Part 3
80 Neurology, Respiratory SBAs, EMQs & MCQs

Neurology SBA

A 32-year-old woman presents with intermittent headaches lasting around 24 hours, associated with nausea and sensitivity to movement, light and sound. The frequency of the headaches is four or five per month. What is the best prophylactic treatment to give her to try and prevent the headaches?

A. Sumatriptan
B. Paracetamol
C. Verapamil
D. Ibuprofen
E. Propranolol

E. Propranolol

Management of migraine involves treatment of the acute episode and prophylactic treatment in patients with regular headaches (usually greater than 3 per month). Acute treatment is with simple analgesia (and antiemetic if necessary) initially, but some patients may benefit from using a triptan. A number of different drugs can be used for prophylactic treatment including propranolol, amitriptyline, sodium valproate and topiramate.

Neurology MCQ

A 22-year-old woman presents with intermittent headaches that occur infrequently, around once every month and last for around 24 hours every time. They are usually unilateral, throbbing in nature with associated nausea, photophobia and phonophobia. Which of the following drugs might be used in treating an acute attack of this type of headache?

A. Sumatriptan
B. Amitriptyline
C. Aspirin
D. Propranolol
E. Pizotifen

A and C might be used in an acute migraine attack. Initially simple analgesia (+/- an antiemetic) are used for migraine, and aspirin is one of the most effective of the simple analgesics for migraine. If these do not help then the triptans may be used – these include sumatriptan, naratriptan and
rizatriptan. The other drugs mentioned here are only used as preventative treatments for migraine. Other drugs apart from propranolol, pizotifen and amitriptyline used for migraine prophylaxis include sodium valproate and topiramate.

**Neurology SBA**

A 25-year-old woman has an episode of altered consciousness lasting a few minutes. She had no memory of the event, but just beforehand she developed a sense of déjà vu and had a rising feeling in her stomach.

A. What is the most likely cause?
B. Complex partial seizure
C. Cardiac arrhythmia
D. Postural hypotension
E. Vasovagal syncope
F. Transient global amnesia

A. Complex partial seizure
She has features which are characteristic ‘aura’ that occur before complex partial seizures arising from the temporal lobe i.e. déjà vu and a rising epigastric sensation. The other causes may lead to altered or loss of consciousness, but not the characteristic aura. Syncope, either due to vasovagal episodes or cardiac causes often have presyncopal symptoms including lightheadedness prior to losing consciousness.

**Neurology MCQ**

A 32 year-old man is known to have complex partial seizures consisting of brief episodes of altered consciousness associated with olfactory hallucinations, episodes of déjà vu and a rising epigastric sensation. Which of the following drugs may be helpful in controlling his seizures?

A. Carbamazepine
B. Sodium valproate
C. Propranolol
D. Amitriptyline
E. Lamotrigine

A, B and E are commonly used antiepileptic medications which may be used in complex partial seizures. Carbamazepine is commonly used as a first-line medication in patients with partial seizures but other drugs including sodium valproate and lamotrigine can be used as well. C and D are not antiepileptic medications. Propranolol and amitriptyline are both commonly used for migraine prophylaxis.
**Neurology SBA**

A 35-year-old woman presents to neurology clinic after developing odd movements of the limbs and face over the last nine months. Her father had similar problems and died in his 50’s. On examination she had grimacing of the face and involuntary, irregular movements of the arms and legs.

What is the most likely diagnosis?

A. Wilson’s disease  
B. Huntington’s disease  
C. Parkinson’s disease  
D. Sydenham’s chorea  
E. Multiple system atrophy

**B. Huntington’s disease**

This woman has a hyperkinetic movement disorder consistent with chorea. With her father suffering from the same illness, it raises the possibility of an autosomal dominant disorder with the most likely cause being Huntington’s disease. In Sydenham’s chorea a family history would not be expected and the other disorders are predominantly hypokinetic movement disorders rather than hyperkinetic (although tremor may be seen in each).

**Neurology MCQ**

A 72-year-old man has Parkinson’s disease with an asymmetrical akinetic-rigid syndrome and rest tremor. Which of the following drugs might you use as therapy for him?

A. Levodopa  
B. Tetrabenazine  
C. Propranolol  
D. Pramipexole  
E. Ropinirole

A, D and E.

Levodopa and the dopamine agonists pramipexole and ropinirole are commonly used as first line therapy for Parkinson’s disease. In younger people the dopamine agonists are usually used first-line whereas in older patients levodopa is used. Tetrabenazine can be used in patients with chorea but is unhelpful for akinetic-rigid syndromes whilst propranolol is commonly used in patients with essential tremor and similarly is not useful for akinetic-rigid syndromes.
Neurology SBA
A 25-year-old man had been hit on the head by a cricket ball and then about one hour later had lost consciousness. On a CT head scan in A+E he had a haemorrhage shaped like a convex lens.
What is the most likely cause?
A. Subdural haematoma
B. Subarachnoid haemorrhage
C. Extradural haematoma
D. Brainstem haemorrhage
E. Intracerebral haemorrhage

C. Extradural haematoma
He has a clinical history often seen in patients with extradural haematomas who have a lucid interval following the head injury before losing consciousness. The CT scan shows the features typical of an extradural haematoma where the bleed is ‘lentiform’ i.e. shaped like a lens. This differentiates it from other types of bleeds e.g. subdural haematomas which may be shaped like a ‘crescent’, subarachnoid haemorrhage where the blood is seen in the subarachnoid space and intracerebral haemorrhages where the blood is seen within the brain.

Neurology SBA
A 32-year-old woman sustains a head injury in a road traffic accident. On examination in A+E she is only making a few, unclear and incomprehensible sounds and she opens her eyes only to a painful stimulus. She will move her arm in order to localise to a painful stimulus. What is her Glasgow Coma Scale score?
A. 7
B. 8
C. 9
D. 10
E. 11

C. 9. She scores 2 for eye response, 2 for verbal response and 5 for her motor response. The maximum GCS is 15 and is scored as best eye response out of 4, best verbal response out of 5 and best motor response out of 6. Eye response is scored as 1 no eye opening, 2 eye opening in response to pain, 3 eye opening to command, 4 eyes open spontaneously. Verbal response is scored as 1 no verbal response, 2 incomprehensible sounds, 3 inappropriate words, 4 confusion, 5 normal speech. Motor response is scored as 1 no motor response, 2 extension to pain, 3 abnormal flexion to pain, 4 normal flexion to pain, 5 localization to pain, 6 obeys commands.
Neurology SBA
A 34-year old woman presents to A+E with a two day history of increasing headache and confusion. She has a temperature of 38.2 degrees. Whilst in the emergency department she has a tonic-clonic seizure. MRI shows increased signal in the temporal lobes on T2 imaging. What is the most likely cause?
A. Alcohol intoxication
B. Severe pneumonia
C. Viral encephalitis
D. Subarachnoid haemorrhage
E. Hepatic encephalopathy

B. Viral encephalitis
She has acute confusion with a headache, seizure and a fever. Combined with the imaging findings this is characteristic for a viral encephalitis. The other disorders may cause acute confusion but not the other features in combination. Brain imaging would be expected to be normal in the other cases apart from subarachnoid haemorrhage where there may be evidence of a bleed on the scan. A temperature and confusion may be seen in severe pneumonia but not a seizure. Alcohol intoxication may lead to seizures, particularly with withdrawal but is unlikely to cause a fever of 38.2.

Neurology MCQ
A 72-year-old woman presents to A+E acutely confused. Which of the following are possible causes?
A. Urinary tract infection
B. Seizure
C. Pneumococcal meningitis
D. Renal failure
E. Hypoglycaemia

All of the above causes may cause an acute confusional state.

Causes can be thought of: 1) Metabolic and electrolyte abnormalities including hyponatraemia, hypercalcaemia, hepatic encephalopathy, uraemia, hypoglycaemia, 2) Infections such as UTIs or pneumonia, 3) Drugs and toxins e.g. alcohol or recreational drugs, 4) Neurological causes such as seizures, stroke or encephalitis, 5) Hypoxia.
Neurology SBA
A 53-year-old woman has a one-week history of sudden onset of weakness of the left side of her face. On examination she has a left-sided facial droop with difficulty on the left side in raising her eyebrow, closing her eye and blowing out her cheek. What is the most likely diagnosis?

A. Myasthenia gravis  
B. Lacunar infarct  
C. Multiple sclerosis  
D. Bell’s palsy  
E. Middle cerebral artery infarct

D. Bell’s palsy
This patient has weakness affecting all muscle groups on the left side of her face including the forehead suggestive of a lower motor neurone lesion (a 7th nerve palsy). The most common cause for this would be a Bell’s palsy. The other options can all cause facial weakness – hemispheric infarcts will cause an upper motor neurone facial weakness with forehead sparing. Myasthenia gravis usually causes bilateral facial weakness and there may be other features of myasthenia including ptosis and ophthalmoplegia. Facial weakness is rare in multiple sclerosis and is usually an upper motor neurone lesion.

Neurology MCQ
A 32-year-old develops right-sided lower motor neurone facial weakness. Which of the following are possible causes of this?

A. Lacunar infarct  
B. Parotid gland tumours  
C. Guillain-Barre syndrome  
D. Bell’s palsy  
E. Middle cerebral artery infarct

B, C and D may all cause a lower motor neurone facial weakness whilst A and E cause upper motor neurone facial weakness. Facial weakness may be caused by a lesion in the upper motor neurone (from the motor cortex to the 7th nerve nucleus in the brainstem e.g. strokes affecting the cerebral hemispheres), the lower motor neurone (i.e. the 7th nerve itself, from the 7th nerve nucleus to the neuromuscular junction e.g. Bell’s palsy, Guillain-Barre syndrome, Lyme disease, sarcoidosis, parotid gland tumours), the neuromuscular junction (e.g. myasthenia gravis) and the muscle (e.g. muscular dystrophies such as myotonic dystrophy).
Neurology SBA
A 51-year-old man with diabetes develops features of an autonomic neuropathy. Which of the following symptoms does not occur in an autonomic neuropathy?

A. Erectile dysfunction  
B. Urinary urgency  
C. Postural hypotension  
D. Stridor  
E. Constipation

D. Stridor
All the other features may be seen in patients with autonomic neuropathy. Symptoms may include abnormal sweating as well as cardiovascular problems such as postural hypotension, gastrointestinal problems such as diarrhoea or constipation, urinary dysfunction such as urgency or frequency, and erectile dysfunction. It occurs in a number of different diseases including diabetes, amyloidosis and Guillain-Barre syndrome.

Neurology MCQ
Which of the following disorders may cause an autonomic neuropathy?

A. Guillain-Barre syndrome  
B. Diabetes  
C. Charcot-Marie-Tooth disease  
D. Amyloidosis  
E. Sarcoidosis

A, B and D may cause an autonomic neuropathy. These are less common than other neuropathies but can occur in a number of different conditions, particularly diabetes, amyloidosis and Guillain-Barre syndrome. Patients with autonomic neuropathies may have a wide variety of symptoms including cardiovascular problems e.g. postural hypotension, gastrointestinal problems e.g. diarrhoea or constipation, erectile dysfunction, abnormal sweating and urinary dysfunction.
**Neurology SBA**

A 67-year-old woman had a 3 month history of weakness of his left leg and a 1 month history of weakness in both arms. He felt things were getting progressively worse. On examination he had wasting and fasciculations in all four arms. He was weak in all four limbs with brisk reflexes throughout with upgoing plantars. He had a normal sensory examination. What is the most likely diagnosis?

- A. Polymyositis
- B. Parkinson’s disease
- C. Multiple sclerosis
- D. Motor neurone disease
- E. Myasthenia gravis

D. Motor neurone disease

He has progressive weakness with a mix of upper and lower motor neurone signs on examination in the presence of a normal sensory exam. This is consistent with motor neurone disease. Parkinson’s disease does not cause weakness. Multiple sclerosis is a central nervous system disorder and therefore associated with upper motor neurone signs. Myasthenia gravis is a neuromuscular junction disorder and polymyositis is a muscle disorder, neither of which would be associated with pathologically brisk reflexes (an upper motor neurone sign).

**Neurology MCQ**

A 67-year-old man has motor neurone disease. Which of the following features would be seen in a pseudobulbar palsy?

- A. Tongue wasting and fasciculations
- B. Dysphagia
- C. Brisk jaw jerk
- D. Spastic tongue
- E. Absent gag reflex

B, C and D are seen in a pseudobulbar palsy, an upper motor neurone disorder whilst A and E (as well as B) may be seen in a bulbar palsy, a lower motor neurone disorder. In a pseudobulbar palsy there is a spastic dysarthria, dysphagia, brisk jaw jerk and a spastic tongue. In a bulbar palsy, there is a nasal dysarthria, dysphagia, absent gag reflex and a wasted tongue with fasciculations.
**Neurology SBA**

A 53-year-old woman presents to the neurology clinic with a six month history of difficulty getting up from a chair. More recently she has noticed difficulty lifting things. On examination she has a rash over the dorsum of her hands and both eyelids. What is the most likely diagnosis?

A. Motor neurone disease  
B. Vitamin B12 deficiency  
C. Dermatomyositis  
D. Myotonic dystrophy  
E. Myasthenia gravis

C. Dermatomyositis.

This patient gives a history of proximal limb weakness, usually associated with muscle disorders. With the associated rash this would be most likely to be dermatomyositis. The description is of Gottron’s papules, a rash over the knuckles, and the heliotrope rash over the eyelids, both characteristic of dermatomyositis. A rash would not be expected in the other disorders.

**Neurology MCQ**

A 45-year-old man develops proximal limb weakness. Which of the following disorders may cause a myopathy?

A. Cushing’s disease  
B. Hypothyroidism  
C. Osteoporosis  
D. Thyrotoxicosis  
E. Turner's syndrome

A, B and D can all cause a myopathy i.e. a disorder of muscles that commonly causes proximal symmetrical limb weakness and/or wasting. Endocrinopathies are common causes of myopathies and other endocrine myopathies include hyperparathyroidism, Addison’s disease and acromegaly. The other common causes of myopathies include inflammatory disorders such as polymyositis and dermatomyositis, and drugs such as steroids and alcohol.
Neurology SBA
A 45-year-old man presents with a one year history of difficulty walking as well as pain and sensory disturbance in the upper limbs. On examination he has a spastic paraparesis and in the upper limb decreased sensation to pain in a ‘cape-like’ distribution i.e. over the shoulders, the lateral aspects of both arms and both thumbs and index fingers with intact proprioception and vibration. What is the most likely cause of his problems?

A. Multiple sclerosis  
B. Syringomyelia  
C. Vitamin B12 deficiency  
D. Anterior spinal artery infarct  
E. Tuberculosis

B. Syringomyelia
The patient has a spastic paraparesis which can be seen in each of the conditions but has a dissociated sensory loss in a ‘cape-like’ distribution which is characteristic of a syrinx in the cervical region. Vitamin B12 deficiency may cause subacute combined degeneration of the cord with dorsal column involvement but sparing of the spinothalamic tract. Anterior spinal artery infarcts may only affect the anterior part of the cord i.e. affect the spinothalamic tract but not the dorsal columns. MS and TB may variably affect the cord but may affect both the spinothalamic tracts and dorsal columns.

Neurology MCQ
A 52-year-old woman presents with difficulty walking for six months and has features characteristic of a spastic paraparesis on examination. Which of the following disorders might cause this?

A. Multiple sclerosis  
B. Syringomyelia  
C. Guillain-Barre syndrome  
D. Transverse myelitis  
E. Charcot-Marie-Tooth disease

A, B and D may cause a spastic paraparesis i.e. they are upper motor neurone disorders that can affect the corticospinal tracts within the spinal cord. C and E are lower motor neurone disorders and affect the peripheral nerve causing the features of a peripheral neuropathy. Guillain-Barre syndrome is an acute onset lower motor neurone disorder causing ascending weakness whilst Charcot-Marie-Tooth disease is a genetic peripheral neuropathy causing distal symmetrical weakness and/or distal sensory disturbance.
Neurology EMQ 1

A. Brown-Sequard syndrome
B. Peripheral neuropathy
C. Myopathy
D. Brainstem lesion
E. Spinal cord compression
F. Anterior spinal cord lesion
G. Neuromuscular junction disorder
H. Plexopathy
I. Posterior spinal cord lesion
J. Motor cortex lesion

Choose which of the above causes is the most appropriate location for each of the descriptions of a neurological deficit.

Q1. A 25-year-old man returns from holiday to Spain and develops sudden weakness of the legs followed a few days later by weakness in the arms. On examination he has weakness in all four limbs and his reflexes are absent.

A1. Answer B. This man most likely has Guillain-Barre syndrome (GBS) i.e. a peripheral neuropathy. His reflexes are absent - a lower motor neurone lesion. Acute ascending weakness in a lower motor neurone pattern is most likely caused by GBS.

Q2. A 65-year-old woman develops weakness in both legs. She has weakness mostly of the flexor muscles in a symmetrical pattern with brisk reflexes. She also has vibration and proprioception impairment in the legs but intact pain and temperature sensation.

A2. Answer I. This woman has a posterior spinal cord lesion characterized by dorsal column impairment with intact spinothalamic tracts.

Q3. A 50-year-old woman has increasing difficulty rising from a chair over a two month period. On examination she has symmetrical proximal weakness of the legs and also the arms with some pain in the same muscles.

A3. Answer C. This woman has a myopathy characterized by symmetrical proximal weakness.

Q4. A 71-year-old man with known prostate cancer presents with increasing difficulty walking over the last couple of weeks. He has weakness of the flexor muscles in the legs and brisk reflexes. All
sensory modalities are impaired in the legs with light touch and pinprick sensation impaired onto the abdomen up to the umbilicus.

A4. Answer E. This gentleman has a spinal cord lesion affecting the whole cord (corticospinal tracts, dorsal columns and spinothalamic tracts). He has a sensory level suggesting a lesion affecting the spinal cord about T10.

Q5. A 50-year-old woman presents with difficulty keeping her head up. She has neck flexion weakness on examination as well as proximal weakness in the arms which is fatigable.

A5. Answer G. This lady has myasthenia gravis, a neuromuscular junction disorder, with characteristic fatigability.

Neurology EMQ 2

A. Broca’s aphasia
B. Pseudobulbar dysarthria
C. Cerebellar dysarthria
D. Wernicke’s aphasia
E. Conduction aphasia
F. Cerebellar dysarthria
G. Bulbar dysarthria
H. Hypokinetic (Parkinsonian) dysarthria
I. Transcortical sensory aphasia

Choose which of the above causes is the most appropriate speech abnormality for each of the descriptions below.

Q1. A 35-year-old woman has slurred speech associated with unsteadiness in walking.

A1. Answer C. This lady has slurring of speech in association with an ataxic gait, both features of a cerebellar disorder.

Q2. A 61-year-old man has difficulty in producing speech. His speech contains incorrect words that are similar in sound to the correct word. His speech is also missing function words such as ‘and’, ‘the’ and ‘of’. Comprehension of speech is normal.
A2. Answer A. This man has a nonfluent or expressive aphasia with speech errors and agrammatism characteristic of Broca’s aphasia in contrast to the fluent or receptive aphasia seen in Wernicke’s aphasia.

Q3. A 42-year-old man has nasal speech associated with a wasted tongue.

A3. Answer G. This man has features of a bulbar palsy, a lower motor neurone syndrome, contrasting with the upper motor neurone features seen in a pseudobulbar palsy.

Q4. A 75-year-old man has difficulty with repeating words but relatively normal speech production apart from the occasional speech error. Comprehension of speech is normal.

A4. Answer E. This man has relatively intact speech production and comprehension but impaired repetition – this is consistent with conduction aphasia (and distinct to either Broca’s aphasia where there is speech production impairment and Wernicke’s aphasia where there is speech comprehension impairment).

Q5. A 69-year-old man has very soft, quiet speech that trails off towards the end of a sentence. The content of his speech is normal as is comprehension.

A5. Answer H. This man has the type of speech disorder seen in Parkinsonian disorders.

**Neurology EMQ 3**

- A. Idiopathic Parkinson’s Disease
- B. Essential tremor
- C. Huntington’s disease
- D. Hemiballismus
- E. Drug-induced parkinsonism
- F. Progressive supranuclear palsy
- G. Wilson’s disease
- H. Thyrotoxicosis
- I. Multiple system atrophy
- J. Sydenham’s chorea
- K. Creutzfeldt-Jakob disease
- L. Physiological tremor
Choose which of the above causes is the most appropriate movement disorder for each of the descriptions below.

Q1. A 55-year-old man has facial grimacing and writhing movements of the arms. His father also had the same problem.
A1. Answer C. This man has a hyperkinetic movement disorder which sounds like chorea. With a family history of the same problem the most likely cause would be Huntington’s disease.

Q2. A 44-year-old woman has a tremor in both arms which is most prominent when her hands are outstretched but is not present when she is resting. She has noticed that it improves whenever she has a glass of wine. The rest of the neurological examination is normal.
A2. Answer B. This woman has a symmetrical postural tremor which improves with alcohol. This is most likely to be an essential tremor. There are no other neurological abnormalities on examination to suggest a parkinsonian disorder

Q3. A 65-year-old man has had rapidly progressive memory problems over the last few months and his arms have started intermittently jerking.
A3. Answer K. This man has myoclonus of the arms. This occurs in a number of conditions but in association with a rapidly progressive dementia is likely to be caused by CJD.

Q4. A 78-year-old woman has a tremor in her right arm which is most prominent at rest. She has also had increased difficulty using the right arm as it has become stiff over the last six months.
A4. Answer A. An asymmetrical rest tremor is most characteristic of idiopathic Parkinson’s disease. This woman also described rigidity, one of the other features of PD along with bradykinesia.

Q5. A 66-year-old man has difficulty walking with a number of falls backwards. Examination reveals relatively symmetrical rigidity and difficulty looking downwards.
A5. Answer F. Progressive supranuclear palsy is one of the “Parkinson-plus” conditions with relatively symmetrical parkinsonism (compared to the asymmetry seen in idiopathic PD) and a supranuclear gaze palsy (an eye movement disorder).
Neurology EMQ 4

A. Juvenile myoclonic epilepsy
B. Hyponatraemia
C. Hypoxia
D. Venous sinus thrombosis
E. Encephalitis
F. Hypoglycaemia
G. Hypocalcaemia
H. Temporal lobe epilepsy
I. Alcohol withdrawal seizures
J. Glioma
K. Head injury
L. Idiopathic generalized epilepsy

Choose which of the above causes is the most appropriate cause of seizures for each of the descriptions below.

Q1. A 42-year-old man presents with a few episodes of altered consciousness. He says that he gets an odd smell before the episodes and occasionally a rising feeling in his stomach.
A1. Answer H. Temporal lobe epilepsy can be associated with a number of symptoms including déjà vu, jamais vu, a rising feel in the stomach and olfactory hallucinations.

Q2. A 65-year-old man presents with confusion and a tremor and appears to be describing visual hallucinations. He then has a tonic-clonic seizure.
A2. Answer I. This gentleman has features of an alcohol withdrawal syndrome.

Q3. A 22-year-old man presents with three generalized tonic-clonic seizures over the last year. He mentions that since the age of 16 he will occasionally get jerking movements of the arms early in the morning.
A3. Answer A. This man has myoclonus (jerking movements) of the arms, which started in his teens, in association with seizures – the most likely diagnosis is juvenile myoclonic epilepsy.

Q4. A 65-year-old man presents with a tonic-clonic seizure. He had recently been started on a drug for hypertension.
A4. Answer B. Hyponatraemia can cause seizures. This gentleman is likely to have been on a thiazide diuretic leading to SIADH and thus hyponatraemia.
Q5. A 26-year-old woman presents with a headache and confusion and on examination was found to have papilloedema. She has a tonic-clonic seizure whilst still in A+E.

A5. Answer D. The presence of headache, seizures and raised intracranial pressure (the patient has papilloedema) is seen in venous sinus thrombosis. This is more likely than encephalitis which may also cause headache and seizures.

Neurology EMQ 5

A. Horner’s syndrome
B. Third nerve palsy
C. Adie’s pupil
D. Opiate overdose
E. Argyll Robertson pupil
F. Marcus Gunn pupil
G. Pontine haemorrhage
H. Tricyclic antidepressant overdose

Choose which of the above causes is the most appropriate pupillary abnormality for each of the descriptions below.

Q1. A 65-year-old man has a small left pupil and the eyelid on that side is drooping. He was also noted to have wasting of the small muscles of the hand on the left.

A1. Answer A. This man has a Horner’s syndrome. Ptosis and pupil abnormalities are associated with Horner’s syndrome (small pupil) and third nerve palsy (large pupil).

Q2. A 30-year-old woman has a normal pupillary size on observation but on shining the light into each eye in turn, the left pupil dilates rather than constricts.

A2. Answer F. This woman has a relative afferent pupillary defect or a Marcus Gunn pupil. Unlike most other pupillary abnormalities the pupils are normal on observation. However, the ‘swinging flashlight’ test reveals a paradoxical dilation of the pupil on shining the light into the eye with the abnormal optic nerve.

Q3. A 33-year-old woman is admitted to A+E with decreased consciousness. She is noted to have bilaterally dilated pupils.
A3. Answer H. Tricyclic antidepressant overdose is associated with dilated pupils compared to opiates which cause constricted pupils.

Q4. A 69-year-old man is admitted to A+E with a severe headache followed by a decrease in conscious level. He was noted to have bilaterally constricted pupils.

A4. Answer G. Decreased conscious level with bilaterally constricted pupils can be due to a number of causes including opiate overdose and organophosphate poisoning but in a 69-year-old man with a preceding severe headache the most likely cause is a pontine haemorrhage.

Q5. A 45-year-old woman has a dilated left pupil. Her neurological exam is otherwise normal apart from decreased reflexes throughout.

A5. Answer C. A unilateral dilated pupil without a ptosis or eye movement disorder is most commonly due to an Adie’s pupil. Loss of deep tendon reflexes is often seen in this condition – Holmes-Adie syndrome.

**Neurology EMQ 6**

A. Central scotoma  
B. Left homonymous hemianopia  
C. Right inferior homonymous quadrantanopia  
D. Left inferior homonymous quadrantanopia  
E. Bitemporal hemianopia  
F. Right superior homonymous quadrantanopia  
G. Left superior homonymous quadrantanopia  
H. Right homonymous hemianopia  
I. Tunnel vision

Choose which of the above causes is the most appropriate visual field defect for each of the descriptions below.

Q1. A 72-year-old woman is found to have a right posterior cerebral artery infarct.

A1. Answer B. Posterior cerebral artery infarcts are usually associated with homonymous hemianopias. Beyond the optic chiasm the visual hemifield is represented on the opposite side of the brain i.e. left hemifield in the right hemisphere.
Q2. A 25-year-old woman develops a painful visual disturbance in her left eye. She had previously had an episode of ataxia a year earlier lasting a few months.

A2. Answer A. This woman is likely to have multiple sclerosis (two episodes of focal neurological deficits separated in time and space). The latest deficit is likely to be an optic neuritis which may cause a central scotoma.

Q3. A 45-year-old man develops enlarged hands and feet as well as coarsened facial features.

A3. Answer E. This man has acromegaly due to a pituitary tumour. Pituitary tumours may press on the optic chiasm causing a bitemporal hemianopia.

Q4. A 66-year-old man was found to have had a left parietal stroke.

A4. Answer C. Beyond the optic chiasm the visual hemifield is represented on the opposite side of the brain i.e. right hemifield in the left hemisphere. The optic radiations pass through the temporal lobe (lower) and the parietal lobe (upper) and represent the opposite part of the field i.e. upper radiation represents the inferior field and vice versa.

Q5. A 65-year-old man has impaired night vision and is found to have retinitis pigmentosa

A5. Answer I. Retinitis pigmentosa causes impaired peripheral vision which may lead to tunnel vision.

**Neurology EMQ 7**

A. Benign paroxysmal positional vertigo  
B. Vasovagal syncope  
C. Vestibular migraine  
D. Vertebrobasilar ischaemia  
E. Labyrinthitis  
F. Meniere’s disease  
G. Postural hypotension  
H. Cardiac arrhythmia

Choose which of the above causes is the most appropriate cause of dizziness for each of the descriptions below.
Q1. A 68-year-old man presents with recurrent episodes of dizziness lasting a few hours each time and associated with hearing loss and tinnitus in his left ear.

A1. Answer F. In Meniere’s disease there is vertigo associated with tinnitus and hearing loss.

Q2. A 45-year-old presents with a feeling of the world spinning for the last few days. She has also vomited a few times.

A2. Answer E. A ‘labyrinthitis’ or vestibular neuronitis causes vertigo lasting days, compared to BBPV which causes vertigo lasting seconds, and vertebrobasilar ischaemia lasting minutes and Meniere’s disease lasting hours.

Q3. A 50-year-old woman has a feeling of dizziness first thing in the morning and on getting up from a chair.

A3. Answer G. The most likely cause is postural hypotension.

Q4. A 65-year-old woman has brief episodes of a feeling of the whole world spinning, particularly when turning in bed.

A4. Answer A. BPPV is characterized by episodes of vertigo lasting seconds precipitated by position e.g. turning head to one side or turning in bed.

Q5. A 32-year-old woman has recurrent episodes of a feeling of the whole world spinning lasting about half an hour. Occasionally these are associated with a right-sided headache.

A5. Answer C. Recurrent episodes of vertigo associated with headache in a young person are most likely to be due to migraine.
**Neurology EMQ 8**

A. Multiple sclerosis  
B. Dermatomyositis  
C. Common peroneal nerve palsy  
D. L5 disc prolapse  
E. Diabetic amyotrophy  
F. Myasthenia gravis  
G. Becker’s muscular dystrophy  
H. Charcot-Marie-Tooth disease  
I. Chronic inflammatory demyelinating polyneuropathy  
J. Vitamin B12 deficiency  
K. Brown-Sequard syndrome  
L. Anterior spinal artery infarction

Choose which of the above causes is the most appropriate cause of leg weakness for each of the descriptions below.

Q1. A 32-year-old man develops a left foot drop after having had a cast on his leg following a fracture.

A1. Answer C. A common peroneal palsy may develop following pressure on the nerve by a plaster cast.

Q2. A 41-year-old woman develops difficulty in rising from a chair and has proximal weakness in her legs. She is also noted to have red areas over the backs of her fingers.

A2. Answer B. This woman has a proximal myopathy with a rash on the back of her hands consistent with Gottron's papules, features of dermatomyositis.

Q3. A 32-year-old woman has symmetrical weakness in both legs particularly of the flexor muscles. She has brisk reflexes and upgoing plantars. A year earlier she had an episode of painful loss of vision lasting a month.

A3. Answer A. This woman has a spastic paraparesis and sounds like she previously had an optic neuritis. The most likely diagnosis is multiple sclerosis (two episodes separated in time and space).

Q4. A 33-year-old man has distal symmetrical wasting and weakness of both legs with bilateral pes cavus.
A4. Answer H. This man has features of a peripheral neuropathy and in combination with pes cavus this is likely to be a hereditary neuropathy such as Charcot-Marie-Tooth disease.

Q5. A 46-year-old man presents with weakness of his left leg. On examination of his sensation he has impaired proprioception and vibration in the left leg and impaired pain sensation in the right leg.

A5. Answer K. This man has the classic features of a Brown-Sequard syndrome with dissociated sensory loss (dorsal column loss ipsilateral to the lesion and spinothalamic tract loss contralateral to the lesion).
Respiratory MCQ

A 44 year old man attends A & E following an acute episode of shortness of breath. A chest x-ray is performed.

Which of the following conditions predispose to this condition?

A. Pulmonary fibrosis  
B. Asthma  
C. COPD  
D. Kartagener’s syndrome  
E. Marfan’s Syndrome

T,T,T,F,T

Pneumothorax is identified on chest x-ray by the presence of a lung edge peripheral to which is an area of lucency, which does not contain lung markings. The following are all predisposing factors:
Congenital pulmonary blebs
Syndromes, such as Marfan’s and homocysteinuria
Chronic chest diseases, including asthma, cystic fibrosis, COPD, and sarcoidosis.
Atypical infections, such as PCP pneumonia
Pneumothoraces can also occur following trauma or iatrogenic injury.
Treatment depends on the size of the Pneumothorax, ranging from conservative treatment to immediate decompression with a pleural drain.

Respiratory SBA

A 59 year old lady with Grade 3 congestive cardiac failure has become increasingly short of breath despite excellent control of her cardiac function and no deterioration in her ejection fraction on echocardiography. A chest radiograph is reported to demonstrate bi-basal lung fibrosis which was not present 2 years earlier. Which of her cardiac medications is the most likely cause of the fibrosis?

a. Atenolol  
b. Spironolactone  
c. Digoxin  
d. Amiodarone  
e. Atorvastatin

d. Amiodarone
Pulmonary disease caused by medication is well recognised. Amiodarone is a frequently prescribed medication and a well known cause of pulmonary fibrosis. Amiodarone is a class III anti-arrhythmic drug commonly used in heart failure patients. Its side effects include fatal interstitial pneumonitis, diffuse alveolar damage and pulmonary fibrosis. Other drugs which are known to cause pulmonary fibrosis include busulfan, bleomycin, methysergide and cyclophosphamide. These drugs are largely used in the treatment of patients with cancer, rather than the cardiac arena.

Of the other drugs in the list above, the only other one which has an important effect on the respiratory system, is atenolol (a beta-blocker). These agents are relatively contra-indicated in asthmatics since they can cause broncho-constriction.
Respiratory SBA

A 45 year old oil rig worker is admitted with fever and shortness of breath following a return from a secondment overseas. Four days into his admission he develops worsening symptoms and a chest radiograph reveals a pleural collection. A pleural tap is performed due to concerns this may represent an empyema. Which of the following results is most fitting with an empyema?

<table>
<thead>
<tr>
<th>Option</th>
<th>Protein (g/dl)</th>
<th>LDH (mmol/l)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>2.4</td>
<td>378</td>
<td>7.15</td>
</tr>
<tr>
<td>b.</td>
<td>3.8</td>
<td>370</td>
<td>7.15</td>
</tr>
<tr>
<td>c.</td>
<td>2.8</td>
<td>277</td>
<td>7.45</td>
</tr>
<tr>
<td>d.</td>
<td>3.8</td>
<td>294</td>
<td>7.45</td>
</tr>
<tr>
<td>e.</td>
<td>3.4</td>
<td>213</td>
<td>7.38</td>
</tr>
</tbody>
</table>

b. Protein 3.8 g/dl LDH 370 mmol/l pH 7.15

A pleural effusion is a collection of fluid in the pleural space, between the parietal and serosal layers of the pleura. Pleural aspiration is usually necessary to determine the cause and nature of the effusion, whereby a sample is sent for biochemical analysis, bacteriological culture and microscopic examination. The effusion can then be classified into a transudate or exudate depending on its biochemical characteristics. pH is measured when there is concern regarding an empyema as it typically has a pH of less than 7.2.

Transudates have a protein content of <3g/dl and a lactate dehydrogenase (LDH) concentration of <200mmol/l. Causes of transudates include: cardiac failure, hypoalbuminaemia (‘nutritional failure’), renal failure, liver failure and constrictive pericarditis.

Exudates have a protein content of >3g/dl and a LDH concentration of >200mmol/l. Causes of exudates include: lobar pneumonia, lung cancer, mesothelioma, pulmonary embolus, TB and empyema.

Empyemas are infected pleural collections which require prompt drainage. This is attempted in the first instance with insertion of a pleural drain. If drainage fails, surgical intervention is required. Empyemas have a low pH (< 7.2), are exudates (protein > 3g/dl) and have a high LDH content (> 200 mmol/l).
**Respiratory SBA**
A 68 year old pub landlord and lifelong smoker is admitted with lethargy and drowsiness. Laboratory tests reveal results consistent with the syndrome of inappropriate anti-diuretic hormone secretion (SIADH) and a chest radiograph demonstrates a 3cm right upper lobe mass. He is due to undergo a CT guided biopsy of the mass. What is the histological subtype most likely to be?

a. Broncho-alveolar cell carcinoma  
b. Squamous cell carcinoma  
c. Pulmonary hamartoma  
d. Ovarian carcinoma metastasis  
e. Small (oat) cell carcinoma  

E. Small (oat) cell carcinoma

SIADH involves the inappropriate secretion of ADH which leads to retention of water and hyponatraemia. SIADH may be caused by many tumours, such as prostate, thymus, pancreatic and lymphomas, however the most common tumour causing SIADH are small cell carcinomas of the lung. Small cell carcinomas (oat cell carcinomas) often originate from APUD cells (amine precursor uptake decarboxylase cells- neuroendocrine cells). There is a high occurrence of paraneoplastic syndromes associated with this type of tumour, so presentation can be very varied.
**Respiratory SBA**

A 36 year old woman is admitted with shortness of breath and pleuritic chest pain following a 16 hour flight to London from Borneo. The working clinical diagnosis is of pulmonary embolus and a CT-pulmonary angiogram is requested. What is the most important consideration before the test can go ahead?

- a. Normal liver function tests
- b. Normal serum glucose
- c. Normal renal function
- d. Normal thyroid function
- e. If she is on the oral contraceptive pill

c. Normal renal function

A CT pulmonary angiogram (CTPA) is a diagnostic test employed to image the pulmonary arteries, its main use is to diagnose pulmonary embolism. In order to carry out a CTPA, contrast is administered intravenously. Radiological contrast media are nephrotoxic. This effect is dose dependent, and in many patients the effect is mild, transient, fully reversible and of no clinical significance. The risk of contrast nephropathy is amplified by the presence of coexisting conditions, which include:

- Renal impairment
- Hypovolaemia
- Low cardiac output
- Diabetes mellitus (especially if treated with metformin)
- Hyperviscosity (myeloma).

For this reason, and in answering the question above, one MUST conduct a renal function test prior to requesting a CTPA (or other contrast imaging investigation), in order to prevent contrast nephropathy. An estimated glomerular filtration rate (eGFR) is probably most useful in most cases. One of the rights bestowed on a newly qualified doctor is that of a referrer for imaging investigations. An essential element of this is to check the preconditions, such as renal function, before requests are made.
**Respiratory SBA**

A 71 year old man with a long history of COPD is admitted for the 8th time this year with shortness of breath. He is on maximum medical therapy, including home oxygen. An arterial blood gas is performed which is interpreted as showing type 2 respiratory failure. Which of the results is most consistent with that diagnosis?

a. pH 7.55  PaO2 7.1 kPa  PaCO2 6.1 kPa  Bicarbonate 34.8 mmol/l  
b. pH 7.45  PaO2 8.4 kPa  PaCO2 7.1 kPa  Bicarbonate 29.4 mmol/l  
c. pH 7.45  PaO2 7.2 kPa  PaCO2 6.4 kPa  Bicarbonate 34.1 mmol/l  
d. pH 7.27  PaO2 7.2 kPa  PaCO2 6.9 kPa  Bicarbonate 34.8 mmol/l  
e. pH 7.27  PaO2 7.1 kPa  PaCO2 5.9 kPa  Bicarbonate 34.6 mmol/l

d. pH 7.27  PaO2 7.2 kPa  PaCO2 6.9 kPa  Bicarbonate 34.8 mmol/l  

COPD (chronic obstructive pulmonary disease) has become the most popular term to describe patients with spectrum of chronic bronchitis and emphysema. Pulmonary function tests commonly show the following results:

- Increased residual volume and total lung capacity
- Reduced vital capacity, FEV₁, peak expiratory flow rate, and FEV₁:FVC ratio.

Respiratory failure is defined as a PaO₂<8kPa (60mmHg), and is divided into type I and type II. In type I respiratory failure, PaCO₂<6.5kPa. PaO₂ is low (hypoxaemic) but PaCO₂ may be normal or low. In type II respiratory failure, the PaCO₂>6.5kPa and the PaO₂ is low.

The significance of this classification is that in type II respiratory failure the patient may have developed tolerance to increased levels of PaCO₂: in other words, the drive for respiration no longer relies on hypercapnic drive (high PaCO₂), but instead on a hypoxic drive (low PaO₂). Therefore if the patient is given a high concentration of oxygen therapy, the hypoxic drive for ventilation may decrease.
Respiratory EMQ: CAVITATING LUNG LESIONS

a. Squamous cell carcinoma metastasis
b. Squamous cell primary lung malignancy
c. Wegener’s granulomatosis
d. Tuberculosis
e. Pulmonary infarct
f. Staphylococcus pneumonia
g. Progressive massive fibrosis
h. Aspergilloma

A 68 year old retired British Coal employee with a long history of shortness of breath attends a respiratory outpatient clinic. This is his yearly clinic review at which he has a chest x-ray. His symptoms are unchanged from 12 months previously. The report of his CXR reads ‘multiple cavitating lesions in both upper lobes, which are unchanged from the previous film’.

1: Progressive Massive Fibrosis (G)
Progressive massive fibrosis (PMF) is due to progression of Coal worker’s pneumoconiosis. With coal worker’s pneumoconiosis, the chest x-ray shows small pulmonary nodules less than 1.5mm. With progressive massive fibrosis, the chest x-ray reveals large fibrotic masses (1-10 cm), predominantly in the upper zones. These masses may cavitate over time.

A 62 year old man with a 10 year history of emphysema admits to increasing shortness of breath over the past 3 weeks. Over the last few days he has had several episodes of haemoptysis. He is known to have several upper lobe bullae. His chest x-ray report reads, ‘Air crescent sign within a cavitating right upper lobe lesion, correlating with one of the established bullae’.

2: Aspergilloma (H)
Aspergilli are typically inhaled as small spores which do not affect people without underlying lung or immune system disease. However, people with pre-existing lung problems, especially cavitating lung diseases, are at risk. This is because the fungus can settle in the cavities within the lungs, and is able to grow free from interference as the immune system is unable to penetrate the cavity. The chest x-ray findings show lesions with an air “halo/crescent” around them. People can often be unaware for some time before incidental diagnosis. However, a small percentage of aspergillomas invade into the cavity wall and can result in bleeding and hence haemoptysis, which may require resection of the damaged lung area containing the aspergilloma.
A 35 year old man with a 3 month history of sinus disease for which he is attending an ENT clinic is admitted with increasing shortness of breath. His chest x-ray reveals multiple cavitating lungs lesions in both lungs. His weight is stable and his white blood cell count is normal.

3: Wegener’s granulomatosis (C)
The patient’s clinical presentation is most in keeping with Wegener’s granulomatosis. This is a multisystem disorder due to a granulomatous reaction within small/medium sized arteries and veins. It typically starts with rhinorrhoea, with subsequent nasal mucosal ulceration, cough, dyspnoea, haemoptysis, epistaxis and/or pleuritic pain. A “saddle nose” deformity is also a feature sometimes seen in this condition. The chest x-ray shows nodular masses or pneumonic infiltrates with cavitation. This disease responds well to immunosuppression, eg. with cyclophosphamide.

A 17 year old 1st year university student attends her GP with a short history of shortness of breath and a productive cough. She has been ignoring her symptoms with all the excitement of university and life in halls of residence, but it is now restricting her activities of daily living. A chest x-ray reveals a 3 cm cavitating left upper lobe lesion, with an enlarged left hilum.

4: Tuberculosis (D) Tuberculosis transmission is through air and direct contact, whereby the initial infection is with *Mycobacterium tuberculosis*. Primary TB is usually asymptomatic; however, occasionally there may be erythema nodosum, a small pleural effusion or pulmonary collapse caused by compression of a lobar bronchus by enlarged nodes. The chest x-ray typically shows consolidation, air space or nodular changes in the upper zones, with loss of volume of the lung, and an enlarged hilum due to the enlarged lymph nodes.

A 67 year old life-long smoker attends his GP with hoarseness and weight loss. He has several palpable nodes bilaterally within the anterior triangle of the neck. In the first instance, a chest x-ray is performed which reports multiple bilateral cavitating lung lesions measuring up to 2cm.

5: Squamous cell carcinoma metastasis (A)
Squamous cell carcinoma is the commonest malignant tumour of the larynx affecting both men and women in a ratio of 5:1. The disease accounts for 1% of all male malignancies. Incidence increases with age, with the peak occurring at 60-70 years. Patients often present with hoarseness, although dyspnoea and stridor are late signs. Predisposing factors include alcohol and tobacco smoke (the condition is very rare in non-smokers).
It must be noted that the squamous cell primary lung malignancy is a possible differential diagnosis, but due to the multiple palpable lymph nodes, answer A is most likely.
Respiratory EMQ : INTRATHORACIC MALIGNANCIES

A. Bronchoalveolar cell carcinoma
B. Squamous cell carcinoma
C. Small cell carcinoma
D. Pleural fibroma
E. Mesothelioma
F. Thymoma
G. Teratoma
H. Large cell carcinoma

A 56 year old smoker presents to his GP with lethargy and a change in appearance including an increase in weight, predominantly around the trunk.

(C) Small cell carcinoma (ACTH secreting)
Small cell carcinomas are also commonly known as oat cell carcinomas, and account for 20-30% of all lung cancers. They arise from endocrine cells explaining why polypeptide hormones are often secreted by these tumours. These enhance tumour growth and result in paraneoplastic syndromes, such as ectopic production of ACTH (seen in this case) which produces an atypical type of Cushing’s syndrome. Typical features include weight loss, pigmentation, metabolic acidosis, hyperglycaemia, and hypertension. The classic features of Cushing’s are often absent. Oat cell carcinomas are typically found in middle aged male smokers. Although the tumours are normally rapidly growing and highly malignant, it is the only bronchial carcinoma that responds well to chemotherapy.

A 67 year old former electrician is admitted to hospital with increasing shortness of breath. He is a lifelong non-smoker. Clinically he has a large left sided pleural effusion which, when drained, was bloody and laboratory analysis identified an exudate. Bronchoscopy was normal.

(E) Mesothelioma
Mesothelioma is a malignant tumour of the visceral or parietal pleura, which may present as discrete pleural deposits or as a localized lesion. It is usually associated with asbestos exposure, however exposure may have been light and there may be a 20-40 year interval from exposure to disease. On x-ray the common finding is a unilateral pleural effusion and pleural thickening, with bloody pleural fluid being identified on tapping. Clinical features include pleuritic pain with increasing dyspnea, weight loss, finger clubbing, and recurrent pleural effusions.
A 65 year old lady is admitted with episodes of syncope. Her fasting blood sugar is 2.6 mmol/l. Respiratory examination is normal. The chest x-ray is abnormal but there is no mediastinal abnormality.

(D) Pleural fibroma
Pleural fibroma is a rare and benign primary tumor, which is mainly asymptomatic. It is not associated with asbestos exposure. The solitary mass can grow to be very large due to its slow growth from the visceral pleural. Pleural fibromas most commonly affect women with the mean age of presentation being around 50 years of age. These tumours generally behave in a benign fashion, although malignant tumours do exist. These tumours are known to be able to produce insulin-like growth factor II (IGF-II), causing the increased utilization of glucose, inducing the hypoglycaemia seen here.

A 25 year-old man attends an outpatient clinic with lethargy and mild stridor. Chest x-ray reveals an anterior mediastinal mass, which is confirmed on CT and shown to contains areas of fat and calcification.

(G) Teratoma
Teratomas are neoplasms of germ cell origin. They occur most often in the gonads, where germ cells are abundant. Teratomas can occasionally arise elsewhere in the body, usually in the midline, possibly from germ cells that have been arrested in their migration. These extra-gonadal sites for teratomas include the mediastinum and sacro-coccygeal region. The mass in this patient’s case may produce mild stridor due to a degree of obstruction of the trachea.

A 57 year-old man attends his GP complaining of increasing shortness of breath and myalgia. His GP refers him to rheumatology, who request a battery of tests including a chest radiograph and an ‘auto-antibody screen’. This reveals an anterior mediastinal mass and a positive Anti-AChR (Anti-acetylcholine receptor) antibody.

(F) Thymoma
Thymomas may be associated with myasthenia gravis whereby the anti-body mediated disease causes muscle fatigue due to the depletion of functioning post-synaptic receptor sites. In 10% of myasthenia gravis patients, a thymic tumour is found, the incidence increasing with age. Fatiguability is the single most important feature, affecting the proximal limb muscles, extraocular muscles, and the muscles of mastication, speech and facial expression. Respiratory difficulties may also occur. Preliminary tests may show a thymoma on chest x-ray that may be confirmed by cross sectional imaging with CT.
**Respiratory EMQ: RESPIRATORY BASED INVESTIGATIONS**

a. Chest x-ray  
b. CT pulmonary angiogram  
c. Pulmonary function tests  
d. Arterial blood gas sampling  
e. High resolution CT scan of chest  
f. Bronchoscopy  
g. Transbronchial biopsy  
h. Positron emission tomography (PET) scan (including chest)

A 69 year old smoker has been diagnosed with a stage T1, N1, M0 right upper lobe bronchial carcinoma. He has a good co-morbid status and is a potential candidate for a curative right upper lobectomy.

(H) Positron emission tomography (PET) scan (including chest)  
Bronchial carcinoma with a stage of T1, N1, M0 indicates that there lesion in less than 3cm and not involving the bronchus or pleura (T1), has ipsilateral hilar node metastases (N1) and no distant metastasis (M0).  
Positron emission tomography (PET) scanning is being increasingly used in the diagnosis and staging of lung cancer. It may detect metastatic disease in the mediastinal nodes, even if they are not enlarged, and is a more accurate imaging technique in the staging of lung cancer, when major curative surgery is being considered.

A 50 year old lady is admitted with shortness of breath, haemoptysis and right sided pleuritic chest pain. Her chest x-ray is normal. D-dimer is elevated.

(B) CT pulmonary angiogram  
This patient’s current symptoms, together with her increased d-dimer, suggests a diagnosis of pulmonary embolism. In order to diagnose this, a CTPA (computed tomography pulmonary angiogram) is required. This involves the injection of iodinated contrast medium into a peripheral vein, in order to rapidly image the pulmonary vessels as the contrast is injected. It is a very sensitive test and has superseded V/Q scanning in most centres.

A 44 year old man with increasing shortness of breath and lethargy has a chest radiograph which demonstrates that the lungs are clear. However, there is right paratracheal lymphadenopathy.
Serum ACE is elevated. A presumptive diagnosis of sarcoidosis is made for which treatment commencement is being considered.

(C) Pulmonary function tests
Sarcoidosis may have various clinical features, including bilateral hilar lymphadenopathy, erythema nodosum, pulmonary fibrosis, elevated serum ACE levels and more. The diagnosis of sarcoidosis can often be made on clinical grounds, particularly when a young adult presents with classical features such as the bilateral hilar lymphadenopathy and erythema nodosum. Although a tissue biopsy would be diagnostic, lung function tests are often conducted first as they are less invasive. The lung function tests may be normal or show reducing lung volumes, impaired gas transfer and a restrictive ventilatory defect due to progression of the disease causing fibrosis of the lungs. Pulmonary function tests may then be performed and reviewed following steroid therapy to access response to treatment.

A 45 year old patient with rheumatoid disease has complained of increasing shortness of breath over the past 9 months. 1 year previously her disease modifying anti-rheumatoid drug was changed to methotrexate.

(E) High resolution CT scan of chest
It is known that methotrexate may induce lung disease such as pulmonary fibrosis. With interstitial lung diseases such as those caused by methotrexate, high resolution CT (HRCT) imaging is the ideal imaging modality. As HRCT's aim is to assess a generalized lung disease, the test is conventionally performed by taking thin sections 10-40 mm apart. The result is a few images which should be representative of the lungs in general, but which cover only approximately one tenth of the lungs. Because HRCT does not image the whole lungs (by using widely spaced thin sections), it is unsuitable for the assessment of lung cancer or other localised lung diseases.

A 17 year old tall man becomes acutely short of breath following an aggressive collision whilst playing in the local football league.

(A) Chest x-ray
In high impact trauma cases, the likelihood of a patient suffering from a pneumothorax is an important consideration.
Respiratory EMQ: SOLITARY PULMONARY LESION

a. Bronchial carcinoma
b. Round pneumonia
c. Lung abscess
d. Pulmonary infarct
e. Arteriovenous malformation
f. Bronchogenic cyst
g. Pulmonary harmatoma
h. Aspergilloma

A 17 year old woman presents with shortness of breath and raised inflammatory markers. A chest x-ray taken 3 months previously was normal. There is now a 3 cm non-cavitating lesion in the left lower lobe.

(B) Round pneumonia
Round pneumonia affects children more commonly than adults. It is a spherical pneumonia caused by *Haemophilus influenza* or *Streptococcus* (pneumococcus). Its location is usually in the lower lobe, most often posterior. Its clinical features include cough, fever, chest pain, malaise, dyspnoea and haemoptysis. A chest x-ray should be repeated 6-8 weeks after clinical recovery to confirm resolution.

A 32 year old longstanding asthmatic with recurrent hospital admissions is admitted with fever and frank haemoptysis. A chest x-ray shows a 3 cm cavitating lesion in the left upper lobe with an ‘air crescent’ within it. No mediastinal lymphadenopathy

(H) Aspergilloma
This is a totally separate disease from allergic bronchopulmonary aspergillosis. It simply represents the growth within previously damaged lung tissue, of *A. Fumigatus*, which forms a ball of mycelia within lung cavities. The typical appearance on chest x-ray is of a round lesion with an ‘air crescent’ above it. The aspergilloma itself causes little trouble, though occasionally significant haemoptysis may occur due to erosion into an adjacent vessel, requiring resection of the damaged area of lung containing the aspergilloma.

A 44 year old man has a screening chest x-ray for work placement in Australia. He has a 10 pack-year history of smoking. He is asymptomatic. Chest x-ray shows a 2 cm right upper lobe nodule with calcification within.

(G) Pulmonary harmatoma
This is the most common benign tumour of the lung and is usually seen on chest x-ray as a very well defined round lesion 1-2 cm in diameter in the periphery of the lung. They occur as solitary round nodules with no predilection for any lobe. Growth is extremely slow, but the tumour can eventually reach several centimeters in diameter. Harmatomas are more common in men and in smokers. Peripheral nodules are asymptomatic, although endobronchial lesions are frequently associated with symptoms or signs of obstruction. As such, they must be distinguished from malignant neoplasms or recognized as the cause of a pneumonia or atelectasis. They usually contain fat and ‘popcorn’ calcification.

A 27 year old asymptomatic lady has a screenin x-ray for her new employment. There is a single right middle lobe lesion on chest x-ray. Her only medical history is of admission to hospital with a brain abscess 6 months ago.

(E) D- Arteriovenous malformation
Despite the presumed congenital origin of AVMs, the clinical presentation most commonly occurs in young adults. Pulmonary ateriovenous malformations are more common in females and may present with primarily neurologic manifestations when pulmonary symptoms are absent or unrecognized. Brain abscess, embolic stroke, and hemorrhage from concomitant brain AVMs are well-recognized complications. Whenever a pulmonary AVM is suspected, the presence of a right-to-left shunt should be confirmed by the performance of a 100% oxygen study, contrast-enhanced echocardiography, or radionuclide perfusion lung scanning. Hereditary haemorrhagic telangetasia is strongly associated with AVMs.

A 19 year old student has a chest x-ray before his year overseas for his university course. Chest x-ray shows a 3cm left lower lobe. Old images are ascertained from 7 years ago showing an identical unchanged abnormality.

Bronchogenic cyst (F)
Bronchogenic cysts may result from abnormal budding of the tracheobronchial tree. They are lined by bronchial elements such as cartilage, smooth muscle and ciliated respiratory epithelium. They are classified by their position - central or peripheral. Cysts are usually single, spherical or oval, unilocular masses. They are mainly asymptomatic and can present at any age, although they are more common in men. Surgical excision is recommended. Radiologically, it is impossible to differentiate a bronchogenic cyst and malignancy.
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