrosis of pregnancy:
    A. Left-sided dilated predominates
    B. Occurs predominantly due to maternal hormones decreasing ureteric tone
    C. Persists at most 3-4 days postpartum in most cases
    D. Occurs in 90% of pregnant women by third trimester
    E. Usually involves the entire length of the uterus

35. Which of the following is a neoplasm affecting the breast that is least likely to contain bone cartilage or osteoid tissue?
    A. Lymphoma
    B. Intraductal papillomas with stromal metaplasia
    C. Phyllodes cystosarcoma
    D. Stromal sarcomas
    E. Adenocarcinomas with epithelial metaplasia

36. Regarding endometrial carcinoma on MR:
    A. Normal zonal anatomy is best demonstrated on T1
    B. Tumour is typically higher signal compared with endometrial lining on T2
    C. Tumour is typically higher signal intensity than myometrium
    D. Enhances faster than myometrium on dynamic contrast enhancement
    E. Usually low SI than brightly enhancing normal myometrial tissue after contrast

37. Which of the following ovarian masses appear more cystic than solid?
    A. Endometriosis
    B. Metastases
    C. Fibroma
    D. Lymphoma
    E. Arrhenoblastoma

38. Which of the following is least likely to suggest a malignant lesion in the breast?
    A. Thin halo
    B. Ill-defined margin
    C. Spiculated morphology
    D. Inhomogeneity
    E. Focal ductal dilation

39. Which of the following is best at distinguishing fibroadenoma from a carcinoma?
    A. Poor reflectivity
    B. Homogenous echopattern
    C. Ill-defined mass
    D. Absent far wall echoes
    E. Posterior acoustic shadowing

40. MRI shows two separate normal sized uteri and cervices with a septum extending into the upper vagina. The two uteri are widely separated, with preservation of the endometrial and myometrial widths. What name is given to this abnormality?
    A. Uterus didelphys
    B. Mullerian agenesis
    C. Unicornate uterus
    D. Uterus bicornuate
    E. Septate uterus

41. HSG shows small diverticular outpouchings in the isthmic portion of the right fallopian tube with distal tube occlusion. What is the diagnosis?
    A. Salpingitis isthmica nodosa (SIN)
    B. Tubal polyps
    C. Adenomyosis
    D. Asherman's syndrome
    E. Ectopic pregnancy

42. Regarding retroperitoneal fibrosis(RPF):
    A. Is common in females in the primary form
    B. Beta-blockers are a common cause
    C. Desmoplastic response to malignancy is the most common case in secondary RPF
    D. Causes lateral deviation of the mid ureter
    E. In the primary form responds to steroids

43. Which is the most likely to cause bilateral small rather than large kidneys?
    A. Medullary cystic disease
    B. Multiple myeloma
    C. PAN
    D. Glycogen storage disease
    E. Acute glomerulonephritis

44. Regarding clear cell tumour of the ovary:
    A. Are rarely invasive
    B. Represents > 20% of ovarian carcinomas
    C. Most patients present at stage 2 disease
    D. Frequently occurs as a unilocular cyst with mural nodule
    E. Has a poorer survival rate compared with other ovarian cancers

45. Regarding mucinous ovarian tumours:
    A. Are most commonly mucinous cystadenocarcinomas
    B. Account for the most common benign epithelial neoplasias of the ovary
    C. Are most common in the post-menopausal population
    D. Rupture may lead to pseudomyxoma peritoneii
    E. When mucinous, cystadenomas are unilocular cysts with few septa

46. Regarding ovarian fibromas:
    A. Demonstrate rapid enhancement on CECT
    B. Commonly present as Meigs' syndrome
    C. Are usually bilateral
    D. Usually hyperechoic on ultrasound
    E. Low on T1 and T2, less or equal to myometrium

47. A 50-year-old female undergoes CT for an echogenic lesion on ultrasound. Pre-contrast CT shows a lesion, which is well-defined and has increased attenuation (60HU). Post-contrast the lesion appears low in attenuation related to the surrounding parenchyma (61 HU). The diagnosis is:
    A. Haemorrhagic renal cell carcinoma
    B. Angiomyolipoma (AML) that has bled
    C. Lymphoma
    D. Haemorrhagic renal cyst
    E. AML

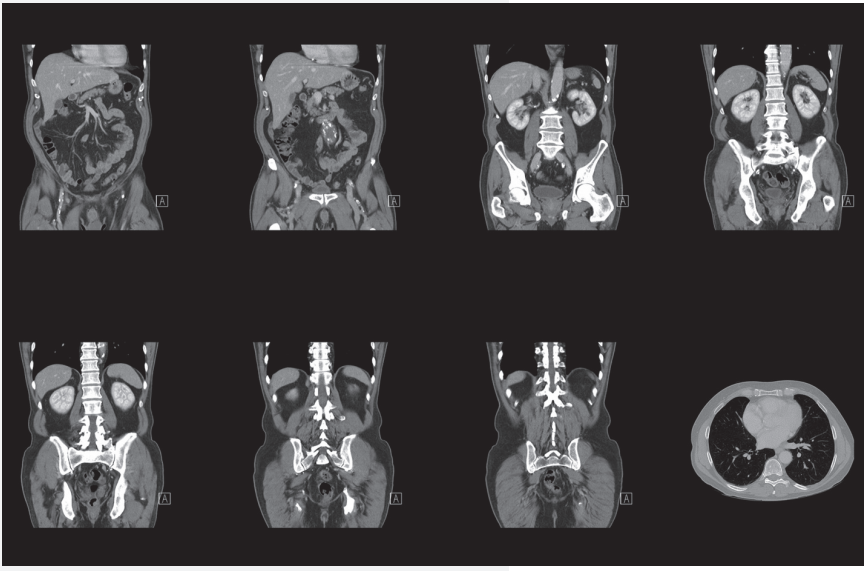
48. A 40-year-old diabetic presents with Urinary Tract Infection (UTI). Abdominal radiograph demonstrates small rounded curvilinear lucencies outlining the bladder wall. What is the diagnosis?
    A. Emphysematous cystitis
    B. Enterovesical fistula
    C. Penetrating trauma
    D. Post-cystoscopy
    E. Pneumatosis intestinalis

49. Regarding MRI prostate seminal vesicles:
    A. Usually low on T2
    B. Usually high SI on Diffusion Weighted Imaging (DWI)
    C. Typically have low ADC values
    D. Are high signal on T2 when atrophic
    E. Are low signal when invaded with tumour

50. Regarding prostate MR:
    A. The Peripheral Zone (PZ) and Transitional Zone (TZ) are difficult to distinguish on MR
    B. Volume of prostate gland > 60cc precludes brachytherapy
    C. The normal PZ is typically heterogeneous on T2
    D. Haemorrhage appears as low SI on T1
    E. Tumours occur more commonly in TZ than PZ

Module 4: Genitourinary, adrenal, obstetrics & gynaecology and breast

Answers



1. B

Post-RFA syndrome occurs 24-48 hours post-ablation. It is a likely inflammatory response to tumour necrosis or cytokine production. Persistence of fever beyond day 10 should be evaluated for infection. Haemorrhage is most commonly seen in central tumours. Ureteral strictures and urinomas are rare.

Ref:

Saksena M *et al*. Percutaneous renal tumor ablation. *Abdom Imaging* 2009; 34(5): 582-587.

2. E

Absence of hydrocele and normal scrotal wall/skin are other features of chronic torsion.

Ref:

Prando D. Torsion of the spermatic cord: the main gray-scale and doppler sonographic signs. *Abdom Imaging* 2009; 34(5): 648-661.

3. B

Co-existent RCC in 10% of cases. Due to diffuse bilateral renal involvement patients with oncocytosis often present with abnormal renal function. Final diagnosis is by biopsy.

Ref:

Ariaratnam N *et al*. Renal oncocytosis: imaging considerations. *Abdom Imaging* 2009; 34(2): 261-264.

4. B

Over 85% of TCCs are infiltrating papillary tumours. CT density is 8-30 HU, slightly higher than urine and lower than renal parenchyma. Post-contrast there is mild to moderate enhancement to 18-55Hu.

Ref:

Wang J *et al*. Transitional cell carcinoma of upper urinary tract vs. benign lesions: distinctive MSCT features. *Abdom Imaging* 2009; 34(1): 94-106.

5. A

Ureteral endometriosis is usually in childbearing age and in the lower third of ureters, often co-existent with other sites of abdominal and pelvic disease.

Ref:

Wang J *et al*. Transitional cell carcinoma of upper urinary tract vs. benign lesions: distinctive MSCT features. *Abdom Imaging* 2009; 34(1): 94-106.

6. C

Yolk sac tumours are well-enhanced tumours consisting of mixed solid and cystic tissue with some area of haemorrhage. A 'bright dot' sign is recognised; a well-enhanced dilated vessel on the post-contrast image. Yolk sac tumours have a poor prognosis. They account for 1% of ovarian malignancies. They are the second most common malignant germ cell tumour after dysgerminomas.

Ref:

Choi HJ *et al*. Yolk sac tumor of the ovary: CT findings. *Abdom Imaging* 2008; 33(6): 736-739.

7. A

Tumor appears as a focus of low signal compared to the normal high signal peripheral zone on T2. T3 disease indicates extracapsular extension and/or seminal vesicle involvement. Tumour appears dark on ADC and bright on high b-value DWI images. Obturator nodes are first to become involved.

8. A

Invasion of perivesical fat indicates T3 disease. Invasion of surrounding organs, pelvic or abdominal wall is T4 disease. T1-T2b tumours are treated with a conservative approach including TURB and local chemotherapy, whereas radical cystectomy and urinary diversion are reserved for invasive cancer.

Ref:

Panebianco V *et al.* Bladder carcinoma: MDCT cystography and virtual cystoscopy. *Abdom Imaging* 2010; 35(3): 257-264.

9. C

Those AML associated with tuberous sclerosis are multifocal, bilateral, larger and present in a younger age group. AML appear echogenic on US.

10. E

Represent 70% of malignant sex cord stromal tumours, but only 2-5% of all ovarian tumours have an unpredictable and indolent course with relapse occurring up to several years after initial diagnosis. The adult subtype accounts for 95% of all GCTs.

Ref:

Rha SE *et al*. Recurrent ovarian granulosa cell tumors: clinical and imaging features. *Abdom Imaging* 2008; 33(1): 119-125.

11. A

Answers B-E are causes with narrow infundibuli.

12. A

AML appears increased on S1 on T1+T2 and is echogenic on US.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p.330.

13. A

Acute glomerulonephritis, RVT and chronic severe ischaemia are all causes of immediate faint persistent nephrogram.

14. A

Acute complete arterial occlusion and severe hydronephrosis are causes of a rim nephrogram. B-E are causes of a striated nephrogram.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 337.

15. C

Minimal normal UAPI > 1.5. High velocity low impedance waveforms on Doppler are findings in a normal pregnancy but are found in the first and second trimesters in molar

pregnancy (far earlier than in a normal pregnancy). Low P1 indicate increased AV shunting and are more likely to become resistant to single drug therapy with methotrexate.

Ref:

Allen SD *et al*. Radiology of gestational trophoblastic neoplasia. *Clinical Radiology* 2006; 61(4): 301-313.

16. A

A rare form of low-grade chronic renal infection with progressive destruction of renal parenchyma, XGP is more common in women and in 50-60 age group. Most cases are diffuse. E.coli and P.mirabils are the most common organisms in these patients with UTI.

Ref:

Loffroy R *et al*. Xanthogranulomatous pyelonephritis in adults: clinical and radiological findings in diffuse and focal forms. *Clinical Radiology* 2007; 62(9): 884-890.

17. C

Late relapse > 2 years after CR, in absence of second primary tumour. Occurs in up to 7% of patients with less predictable pattern of nodal spread. NSGT form 40% of testicular GCT compared with 60% seminomatous. Left-sided tumours metastasize to left PA nodes below the level of the renal vein. Echelon nodes are usually right-sided, anterior to right psoas.

Ref:

Rutherford EE *et al*. Late relapse of metastatic non-seminomatous testicular germ cell tumours. *Clinical Radiology* 2006; 61(11): 907-915.

18. A

Splenic, liver and multiple sites of disease are independent predictors of poor outcome.

Ref:

Sohaib SA *et al*. Recurrent endometrial cancer: patterns of recurrent disease and assessment of prognosis. *Clinical Radiology* 2007; 62 (1): 28-34.

19. D

Prostatic sarcomas represent 0.1% of all primary prostate malignancy in adults. Mean age is younger than that of adenocarcinoma. Typically presents as a large solid and cystic mass with rapid hypervascular and heterogenous soft tissue occupying all or most of the prostate.

Ref:

Ren FY *et al*. Adult prostate sarcoma: radiological-clinical correlation. *Clinical Radiology* 2009; 64(2): 171-177.

20. A

30% of all paratesticular masses and most common benign neoplasm. Hamartomatous lesions are of probable mesothelial origin in young adults and usually present either as a painless mass or an incidental finding.

21. A

Demonstration of fat within a renal mass on CT or MRI is diagnostic of AML.

Ref:

Lenton J. Embolization of renal angiomyolipoma: immediate complications and long-term outcomes *Clinical Radiology* 2008; 63(8): 864-870.

22. C

Elevated choline + creatine: citrate ratio best describes MRS features of prostate cancer.

23. D

Antimuscarinics are contraindicated in myasthenia gravis (but may be used to decrease the muscarinic side effects of anticholinesterases), paralytic ileus, pyloric stenosis and prostatic enlargement. They should be used with caution in Down's syndrome, GORD, diarrhoea, ulcerative colitis, acute myocardial infarction, hypertension, conditions characterised by tachycardia (hyperthyroidism, cardiac insufficiency, cardiac surgery), pyrexia, pregnancy and in individuals susceptible to angle closure glaucoma. HBB improves image quality and lesion visualisation in oncologic pelvic MR.

Ref:

Johnson W *et al*. The value of hyoscine butylbromide in pelvic MRI. *Clinical Radiology* 2007; 62(11): 1087-1093.

24. C

This investigation requires a hydrated patient to lie supine with knees slightly flexed to reduce lumbar lordosis. DTPA is handled the same way as inulin. D and E are correct for MAG3.

25. C

Affects medium and small arteries. Aneurysms are 2-3cm in size, which when thrombosed produce moth-eaten nephrogram. Angiography has high sensitivity and specificity but a much higher negative than positive predictive value in diagnosis. Diagnosis is often made with clinical features and angiography.

26. B

FMD accounts for 35% of RAS. It is more common in children and young adults, affecting a greater amount of females than males. It is associated with hypertension and progressive renal insufficiency. FMD occurs bilaterally in $\frac{2}{3}$ of cases and R > L 4:1. It usually affects the mid distal renal artery and there can be a beaded appearance of artery.

27. D

Class II have at least one thin septa traversing them (< 1mm) and they have an appearance of thin areas of mural calcification or fluid content with greater attenuation. These lesions are benign however IIF with numerous class II features should be followed up. Class III features as above are indicative of malignancy and biopsy or surgical exploration is necessary. Type IV cystic lesions are clearly malignant.

28. B

Stage T2 disease is indicated when the tumour size is greater than 2.5cm.

29. E

Diffuse infiltration leads to renal enlargement. Focal lesions have a characteristic usually low attenuation post-contrast on CT, low SI on T1 and hypo-isointense on T2.

30. D

Metastases are usually small (< 3cm), multiple and confined to cortex. The most common mode of spread is haematogenous. Metastases tend not to invade the renal vein or calcify; they are more infiltrative, less exophytic compared with renal cell carcinoma.

31. C

In TCC inferior vena caval and renal vein invasion are uncommon.

32. E

SCC of the kidney is a relatively rare condition. It carries a poor prognosis due to its aggressive nature. Both renal calculi and chronic infection have been implicated in its aetiology. Cross sectional imaging appearances are identical to those of TCC.

33. A

Acute cortical necrosis causes cortical nephrocalcinosis, whereas B-E are causes of medullary nephrocalcinosis.

34. D

In most women dilatation disappears postpartum. Resolution can take between a few days to several weeks. Maternal hormones play a minor part. Right-sided hydronephrosis is more common.

35. A

B-D can contain bone, cartilage and osteoid tissue. Osteogenic sarcomas may also arise from sarcomatous transformation of connective tissue elements of pre-existing breast neoplasms.

Ref:

Choudhary S *et al*. Case report: Osteosarcoma of the breast--an unusual presentation. *Clinical Radiology* 2006; 61(3): 291-293.

36. E

Endometrial tumours are usually isointense to myometrium on T1 and lower SI to endometrial lining on T2. Tumours demonstrate slower enhancement on DCE than myometrium. Normal zonal anatomy is clearly depicted on T2.

Ref:

Barwick TD *et al*. Imaging of endometrial adenocarcinoma. *Clinical Radiology* 2006; 61(7): 545-555.

37. A

Cystadenocarcinoma, dermoid abscess, endometriosis and ectopic pregnancy are examples of cystic ovarian masses.

38. A

A wide halo is more suggestive of a malignant lesion but features are not invariable.

39. B

Fibroadenomas classically have a homogenous internal echopattern.

40. A

When partial fusion of the Müllerian ducts occurs, myometrium forms the dividing septum. This abnormality is known as a bicornuate uterus. A septate uterus arises when there is only partial resorption of the final fibrous septum dividing the two horns of the uterus. The latter defect results in further reproductive complications.

41. A

SIN is associated with pelvic inflammatory disease and a higher risk of ectopic pregnancy.

42. E

Two thirds of cases of RPF are primary and one third are secondary. Both forms are more common in males. Secondary causes include drugs such as methysergide, beta-blockers, phenacetin. Medial deviation of the ureter occurs in the mid third.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 970.

43. A

Acute arterial hypotension, arteriosclerosis, nephrosclerosis and hereditary nephropathies including medullary cystic disease and Alport syndrome are all causes of bilateral small kidneys.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 883–884.

44. D

50% of patients have a 5-year survival rate; it presents in stage I in 75% of cases and accounts for up to 10% of all ovarian cancers.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 1033.

45. D

20 % of ovarian tumours are mucinous. These are the second most common benign epithelial neoplasm after serous ovarian neoplasias. Mucinous cystadenomas account for 80% and are multiloculated cysts with numerous septae, occurring in the third to fifth decades.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p.1051.

46. E

Well-defined solid masses in patients > 40. Low SI on T1+T2, with poor delayed contrast enhancement. Bilateral in 4-8% and associated with Meigs' syndrome in 1%.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 1056

47. D

A less than 10 HU increase post-contrast indicates benign hyperdense cyst. Other benign features include being sharply marginated and homogenous.

48. A

Emphysematous cholecystits occurs more commonly in females and is usually due to E.coli. Gas is present in the bladder mucosal lumen. On ultrasound there is a thickened bladder wall with echogenic foci and acoustic shadowing.

49. E

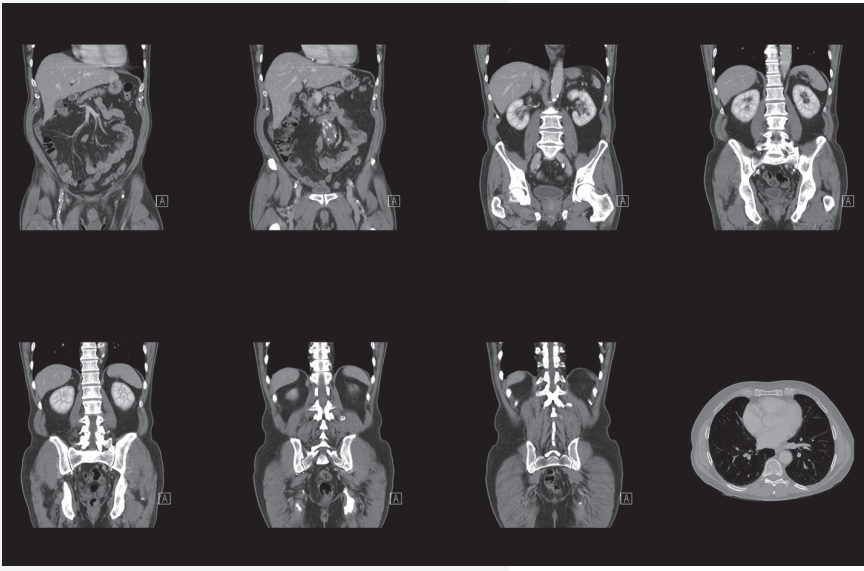
Seminal vesicles may appear low in signal on T2 when atrophic, empty or with tumour involvement.

50. B

Contraindications to brachytherapy include a volume of over 60cc.

Module 5: Paediatrics

Question Bank



1. A 14-year-old boy with a heart murmur has an echo showing ASD. An abnormality of the SVC is suggested and investigated with CT. Which is the most common congenital abnormality of the SVC?
   A. Double SVC
   B. Single left-sided SVC
   C. Partial Anomolous Pulmonary Venous Return (PAPVR)
   D. Hemiazygous continuation
   E. Total Anomolous Pulmonary Venous Return (TAPVR)

2. In mild-moderate hypoxic brain injury in a full term neonate typically spares:
   A. Watershed areas
   B. Parasagital cortex
   C. Deep grey matter structure
   D. Subcortical white matter
   E. Frontal lobes

3. A 7-year-old boy with a well mother and father develops a progressive deterioration in vision, loss of hearing, optic disc pallor and ataxia. Mental deterioration is also noted. CT shows symmetric low densities in the occipitoparietaltemporal white matter with thin curvilinear enhancing rims. MR shows hypodensity on T1 and bilateral hyperintense confluent areas. Which is the most likely diagnosis?
   A. Adrenomyloneuropathy
   B. Adrenoleukodystrophy
   C. Friedreich's ataxia
   D. Ataxia telangiectasia
   E. Spongiform leukodystrophy

4. The absence of which of the following indicates a diagnosis of Dandy-Walker variant rather than Dandy-Walker malformation?
   A. Dysgenesis of the corpus callosum
   B. Holoprosencephaly
   C. Cerebellar heterotopia
   D. Enlargement of the pituitary fossa
   E. Cerebellar gyri malformation

5. Which of the following is a feature of a 15-year-old boy with juvenile angiomyofibroma?
   A. Posterior bowing of the posterior antral wall
   B. Invasion of the frontal sinuses
   C. Widening of the superior orbital fissure
   D. Delayed enhancement on CT
   E. Intermediate SI on T1 with punctuate areas of hyperdensity

6. Which is the cause of wide sutures rather than craniosynostosis?
   A. Sickle cell anaemia
   B. Cleidocranial dysostosis
   C. Thalassemia
   D. Hurler's disease
   E. Achondroplasia

7. Which is a cause of wormian bones?
   A. Osteomalacia
   B. Hypoparathyroidism
   C. Osteogenesis imperfecta
   D. Cleidocranial dysplasia
   E. Hypervitaminosis A

8. Which is a cause of hair-on-end appearance of the skull?
   A. Fibrous dysplasia
   B. Dyke-Davidoff-Masson syndrome
   C. Neuroblastoma
   D. Thalassemia minor
   E. Cerebral atrophy following shunting of hydrocephalus

9. A 4-year-old girl with low-grade fever and back pain has an elevated Erythrocyte Sedimentation Rate (ESR) but normal White Cell Count (WCC). Diskitis is considered. Which is the best answer regarding diskitis?
   A. Usually affects children 4-10 years old
   B. Thoracic spine is most commonly affected
   C. Usually involves 3 consecutive disc spaces
   D. Decreased marrow intensity on 2 consecutive vertebrae on T1 MR is characteristic
   E. Radiographs are usually positive before bone scan

10. An eccentric mass expands the cord on MR of a 5-year-old boy. The mass is isointense on T1 and hyperintense on T2. Which is the most common intramedullary neoplasm in children, exhibiting these features?
   A. Ependymoma
   B. Astrocytoma
   C. Ganglioglioma
   D. Haemangioblastoma
   E. Subependymoma

11. A female newborn is found to have a sacral mass. On MR this is lobulated with well-defined margins and heterogeneous SI on T1 with high, intermediate and low SI areas. It is a predominantly eternal lesion, covered by skin with only minimal presacral component. Which is the most likely diagnosis?
    A. Myelomeningocele
    B. Sacrococcygeal teratoma
    C. Rectal duplication cysts
    D. Haemangioma
    E. Lymphoma

12. MRI brain in a neonate shows multiple abnormalities including an anterior interhemispheric fissure adjoining a high riding third ventricle, an enlarged foramen of monro and a sunburst gyral pattern. An interhemispheric cyst is also seen. Which is the diagnosis?
    A. Arachnoid cyst
    B. Agenesis of the corpus callosum
    C. Prominent cavum septum pellucidi and vergae
    D. Chiari II malformation
    E. Dandy-Walker malformation

13. Which is the most common site of metastatic spread in medulloblastoma?
    A. Axial skeleton
    B. Lymph nodes
    C. Lung
    D. Subarachnoid space
    E. Liver

14. Ovoid areas of increased echogenicity are seen on US of a neonate. Which of the following favours choroid plexus rather than germinal mature haemorrhage?
    A. Tapering toward cardiothalamic grove
    B. Inferolateral to floor of frontal horn
    C. Bulbous enlargement of cardiothalamic groove
    D. Location anterior to foramen of Monro
    E. Low birth weight and premature neonate

15. Regarding neuroblastomas:
    A. Produces catecholamines in all cases
    B. Are most common in 5-10 years
    C. Have a better prognosis in a younger child
    D. The most common site following the adrenals is the neck
    E. Esthesioneuroblastoma is a very malignant tumour arising from olfactory mucosa

16. An 8-month-old has a neuroblastoma in the right adrenal with metastatic spread to the liver, bone marrow and skin. What stage of disease does he have?
    A. Stage 2B
    B. 3
    C. 2A
    D. 4
    E. 4S

17. Which of the following is a feature of Ollier's disease rather than Maffucci syndrome?
    A. Associated with granulosa cell tumour of the ovary
    B. Predilection for tubular bones, hands and feet
    C. Very large enchondromas
    D. Growth disturbance of long bones
    E. Absence of haemangiomas

18. Which is a case of alternating radiolucent and dense metaphyseal bands?
    A. Osteopetrosis
    B. Hypervitaminosis D
    C. Heavy metal poisoning
    D. Congenital hypothyroidism
    E. Normal infants

19. A spine radiograph for a child with short stature shows decreased interpeduncular distance, progressively smaller in lower, lumbar spine, bullet shaped vertebral bodies and short wide iliac bones. There is also increased lumbar lordosis and kyphoscoliosis. Which is the most likely diagnosis?
    A. Achondroplasia
    B. Down's syndrome
    C. Metatrophic dysplasia
    D. Hurler's
    E. Hunter's

20. A 3-year-old male with known muccopolysaccharidosis has anterior beaking of the mid vertebral body and no neurological features. Which is the most likely diagnosis?
    A. Morquio MPS 4
    B. Hurler's MPSI-1+
    C. Hunter's MPS2
    D. Sanfillippo MPS3
    E. Maroteaux–Lamy syndrome. MPS decrease

21. In Developmental Dyplasia of the Hip (DDH), ultrasound is the modality of choice in patients of:
    A. < 3 months
    B. < 6 months
    C. < 9 months
    D. < 12 months
    E. < 18 months

22. A 10-year-old boy with a limp is investigated with Anterior-Posterior (AP) and frog's legs lateral radiograph. Which patterns of disease suggest Perthes' rather than slipped upper femoral epiphyses?
    A. Subcortical lucency and fissuring of epiphysis
    B. Widening of proximal femoral growth plate
    C. Medial displacement of femoral epiphysis
    D. Loss of height of femoral epiphysis
    E. Scalloped and irregular metaphysis

23. Which of the following are MRI characteristics of juvenile dermatomyositis?
    A. Unilateral disease in right thigh
    B. Upper limb > lower limbs
    C. Medial compartments > anterior and lateral compartments
    D. Decreased fat content in affected area
    E. Foci of low signal on all sequences

24. Regarding MR features of rhabdomyosarcoma:
    A. Hyperintense to muscle on T1
    B. Hypointense to muscle on T2
    C. Homogenous enhancement T1 post-contrast
    D. Well-defined margins
    E. High SI on Short TI Inversion Recovery (STIR)

25. A 12-year-old boy injures his ankle whilst playing football. Plain radiographs demonstrate a fracture through the epiphysis, growth plate and metaphysis of the distal tibia and associated soft tissue swelling. Which Salter-Harris fracture is this?
    A. Type I
    B. Type II
    C. Type III
    D. Type IV
    E. Type V

26. Which of the following has the highest specificity for Non-Accidental Iniury (NAI)?
    A. Scapula fracture
    B. Vetebral fractures
    C. Complex skull fracture
    D. Digital fracture
    E. Epiphyseal separation injuries

27. Which is the most common location for congenital lobar hyperinflation?
    A. Left Upper Lobe (LUL)
    B. Right Upper Lobe (RUL)
    C. Right Middle Lobe (RML)
    D. Right Lower Lobe (RLL)
    E. Left Lower lobe (LLL)

28. As part of investigations for respiratory distress in a neonate, a CT chest is performed showing variable sized cysts in the left lower lobe which are measuring 3cm (multicystic mass of pulmonary tissue). Regarding congenital pulmonary airway malformation, which of the following is correct?
    A. Is the second most common pattern of disease
    B. Represents Type 2 disease
    C. Represents Type 3 disease
    D. The location determines the category of type (1/2/3)
    E. Represents Type 1

29. Which of the following suggests intralobar rather than extralobar sequestration?
    A. Own pleural covering
    B. Systemic venous drainage
    C. Symptomatic in first six months
    D. Infarction rare
    E. Congenital anomalies in 15%

30. Regarding congenital diaphragmatic hernias:
    A. Most commonly right-sided
    B. Of Bochdalek type are anterior
    C. Of Morgagni are posterior
    D. Are associated with pulmonary hypoplasia
    E. Are mostly diagnosed by postnatal ultrasound

31. In Scimitar syndrome, a chest radiograph would show:
    A. A curved vessel at the left medial costophrenic angle
    B. Hypoplasia of the left lung
    C. Prominent left atrium
    D. Decreased pulmonary vascularity
    E. Radiographic features similar to Atrial Septal Defect (ASD)

32. In an acyanotic child with an enlarged heart and an enlarged main pulmonary artery, which is the diagnosis?
    A. Transposition of the great vessels
    B. Ventricular Septal Defect (VSD)
    C. Truncus arteriosis
    D. TAPVR
    E. Tricuspid atresia

33. Currarinos triad is a rare association of anomalies including anorectal malformations, lumbrosacral anomalies and which of the following?
    A. Meconium ileus
    B. Presacral mass
    C. Ileal atresia
    D. Hirshsprungs
    E. Cloacal extrophy

34. Which of the following is most likely to be a feature of an enteric duplication cyst?
    A. Multilocular nature
    B. Hypoechoic internal layer
    C. Echogenic outer layer
    D. Layered echogenic debris within cyst
    E. Dense calcification

35. Which is the most common location for enteric duplication cysts?
    A. Ileum
    B. Oesophagus
    C. Colon
    D. Jejunum
    E. Stomach

36. Which is the most common type of transition between affected aganglionic and normal gangionic bowel in Hirschsprung's disease?
    A. Long segment
    B. Short segment
    C. Ultra short segment
    D. Total intestinal aganglionosis
    E. Total colonic

37. Which of the following is the most common type of tracheoesophageal fistula (TOF)?
    A. Oesophageal atresia and proximal atretic portion and location of fistulas
    B. Pure oesophageal atresia without TOF
    C. Isolated TOF (H type) without oesophageal atresia
    D. Oesophageal atresia with proximal and distal TOF
    E. Oesophageal atresia with proximal TOF and distal atretic portion

38. A 6-week-old boy with persistent non-bilious vomiting undergoes ultrasound of the abdomen. Which of the following is an ultrasound feature of pyloric stenosis?
    A. Elongated pyloric channel > 16mm
    B. Elongated pyloric channel > 12mm
    C. Thickened pyloric muscle > 2mm
    D. Increased pyloric diameter > 6mm
    E. Increased pyloric diameter > 10mm

39. Which is the most specific radiologic sign in the investigation of intususception in a 6-month-old?
    A. Paucity of bowel gas in the right lower quadrant
    B. Soft tissue mass in the right upper quadrant obscuring the liver
    C. Non-visualisation of the air filled caecum
    D. Soft tissue mass with concentric lucencies
    E. Small bowel obstruction

40. In biliary atresia on US:
    A. The liver is almost always of abnormal echogenicity
    B. GB is present in 75% of cases
    C. Extrahepatic ducts are visible
    D. An echogenic triangular cord sign represents a fibrotic remnant of the common duct
    E. Lack of excretion of 99mT labelled studies into small bowel by 24 hours is diagnostic

41. Which of the following occurs with Caroli's disease to form Caroli's syndrome?
    A. Hepatosplenomegaly
    B. Hepatic fibrosis
    C. Portal hypertension
    D. Cholangiocarcinoma
    E. Renal cystic abnormalities

42. A 6-year-old girl with a large abdominal mass in the right upper quadrant and with an elevated AFP undergoes ultrasound assessment. This shows a 10cm mass in the right lobe of the liver, of heterogeneous echotexture, but predominantly solid. A spoke-wheel appearance is seen due to fibrous septa radiating from a central hub. Which is the most likely diagnosis?
    A. Haemangioendothelioma
    B. Hepatoblastoma
    C. Mesenchymal hamartoma
    D. Hepatocellular carcinoma
    E. Metastasis from neuroblastoma

43. Regarding imaging of duplicated kidneys:
    A. Micturating Cystourethroram (MCUG) shows reflux into the upper pole
    B. Duplicated kidneys tend to be smaller
    C. Duplex kidneys may have more than 1 renal artery and vein
    D. US shows dilatation of the lower pole calyx with a normal upper pole
    E. A band of medulla crosses the cortex of the kidney on US

44. Regarding posterior urethral valves:
    A. Are seen equally on males and females
    B. Associated with antenatal polyhydramnios
    C. Gradual change in calibre occurs in the posterior urethra
    D. Are associated with a smooth walled urinary bladder
    E. Are associated with vesicoureteric reflux

45. Neonatal ultrasound shows kidneys whch are enlarged bilaterally hyperechoic with loss of normal cortico-medullary differentiation. Cysts are noted which are less than 1cm. There are focal rosettes of radially oriented dilated collecting tubules. What is the diagnosis?
    A. Autosomal Recessive Polycistic Kidney Disease (ARPKD)
    B. Autosomal Dominant Polycistic Kidney Disease (ADPKD)
    C. Asymmetrical large renal cysts
    D. Tuberous sclerosis
    E. Multicystic Dysplastic Kidney (MCDK)

46. Which of the following are common features in mesoblastic nephroma?
    A. Cystic areas of necrosis
    B. Areas of haemorrhage
    C. Calcification
    D. Invasion of vessels
    E. Polyhydramnios in pregnancy

47. Nephroblastomatosis, Beckwith-Wiedemann syndrome, chromosome 11 abnormalities and trisomy 18 are all associations of which of the following?
    A. Autosomal recessive polycystic kidney disease
    B. Neuroblastoma
    C. Nephroblastomatosis
    D. Wilms' tumour
    E. Multilocular cystic nephroma

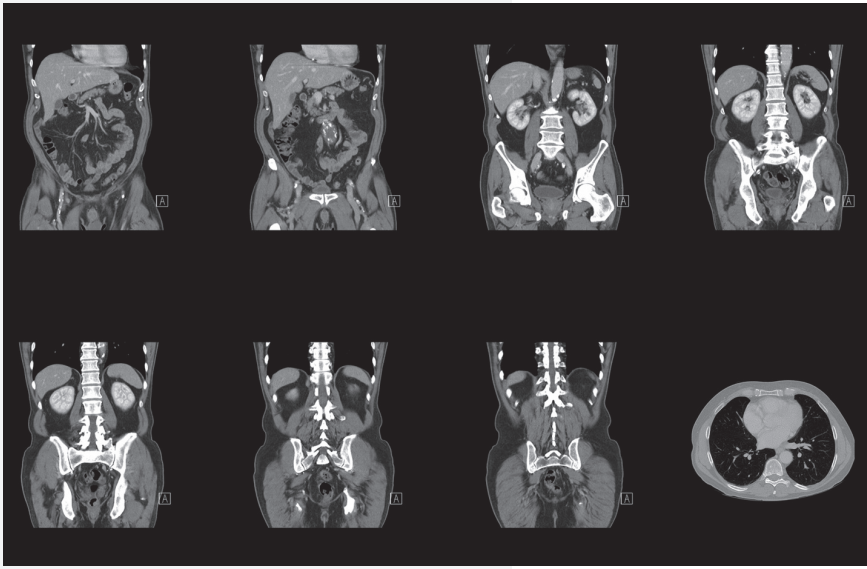
48. A female infant is found to have a pelvic mass. She is systemically well. US shows a well-defined fluid-filled cavity between the bladder and rectum with some debris but no increased vascularity. There is uterine distension and echogenic debris within the vagina. Hydronephrosis is noted. Which is the diagnosis?
    A. Pelvic abscess
    B. Hydrometocolpos
    C. Ovarian tumour
    D. Fallopian tube torsion
    E. Sacrococcygeal teratoma

49. Which of the following is a feature of neuroblastoma?
    A. Large hypoechoic mass arising the suprarenal region
    B. Calcification in most cases on CT
    C. No increased vascularity
    D. Echogenic liver lesions
    E. Vascular invasion

50. A child with Wilms' tumour has exomphalos, macroglossia, gigantism and hepatomegaly. Which is the diagnosis?
    A. Hemihypertrophy
    B. Drash syndrome
    C. Beckwith-Wiedemann
    D. Trisomy 18
    E. Trisomy 21

Module 5: Paediatrics

Answers



1. A

Occurs in 0.3% of the population, but more common in patients with congenital heart disease, particularly with ASD. Persistent left SVC is much rarer and can be confused with lymphadenopathy.

Ref:

Burney K *et al*. CT appearances of congential and acquired abnormalities of the superior vena cava. *Clinical Radiology* 2007; 62(9): 837-842.

2. C

The brainstem, cerebellum and deep grey structures are spared in mild-moderate ischemia. Severe hypoxic injury involves the ventral and lateral thalamus, posterior putamen, perirolandic regions and corticospinal tracts.

Ref:

Grant PE *et al*. Acute injury to the immature brain with hypoxia with or without hypoperfusion. *Magn Reson Imaging Clin N Am* 2006; 14(2): 271-285.

3. B

Features describe adrenolukodystrophy, an X linked recessive condition. Patients also have adrenal gland insufficiency with increased pigmentation and raised Adrenocorticotropic Hormone (ACTH) levels.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 264.

4. D

The other features are common to both.

Ref:

Shekdar K. Posterior fossa malformations. *Semin Ultrasound CT MR* 2011; 32(3): 228-241.

5. C

Widening of the pterygopalatine fossa with anterior bowing of the posterior antral wall, invasion of the sphenoid sinus (in ⅔), widening of the superior and inferior orbital fissures, and immediate enhancement after contrast injection are all features. On MR, punctuate hypodensities on T1 are due to the highly vascularised stroma.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 387.

6. B

Other causes of wide cranial sutures include osteogenesis imperfecta, pyknodysostosis, hypoparathyroidism and raised intracranial pressure.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 387.

7. C

Other causes include 'PORK CHOPS': pyknodysostosis, rickets, kinky hair syndrome, cleidocranial dysostosis, hypothyroidism/hypophosphatasia, otopalatodigital syndrome, pachydermoperiostosis, syndrome of Down's.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 387.

8. C

Other causes include hereditary spherocytosis, iron deficiency anaemia, neuroblastoma, G6PD deficiency, sickle cell anaemia and thalassemia major.

9. D

Diskitis is the most common paediatric spine pathology. Staphylococcus aureus is the most common causative organism. The peak ages are 6 months-4 years and 10-14 years. L3-4 and L 4-5 are most commonly affected sites.

10. B

Astrocytomas appear as homogenously ill-defined cord tumours, with poorly defined margins and patchy irregular enhancement with gad. Masses can take the form of eccentric irregular tumour cysts, polar cysts and syrinxes.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 213.

11. B

Fat, soft tissue and calcification cause the heterogeneous SI on T1. This is the most common solid tumour in the newborn, more common in females.

Ref:

Kocaoglu M *et al*. Pediatric presacral masses. *Radiographics* 2006; 26(3): 833-857.

12. B

Absence of septum pellucidum, corpus callosum and cavum septum pellucidi, and wide separation of the lateral ventricles, are other features of agenesis of the corpus callosum.

13. D

Subarachnoid space is the most common, with drop metastases occurring in 40%.

14. A

Prematurity and low birth weight are amongst risk factors for GMH. Chord plexus is attached to inferomedial aspect of ventricular floor, tapering toward cardiothalamic groove and never anterior to the foramen of Monro.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 312.

15. E

Neuroblastomas produce catecholamines in 95% of cases. The peak age of diagnosis is < 3 and there is a better prognosis in older children. The most common site is adrenals, followed by chest, followed by neck.

Ref:

Chu CM *et al*. Clinical presentations and imaging findings of neuroblastoma beyond abdominal mass and a review of imaging algorithm. *Br J Radiol* 2011; 84(997): 81-91.

16. E

Stage 4S applies to infants who demonstrate a tumor on one side of the body, as seen in Stages 1 and 2, but also have affected liver, skin, and/or bone marrow. Stage 4 involves distant lymph nodes and bone with or without bone marrow/liver/other organs.

17. E

Both are associated with juvenile granulosa cell ovarian tumours and other malignancies. The presence of multiple enchondromas with haemangiomas indicates Ollier's disease.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 74.

18. A

Osteopetrosis, growth arrest lines, chemotherapy, rickets, chronic anaemias and treated leukaemia are causes. Solitary dense metaphyseal band may be caused by B-E.

19. A

Other features include small skull bone with narrow foramen magnus, instability of cervical spine, horizontal acetabulum and small sacral notch.

20. A

Others have anterior beaking of inferior body. Other spinal features include vertebra pleura, hypoplastic dens dorsolumbar gibbus and posterior scalloping.

Ref:

Rasalkar DD *et al*. Pictorial review of mucopolysaccharidosis with emphasis on MRI features of brain and spine. *Br J Radiol* 2011; 84(1001): 469-477.

21. A

Once femoral epiphyses ossifies, DDH becomes more difficult.

Ref:

Karmazyn B. Ultrasound of pediatric musculoskeletal disease: from head to toe. *Semin Ultrasound CT MR* 2011; 32(2): 142-150.

22. A

B-E are seen in SUCFE but some of these features are also seen in Perthes'. However, subcortical lucency and fissuring is not seen in SUFE.

23. E

Calcification which may be punctate or sheet-like can appear as low SI. Usually bilaterally symmetrical thighs > upper limbs anterior and lateral compartments > medial compartments. Atrophy and increased fatty infiltrates are secondary to steroids and disease.

Ref:

Ladd PE *et al*. Juvenile dermatomyositis: correlation of MRI at presentation with clinical outcome. *AJR Am J Roentgenol* 2011; 197(1): 153-158.

24. E

Other features include local oedema, extension and destruction. Usually isointense to muscle on T1, similar or hyperintense to muscle on T2 and with poorly defined margins and heterogeneous contrast enhancement.

25. D

- I: Slipped through growth plate
- II: Above (metaphysis and growth plate)
- III: Lower (growth plate and epiphysis)
- V: Compression and damage

26. A

B-E are moderately specific. Other high specificity signs are classic metaphyseal fractures, rib fractures, and sternal fractures.

Ref:

Offiah A *et al*. Skeletal imaging of child abuse (non-accidental injury). *Pediatric Radiology* 2009; 39(5): 461-470.

27. A

Congenital lobar hyperinflation occurs most commonly in the LUL (42%) followed by the RML (35%). Imaging features include a radiodense lobe that becomes radiolucent and hyperexpanded as fetal fluid is replaced with air.

28. E

Type 2 smaller cysts are 0.5-2cm. Type 3 appears solid but contains multiple small cysts (0.3-0.5cm). Type 1 is the most common.

29. E

Other features of intralobar sequestration includes visceral pleural cavity (pathological findings), and venous drainage to inferior pulmonary vein. Extralobar are associated with 50% of congenital abnormalities.

30. D

Most congenital diaphragmatic hernoas are diagnosed by antenatal ultrasound, and are left-sided. Bochdalek hernias are posterior and common. Morgagni hernias are anterior and rare.

31. E

Part or all of the hypogenetic lung, which is almost always right-sided, is drained by an anomalous vein. There is increased pulmonary vascularity.

Ref:

Algın O *et al*. Signs in chest imaging. *Diagnostic and Interventional Radiology* 2011; 17(1): 18-29.

32. B

The other options are causes of an enlarged heart in a cyanotic child with a concave main pulmonary artery.

33. B

This may be teratoma, anterior meningocele or enteric cyst.

34. D

Often an incidental finding on antenatal/postnatal US, most present in childhood. May become symptomatic due to compression effect on adjacent structures. Complications include ulceration, bleeding, volvulus and small bowel obstruction.

35. A

75% are abdominal. Synchronous lesions occur in 10-20%.

36. B

Short segment accounts for 70-80%. Long segment accounts for 15-25%.

37. A

82% are of this type.

38. A

US features include gastric hyperperistalsis, failure to open pyloric channel or dynamic study and the echogenic mucosal layer may also look hypertrophied.

Ref:

Hernanz-Schulman M. Pyloric stenosis: role of imaging. *Pediatric Radiology* 2009; 39 Suppl 2: S134-139.

39. D

Target sign also seen on US as a mass with alternating rings of hyper and hypechogenicity in TS and layered or pseudo-kidney appearance on LS.

Ref:

Applegate KE. Intussusception in children: evidence-based diagnosis and treatment. *Pediatric Radiology* 2009; Apr 39 Suppl 2:S140-143.

40. D

E is highly suggestive but not diagnostic. The gallbladder is present in 25% of cases. The liver may be enlarged but is usually of normal echogenicity.

41. B

Hepatosplenomegaly and portal hypertension are consequences. There is an increased risk of cholangiocarcinoma and renal cystic abnormalities.

42. B

Haemangioendotheliomas have normal Alpha fetoprotein (AFP). Mesenchymal hamartomas are usually more cystic.

Ref:

Roebuck DJ *et al*. Radiological staging in children with hepatoblastoma. *Pediatric Radiology* 2006; 36(3): 176-182.

43. C

In cases of duplicated kidneys, MCUG shows reflux into the lower pole. Duplicated kidneys tend to be larger and US shows dilatation of the upper pole calyx and a normal lower pole. A band of cortex can be seen to cross the medulla.

44. E

Occurs in boys. Associated with oligohydramnios, an abrupt change in calibre of the posterior urethra and a trabeculated urinary bladder wall.

45. A

ADPKD have normal renal echogenicity. Small cyst may not be immediately identified on ultrasound.

46. E

Cystic areas of necrosis, areas of haemorrhage and calcification are uncommon.

47. D

These are all known associations of Wilm's tumor.

Ref:

McHugh K. Renal and adrenal tumours in children. *Cancer Imaging* 2007; 5(7): 41-51.

48. B

MR shows mixed SI on T1 and T2 due to blood products and may be associated with uterine and cervical anomalies.

49. A

Low attenuation metastatic liver lesion are echogenic on US. May have lytic/sclerotic or mixed bone metastases, increased vascularity and vascular encasement.

Ref:

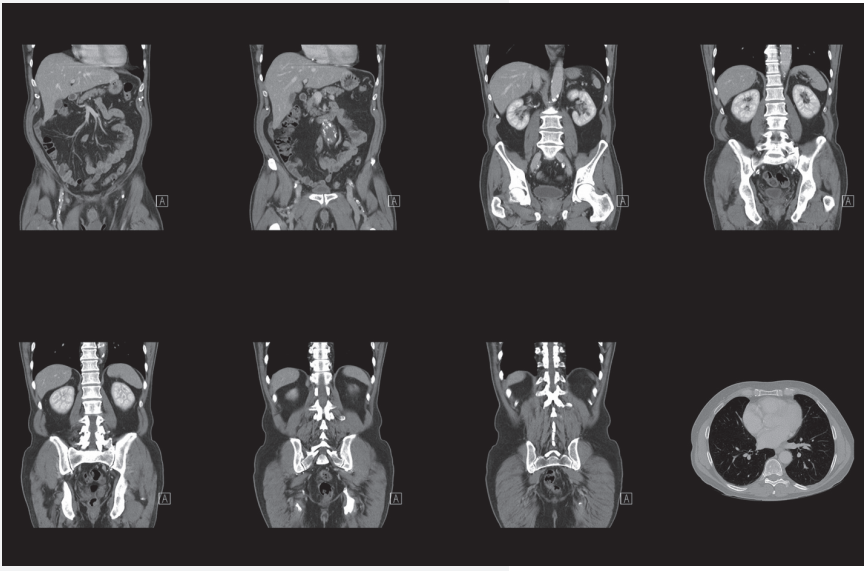
Chu CM *et al*. Clinical presentations and imaging findings of neuroblastoma beyond abdominal mass and a review of imaging algorithm. *Br J Radiol* 2011; 84(997): 81-91.

50. C

A, B and C are all associations of Wilm's tumour. 10-20% of patients with Beckwith-Wiedemann develop Wilm's tumour.

Module 6: Central nervous system and head & neck

Question Bank



1. Which of the following features favour Rathke's cleft cyst rather than craniopharyngioma?
   A. Absence of calcification
   B. Cystic element on MR
   C. Involvement of suprasellar and sellar regions
   D. Enhancement of the wall
   E. High signal intensity on T1

2. A 38-year-old male with Human Immunodeficiency Virus (HIV) stopped taking his retrovirals 6 months ago and now presents with confusion. CT brain shows non-enhancing hypodensities, with apparent dilated perivascular spaces, although these were not present on a CT brain from 2 years ago. What is the most likely cause?
   A. Cryptococcus
   B. Progressive multifocal leukoencephelopathy
   C. Tuberculosis
   D. CMV encephalitis
   E. Toxoplasmosis

3. A 30-year-old male with recurrent Transient Ischemic Attacks (TIAs) and a history of migraine with aura undergoes CT brain. Subcortical infarcts are identified raising suspicion of cerebral autosomal dominant arteriopathy with subcortical infarcts (CADASIL). Which is the most characteristically involved location for subcortical infarcts?
   A. Anterior temporal pole
   B. Frontal lobe
   C. Centrum semiovale
   D. Deep grey matter structure
   E. Pons

4. A 40-year-old with headache, confusion, seizures and visual disturbance has a CT showing low attenuation involving the cortex and subcortical white matter in both occipital lobes. Diffusion weighted MR shows no restriction. Which is the most likely diagnosis?
   A. Posterior reversible encephalopathy syndrome
   B. Bilateral occipital infarction
   C. CADASIL
   D. Sinus venous thrombosis
   E. Hypoxic brain injury

5. Which is the best answer describing neuro-imaging features of pre-eclampsia?
   A. Most frequent abnormality on MR is high signal change on T2/fluid attenuated inversion recovery (FLAIR)
   B. Lesions are in subcortical white matter only
   C. Majority of lesions progress to infarction
   D. Lesions are unilateral
   E. Cerebral vasospasm is common in mild to moderate pre-eclampsia

6. MRI of a mass in the parotid tail shows a well-circumscribed heterogeneous lesion with mixed cystic and enhancing solid components. Earlier US showed vessels in a hilar distribution with branches in the septa of the structure. There is no lymphadenopathy. What is the likely cause?
   A. Warthin's tumour
   B. Ductal cyst
   C. Lymphoepithelial cyst
   D. Pseudoaneurysm from a branch of the external carotid artery
   E. AVM

7. Which of the following is a cause of cerebellar atrophy with cerebral atrophy?
   A. Senile brain atrophy
   B. Friedreich's ataxia
   C. Ataxic telangectasia
   D. Phenytoin toxicity
   E. Paraneoplastic atrophy

8. A CT brain of a 25-year-old male with a head injury but no focal neurology shows no acute abnormality. A thin cerebrospinal fluid (CSF) density is noted between the frontal horns of the lateral ventricles in the midline. Which is the diagnosis?
   A. Cavum septi pellucidi
   B. Cavum vergae
   C. Cavum veli interpositii
   D. Colloid cyst
   E. Arachnoid cyst

9. Which brain tumour has the greatest incidence across all age groups?
   A. Glioma
   B. Meningioma
   C. Metastases
   D. Pituitary adenoma
   E. Haemangioblastoma

10. Which of the following is an extra-axial posterior fossa tumour in adults?
    A. Choroid plexus papilloma
    B. Metastasis
    C. Haemangioblastoma
    D. Lymphoma
    E. Glioma

11. Which is the most prevalent intraventricular tumour?
    A. Astrocytoma
    B. Meningioma
    C. Choroid plexus paplilloma
    D. Dermoid
    E. Subependymoma

12. Which is the cause of low attenuation in the basal ganglia?
    A. Wilson's disease
    B. Hypoparathyroidism
    C. Pseudohypoparathyroidism
    D. Hypothyroidism
    E. Radiation therapy

13. On review of an MRI of a complex case marked hypointensity of the globus pallidus is noted on T2W1, surrounding a higher intensity centre, 'eye of the tiger sign'. Which is the most likely cause?
    A. Dandy-Walker malformation
    B. Multiple sclerosis
    C. Hypoparathyroidism
    D. Wilson's disease
    E. Hypoglycaemia

14. Which of the following features describes an intra-axial mass?
    A. Cortex displaced towards bone
    B. Mass contiguous with dura
    C. Buckling of grey and white matter
    D. Widened subarachnoid cistern
    E. Dural feeding arteries

15. Which of the following favours an arachnoid rather than an epidermoid cyst?
    A. Hyperdense to CSF on CT
    B. Smooth margin
    C. Encased vessels
    D. Deviates from CSF on proton density
    E. Restricted diffusion

16. A 40-year-old male has a CT brain to investigate seizures. Which of the following best describes a cavernoma?
    A. Popcorn appearance with high SI centre on T1+T2
    B. Most commonly occurs in the cerebellum
    C. Usually considerable mass effect
    D. Hypodense region on CT
    E. Rarely calcify

17. Which of the following associations favour Chiari I rather than Chiari II malformation?
    A. Klippel-Feil anomaly
    B. Myelomyeocele
    C. Dysgenesis corpus callosum
    D. Absence of septum pellucidi
    E. Excessive cortical gyration

18. Which of the following best describes imaging changes in a colloid cyst?
    A. Typically hypodense on non-contrast CT
    B. Appears high SI on T1
    C. Appears low SI on T2
    D. Commonly widens septum pellucidi
    E. Most commonly causes symmetrical enlargement of lateral ventricles

19. Which is the most common location for epidermoid in the Central Nervous System (CNS)?
    A. Cerebellar pontine angle (CPA)
    B. Suprasellar region
    C. Perimesencephalic cisterns
    D. Ventricles
    E. Skull vault

20. Which of the following is not typical of Creutzfeldt-Jakob disease (CJD)?
    A. Progressive dementia
    B. Ataxia
    C. Hyperintensity on T2 in head of caudate and putamen
    D. Bilateral involvement
    E. Gadolinium enhancement of lesion

21. Which of the following favours dural meningeal carcinomatosis rather than leptomeningeal cacinomatosis?
    A. Short discontinuous thin sections of enhancement
    B. Positive cytology
    C. Thin area of subarachnoid enhancement following convulsions of gyri
    D. Discrete leptomeningeal nodules
    E. Invasion of underlying brain with mass effect and oedema

22. Which is the cause of a cystic rather than a haemorrhagic cause of brain metastases?
    A. Adenocarcinoma of the lung
    B. Malignant melanoma
    C. Choriocarcinoma
    D. Renal cell carcinoma
    E. Thyroid carcinoma

23. Which is the most common location of oligodendroglioma?
    A. Frontal lobe
    B. Temporal lobe
    C. Parietal lobe
    D. Occipital lobe
    E. Cerebellum

24. Which of the following best describes the typical appearance of intracranial haemorrhage in the late subacute phase (8-30 days)?
    A. Increased T1, increased T2
    B. Increased T1, decreased T2
    C. Isointense T1, decreased T2
    D. IsointenseT1, increased T2
    E. Decreased T1, decreased T2

25. A combination of subependymal nodules, giant cell astrocytomas, white matter lesion and retinal phakomatoses suggests:
    A. Tuberous sclerosis
    B. NFI
    C. NF2
    D. Sturge-Weber syndrome
    E. Von Hippel-Lindau

26. A 20-year-old woman has a right-sided proptosis, chemosis and bruit over the orbit. On MRI she is found to have dense enhancement of the right-sided extra-occular muscles with dilatation of the right cavernous sinus and periorbital soft tissues. Angiography reveals abnormal early opacification of a dilated left cavernous sinus and superior ophthalmic vein. Which is the most likely diagnosis?
    A. Carotid-cavernous fistula
    B. Thyroid eye disease
    C. Orbital pseudotumour
    D. Retro-orbital metastases
    E. Optic nerve plexiform neurofibroma

27. A 60-year-old woman with mild proptosis undergoes a CT which shows enlargement of the bellies of the medial, and to a lesser extent, lateral rectus muscle. Tendons appear normal. What is the likely diagnosis?
    A. Idiopathic orbital myositis
    B. Carotid cavernous fistulae
    C. Retro-orbital metastases
    D. Graves ophthalmopathy
    E. Plexiform neurofibroma of optic nerve

28. A follow-up of a young man under the care of the neuro-oncologists reveals a drop in metastases. Which statement is most true?
    A. Drop metastases tend to be in the upper spine
    B. Metastases within the spinal canal are usually ventral
    C. Glioblastoma is the commonest cause of drop metastases
    D. Are associated with positive CSF cytology in approximately 10% of cases
    E. Usually demonstrates homogenous enhancement with contrast

29. Which is the most common imaging finding in neurosarcoidosis?
    A. Leptomeningeal contrast enhancement
    B. Hyperintense white matter T2 lesion
    C. Grey matter lesions enhancing on MR
    D. Involvement of the hypothalamus
    E. Focal epidural masses

30. In herpes simplex virus (HSV) type 1 encephalitis:
    A. Early CT findings include hyperdensity in one or both temporal lobes
    B. Avid contrast enhancement in the temporal lobes is often present on C7
    C. MR shows avid contrast enhancement in the temporal lobes
    D. The basal ganglia are typically spared
    E. Signal abnormalities are usually persistent even after drug treatment

31. A patient with a genetic condition and known bilateral renal cysts undergoes MRI brain showing a cystic lesion with mural nodule. This finding is associated with:
    A. VHL
    B. Tuberous sclerosis
    C. Sturge-Weber
    D. Heritary Haemorrhagic Telangiectasia (HHT)
    E. Neurofibromatosis

32. Tram track gyriform calcification is most likely to be seen in:
    A. NF I
    B. Tuberous sclerosis
    C. Von Hippel-Lindau
    D. HHT
    E. Sturge-Weber

33. A 2cm mass is seen on MR at the left CPA with uniform enhancement and high SI on T2 and dural tail. What is the diagnosis?
    A. Meningioma
    B. Vestibular schwannoma
    C. Epidermoid
    D. Metastatic deposit
    E. Glomus tumour

34. A 40-year-old woman under investigation for hypo-parathyroidism undergoes ultrasound of the neck. Which is the best answer regarding parathyroid adenoma?
    A. Usually indistinguishable from margin of thyroid gland
    B. High T1
    C. Low T2
    D. Typically hypoechoic nodules
    E. Usually hypodense on CT

35. A 60-year-old with treated SCC of the orpharynx undergoes ultrasound neck to evaluate a new swelling. Which feature most likely indicates malignant nodes?
    A. Matting
    B. Calcification
    C. Ovoid shape
    D. Hilar vascularity
    E. Peripheral vasculitis

36. Concerning carotid body tumours:
    A. Usually painful, pulsatile, mass below the angle of the jaw
    B. Malignant transformation in 6%
    C. Demonstrate poor vascularity on angiography
    D. Poor contrast enhancement on MR
    E. Usually high T1

37. Which of the following features favours extradural rather than subdural haematoma?
    A. Extra-axial collection
    B. Mixed hyper and hypodense areas
    C. Crossing of sutures
    D. Crossing of dural attachment
    E. Skull fractures

38. Which of the following most favours ameloblastoma compared with odontogenic keratocyst?
    A. Growth in buccolingual direction
    B. Growth in AP direction
    C. Non-expansile
    D. CT 40-50 HU
    E. High SI on T2

39. Which feature indicates orbital meningioma compared with optic nerve glioma?
    A. Straight optic nerve
    B. Well-defined margins
    C. Rarely calcifies
    D. Absence of hyperostosis
    E. Widened optic canal

40. Which of the following is the most common cause of pulsatile tinnitus?
    A. Glomus tumour
    B. Cholesterol granuloma
    C. Dehiscent jugular bulb
    D. Carotid artery dissection
    E. Meningioma

41. Considering Moyamoya disease in adults:
    A. Infarct seen in cortical/subcortical areas
    B. Multiple small flow voids are characteristic
    C. Affects anterior circulation
    D. Presentation with ischemia is more common in adults than in children
    E. The supraclinoid MCA is spared

42. Which is a cause of solitary dense pedicle rather than erosion/absence?
    A. Osteoblastoma
    B. Metastatic carcinoma
    C. Neurofibroma
    D. Tuberculosis with paravertebral abscess
    E. Aneurysmal bone cyst

43. Which is most likely to represent an intramedullary mass lesion?
    A. Ependymoma
    B. Meningioma
    C. Neurofibroma
    D. Arachnoid cyst
    E. Abscess

44. Which is the most common cause of erosion of the odontoid peg?
    A. Rheumatoid arthritis
    B. SLE
    C. Ankylosing spondylitis
    D. Psoriasis
    E. Down's syndrome

45. Which is the most common location for toxoplasmosis?
    A. Basal ganglia
    B. Frontal lobe
    C. Occipital lobe
    D. Temporal lobe
    E. Brainstem

46. Progressive multifocal leukoencephalopathy has a predilection for:
    A. Cerebellum
    B. Parietal lobe
    C. Occipital lobe
    D. Parieto-occipital region
    E. Frontal lobe

47. Which of the following is an extraconal extraorbital lesion, rather than an extraconal intraorbital lesion?
    A. Squamous cell carcinoma of the sinus
    B. Teratoma
    C. Dermoid cyst
    D. Capillary haemangioma
    E. Lymphangioma

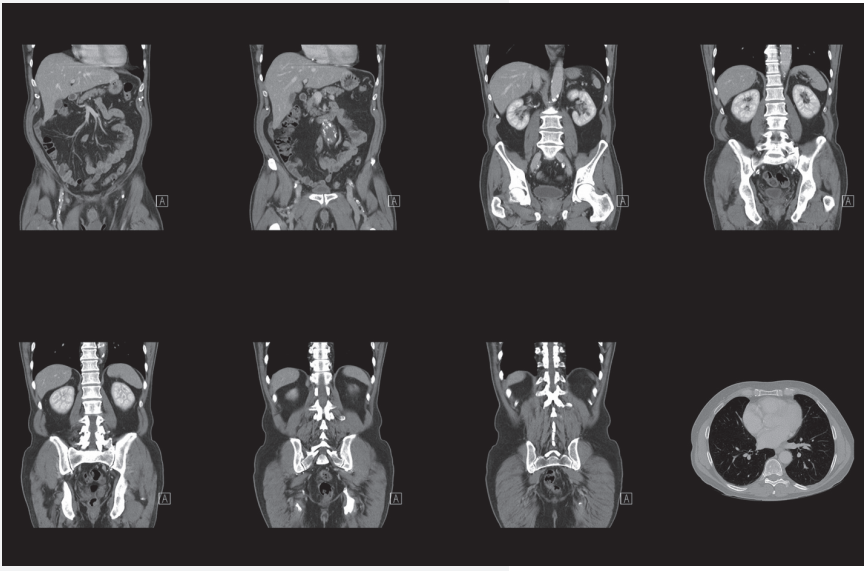
48. Which of the following is a case of increased radiotracer uptake in the thyroid gland?
    A. Thyroid replacement therapy
    B. Lithium therapy
    C. Propylthiouracil
    D. Chronic thyroidits
    E. Radioiodine ablation

49. On a thyroid radioisotope study, which is a cause of a hot thyroid nodule?
    A. Involutional nodule
    B. Focal thyroiditis
    C. Adenomatous hyperplasia
    D. Granuloma
    E. Abscess

50. In the staging of supraglottic laryngeal cancer, which indicates stage T3 disease?
    A. Tumour confined to the site of origin
    B. Cord fixation
    C. Involvement of adjacent supraglottic site
    D. Involvement of the tongue base
    E. Involvement of the thyroid cartilage

Module 6: Central nervous system and head & neck

Answers



1. A

Rathkes cleft cysts do not calcify. They affect women to men in a 2:1 ratio and adults from 40-60 years of age. They cause variable MR appearances depending on protein content of cyst. They can rarely show enhancement.

Ref:

Rao VJ *et al*. Imaging characteristics of common suprasellar lesions with emphasis on MRI findings. *Clinical Radiology* 2008; 63(8): 939-947.

2. A

More commonly cryptococcus meningitis but cryptococcus or gelatinous pseudocysts reside in dilated perivascular spaces.

Ref:

Rao VJ *et al*. Imaging characteristics of common suprasellar lesions with emphasis on MRI findings. *Clinical Radiology* 2008; 63(8): 939-947.

3. A

A young patient with migraines, auras, TIAs or subcortical strokes should raise suspicion of CADASIL. Subcortical infarcts are characteristically in the anterior temporal pole and external capsule but may involve C, D and E.

Ref:

Downer JJ *et al*. Symmetry in computed tomography of the brain: the pitfalls. *Clinical Radiology* 2009; 64(3): 298-306.

4. A

These are typical imaging findings but the abnormalities are not always reversible or posterior.

Ref:

Downer JJ *et al*. Symmetry in computed tomography of the brain: the pitfalls. *Clinical Radiology* 2009; 64(3): 298-306.

5. A

Lesions are in deep and subcortical white matter, pons and basilar territories. They may be unilateral or bilateral and the majority are reversible although some can progress to infarction. Vasospasm is uncommon in mild to moderate pre-eclampsia.

6. A

Warthin's tumours are benign salivary gland tumours, accounting for 6-10% of all parotid tumours. Warthin's tumours are bilateral in 15% of cases.

Ref:

Dineen R *et al*. Imaging of acute neurological conditions in pregnancy and the puerperium. *Clinical Radiology* 2005; 60(11): 1156-1170.

7. A

B-E are causes of cerebellar atrophy without cerebral atrophy.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 234.

8. A

Occurs in 80% of term infants and 15% of adults. Rarely may dilate and cause obstructive hydrocephalus.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 236.

9. A

Gliomas consist of astrocytomas, oligodendrogliomas, paragangliomas, ganglogliomas and medulloblastomas.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 238.

10. A

Other extra-axial posterior fossa masses include acoustic neuroma, meningioma, chordoma and epidermoid.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 239.

11. A

Ependymomas followed by astrocytoma are the most common.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 241.

12. A

Other causes increase carbon monoxide poisoning, barbituate intoxication, hypoxia, hypoglycaemia and lacunar infarcts.

Ref:

Dahnert W (2007) *Radiology Review Manual.* 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 244.

13. A

Due to excess iron accumulation, a central gliosis is associated with Haltervorden-Spatz disease, dementia, retinitis pigmentosa, X-linked disorders with mental retardation, atrophy and Parkinsonian disorders.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 241.

14. A

B-E are extra-axial features.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 246.

15. B

A and C-E are features of epidermoid cyst. A and C demonstrate CSF-like density and have smooth margins.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 276.

16. A

Cavernomas are most commonly located in subcortical regions and are hypodense areas which can calcify. They are associated with minimal mass effect/oedema. Cavernomas can undergo haemorrhagic change and are associated with seizures.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 273.

17. A

Syringohydromyelia, hydrocephalus, malformation of small bones and spine are also associations of Type I Chiari malformation.

18. B

Protein content/paramagnetic effect of Magnesium Mg2+/ Calcium Ca2+/, Iron Fe, in a cyst cause increased T1 and T2 SI. Colloid cysts appear iso/hyperdense on NCCT. They can occasionally widen septum pellucidum and cause asymmetrical enlargement of the lateral ventricles.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 277-278.

19. A

Located in CPA in 40%, accounting for 5% of CPA tumours.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 286.

20. E

No gadolinium enhancement and no white matter involvement.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 303.

21. A

Dural meningeal carcinomatosis is rarely associated with positive cytology and involves localised or diffuse curvilinear enhancement underneath inner table in expected position of dura.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 306.

22. A

Squamous cell lung cancer and adenocarcinoma of the lung cause cystic metastasis to the brain. Answers B-E are causes of haemorrhagic metastases.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 309-310.

23. A

Most commonly involve cortical and subcortical white matter, occasionally through corpus callosum as butterfly glioma.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 320.

24. A

B represents early subacute haemorrhage, C represents acute (12-72 hours), D represents hyperacute (less than 12 hours) and E represents chronic haemorrhage (> 1 month).

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 404.

25. A

These are all features of tuberous sclerosis.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 450-451.

26. A

MR angiography shows reversal of flow through the Superior Ophthalmic Vein (SOV), rapid progress of proptosis, visual loss or raised intracranial pressure requiring emergency treatment.

27. D

Sparing of muscle tendons is typical. Most cases are bilateral.

28. E

Drop metastases are usually dorsal in location in the spinal canal. Medulloblastomas are the most common cause of drop metastases. A higher percentage of CSF cytology is positive.

29. A

Basilar meninges often involved. B-E are recognised imaging findings. Spinal disease is less common than brain disease and findings include intramedullary lesions and intrathecal nodular masses.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagnosis, and Discussion*. Philadelphia: Lippincott Williams & Wilkins. p. 321.

30. D

Early CT findings may show medial temporal hypodensity. Areas poorly enhance on CT and MR. Signal abnormalities often decrease in response to treatment.

31. A

⅓ haemangioblastomas are purely solid, ⅓ are cystic with mural nodes and ⅓ are cystic with a more complex solid component.

Ref:

Provenzale, JM and Nelson, RC (1998) *Duke Radiology Case Review: Imaging, Differential Diagnosis, and Discussion*. Philadelphia: Lippincott Williams & Wilkins. p. 327.

32. E

Other features include cerebral atrophy with thickening of skull vault and surface enhancement, enlarged choroid plexus and enlarged medullary/subependymal veins. Choroid angiomas may be present.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 451.

33. A

Broad based attachment to petrous bone. More homogenous SI and less bright T2. Uniform enhancement distinguishes from vestibular schwannoma.

Ref:

Chapman S and Nakielny R (2003) *Aids to Radiological Differential Diagnosis*. 4th edition. London: Saunders Ltd. p. 469.

34. D

Parathyroid adenomas are typically well circumscribed, round or oval hypoechoic nodules. They are usually low signal on T1 and high on T2. However, they may appear as high signal on both in the presence of haemorrhagic change. Parathyroid adenomas are usually hyperdense on CT.

Ref:

Ahuja AT *et al*. Imaging for primary hyperparathyroidism-what beginners should know. *Clinical Radiology* 2004; 59(11): 967–976.

35. E

Matting is associated with tubercular lymph nodes. Increased peripheral vessels is a feature of malignant nodes.

Ref:

Ahuja A *et al*. Sonography of neck lymph nodes. Part II: abnormal lymph nodes. *Clinical Radiology* 2003; 58(5): 359-366.

36. B

Carotid body tumours are painless pulsatile vascular masses, hyperintense on T2 and heterogeneously isointense on T1 with avid enhancement. Multiple flow voids are usually seen on MRI.

37. D

Both are extra-axial and can be of mixed attenuation. Although skull fractures are more common in EDH, this cannot be the single best answer as EDH cross dural attachments are limited by cranial sutures.

38. A

Ameloblastomas grow in the buccolingual direction and are expansile.

Ref:

Macanovic M *et al*. Incidental bony pathology when reporting trauma orthopantomograms. Ameloblastomas grow in the buccolingual direction and are expansile. *Clinical Radiology* 2010; 65(10): 842-849.

39. A

Other features of meningioma include calcification, homogenous enhancement and hyperostosis.

40. A

Glomus tumour is the most common cause of pulsatile tinnitus.

41. B

Multiple flow voids are due to hypertrophied lenticulostriate arteries. Children more often present with ischemia and infarct in cortical/subcortical areas. Adults more often present with haemorrhage than children, but when infarcts do occur, they are most often in the deep white matter. The disease can involve the posterior circulation. The supraclinoid MCA is the first to be involved.

Ref:

Kuroda S *et al*. Moyamoya disease: current concepts and future perspectives. *Lancet Neurology* 2008; 7(11): 1056-1066.

42. A
Osteoblastoma is a cause of a solitary dense pedicle.

43. A
Other intramedullary masses include astrocytomas are dermoids (lipoma/teratomas), acutely expanding infarcts and haematoma.

44. A
Rheumatoid arthritis is the most common cause of erosion of the odontoid peg.

45. A
75% of cases are in the basal ganglia.

46. D
Progressive multifocal leukoencephalopathy has a predilection for the parieto-occipital region.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 324-325.

47. A

Other causes are lymphoma, adenocarcinoma, adenoid cystic carcinoma, mucoceles and paranasal sinusitis.

48. B

Other causes include early thyroiditis, hyperthyroidism, and rebound after withdrawal of anti-thyroid medications.

Ref:

Dahnert W (2007) *Radiology Review Manual*. 6th edition. Philadelphia: Lippincott Williams & Wilkins. p. 363.

49. C

Other causes include autonomous adenoma and, very rarely, thyroid cancer. Any hot nodule on Tc-99m should be imaged with I-123 to differentiate between autonomous and cancerous lesions.

50. B

Stage T3 disease includes tumour limited to the larynx with cord fixation or extension to post-cricoid area, and medial wall of the pyriform sinus/pre-epiglottc space.

Ref:

Connor S. Laryngeal cancer: how does the radiologist help? *Cancer Imaging* 2007; 28(7): 93-103.

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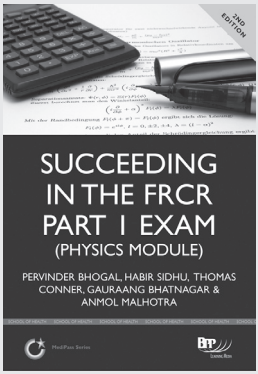

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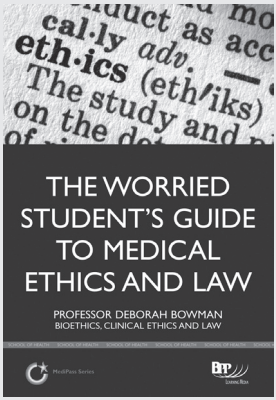

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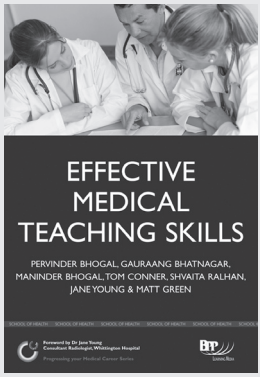

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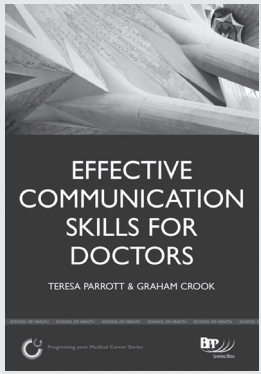

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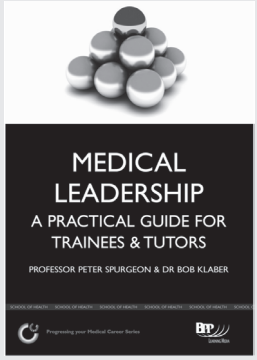

Are you a doctor or medical student who wishes to acquire and develop your leadership and management skills? Do you recognise the role and influence of strong leadership and management in modern medicine?

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Using case studies and practical exercises to provide a strong work-based emphasis, this practical guide will enable you to build on your existing experiences to develop your leadership and management skills, and to develop strategies and approaches to improving care for your patients.

This book addresses:

- Why strong leadership and management are crucial to delivering high quality care
- The theory and evidence behind the Medical Leadership Competency Framework
- The practical aspects of leadership learning in a wide range of clinical environments (eg handover, EM, ward etc)
- How Consultants and trainers can best facilitate leadership learning for their trainees and students within the clinical work-place

Whether you are a medical student just starting out on your career, or an established doctor wishing to develop yourself as a clinical leader, this practical, easy-to-use guide will give you the techniques and knowledge you require to excel.

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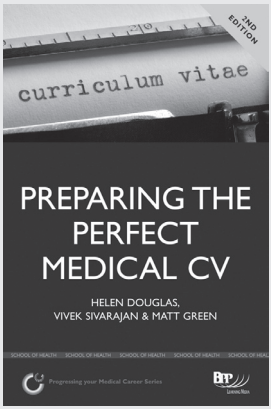

Are you unsure of how to structure your Medical CV? Would you like to know how to ensure you stand out from the crowd?

With competition for medical posts at an all time high it is vital that your Medical CV stands out over your fellow applicants. This comprehensive, unique and easy-to-read guide has been written with this in mind to help prospective medical students, current medical students and doctors of all grades prepare a Medical CV of the highest quality. Whether you are applying to medical school, currently completing your medical degree or a doctor progressing through your career (foundation doctor, specialty trainee in general practice, surgery or medicine, GP career grade or Consultant) this guide includes specific guidance for applicants at every level.

This time-saving and detailed guide:

- Explains what selection panels are looking for when reviewing applications at all levels.
- Discusses how to structure your Medical CV to ensure you stand out for the right reasons.
- Explores what information to include (and not to include) in your CV.
- Covers what to consider when maintaining a portfolio at every step of your career, including, for revalidation and relicensing purposes.
- Provides examples of high quality CVs to illustrate the above.

This unique guide will show you how to prepare your CV for every step of your medical career from pre-Medical School right through to Consultant level and should be a constant companion to ensure you secure your first choice post every time.

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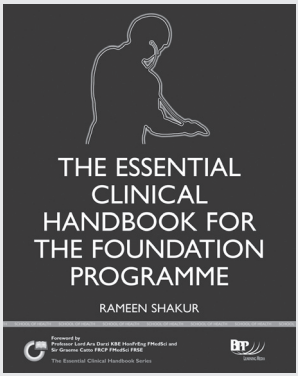

Unsure of what clinical competencies you must gain to successfully complete the Foundation Programme? Unclear on how to ensure your ePortfolio is complete to enable your progression to ST training?

This up-to-date clinical handbook is aimed at current foundation doctors and clinical medical students and provides a comprehensive companion to help you in the day-to-day management of patients on the ward. Together with this it is the first handbook to also outline clearly how to gain the core clinical competencies required for successful completion of the Foundation Programme. Written by doctors for doctors this comprehensive handbook explains how to successfully manage all of the common cases you will face during the Foundation Programme and:

- Introduces the Foundation Programme and what is expected of a new doctor especially with the introduction of Modernising Medical Careers
- Illustrates clearly the best way to manage, step-by-step, over 150 commonly encountered clinical diseases, including NICE guidelines to ensure a gold standard of clinical care is achieved.
- Describes how to successfully gain the core clinical competencies within Medicine and Surgery including an extensive list of differentials and conditions explained
- Explores the various radiology images you will encounter and how to interpret them
- Tells you how to succeed in the assessment methods used including DOP's, Mini-CEX's and CBD's.
- Has step by step diagrammatic guide to doing common clinical procedures competently and safely.
- Outlines how to ensure your ePortfolio is maintained properly to ensure successful completion of the Foundation Programme.
- Provides tips and advice on how to start preparing now to ensure you are fully prepared and have the competitive edge for your CMT/ST application.

The introduction of the e-Portfolio as part of the Foundation Programme has paved the way for foundation doctors to take charge of their own learning and portfolio. Through following the expert guidance laid down in this handbook you will give yourself the best possible chance of progressing successfully through to CMT/ST training.

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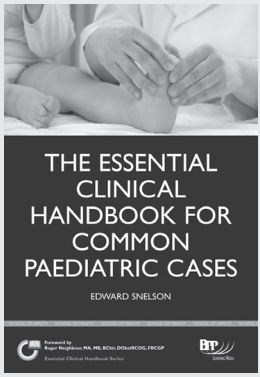

Not sure what to do when faced with a crying baby and demanding parent on the ward? Would you like a definitive guide on how to manage commonly encountered paediatric cases?

This clear and concise clinical handbook has been written to help healthcare professionals approach the initial assessment and management of paediatric cases commonly encountered by Junior Doctors, GPs, GP Specialty Trainee's and allied healthcare professionals. The children who make paediatrics so fun, can also make it more than a little daunting for even the most confident person. This insightful guide has been written based on the author's extensive experience within both a General Practice and hospital setting.

Intended as a practical guide to common paediatric problems it will increase confidence and satisfaction in managing these conditions. Each chapter provides a clear structure for investigating potential paediatric illnesses including clinical and non-clinical advice covering: background, how to assess, pitfalls to avoid, FAQs and what to tell parents.

This helpful guide provides :

- A problem/symptom based approach to common paediatric conditions
- An essential guide for any doctor assessing children on the front line
- Provides easy-to-follow and step-by-step guidance on how to approach different paediatric conditions
- Useful both as a textbook and a quick reference guide when needed on the ward

This engaging and easy to use guide will provide you with the knowledge, skills and confidence required to effectively diagnose and manage commonly encountered paediatric cases both within a primary and secondary care setting.

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