Neurology SBA Questions

Questions were made by students on behalf of The Peer Teaching Society. We hope there are no mistakes but are not liable for any false or misleading information.

1. A 24-year-old male presents to the GP with a foot drop. He has a loss of sensation in his lateral leg and foot, ankle eversion is unaffected, but inversion is weak.

   What is the likely cause of his symptoms?

   a) Common peroneal nerve palsy
   b) Cauda equina syndrome
   c) L5 Radiculopathy
   d) Deep peroneal nerve damage
   e) Severed spinal cord at the T3 level

2. A 40-year-old female presents to the GP with a weakness in his hand. He says he has a very poor grip and often ends up dropping objects that he tries to pick up. When questioned he describes a pain in his elbow and a tingling sensation that radiated from his elbow down to his hand. On examination you notice that his hand is fixed in a claw position.

   What group of muscles would you expect to have wasted due to the nerve damage?

   a) Hypothenar
   b) Thenar
   c) Lateral lumbricals
   d) Supinators
   e) Flexor compartment of the forearm

3. Jane a 30-year-old lady is referred to migraine clinic with shooting pains across the left side of her face. The shooting pains occur randomly, and only last a few seconds. They occur across her left cheek and jaw, and do not affect her forehead or eye. They occur three or four times per day.

   What would be the most appropriate first line medication to start to help prevent her symptoms?

   a) Propranolol
   b) Verapamil
   c) Paracetamol
   d) Carbamazepine
   e) Prednisolone

4. A 50-year-old male presents to A+E with haemoptysis and epistaxis. When taking a history, he tells you that he was diagnosed with Granulomatosis with polyangiitis 4 years ago.

   What may you find on this man on examination?

   a) Clubbing
   b) Saddle shaped nose
   c) Roth spots
   d) Jaundice
   e) Bouchard's nodes

5. Which of these medications is not a prophylaxis treatment for migraines?

   a) Propranolol
   b) Ibuprofen
   c) Amitriptyline
   d) Topiramate
   e) Botulinum toxin type A

6. Which of the following is not a suitable investigation to order for suspected dementia?

   a) Mini-mental state assessment
   b) MRI
   c) CSF analysis
   d) CT scan
   e) Confusion screen

7. You see a patient with confusion and memory loss. They are struggling with language recall and their behaviour has changed recently. Upon further questioning, you learn that their symptoms are behaving in a stepwise like progression, and they are stable for a while, before they deteriorate again.

   What is your most likely diagnosis?

   a) Alzheimer's
   b) Infection
   c) Vascular dementia
   d) Dementia with Lewy bodies
   e) Fronto-temporal dementia

8. You are asked to review a patient with hyperkinesia. She is 40 years old and was adopted so is unsure of her family history. She has recently been forgetful and has a long history of depression. Lately this has become much worse. You also note that her movements are irregular and involuntary. She appears very restless whilst talking to you.

   Based on this presentation, what would you be concerned about?

   a) Psychosis
   b) Parkinson's Disease
   c) Motor Neuron Disease
   d) Meningitis
   e) Huntington's Disease

9. Which of the following best describes the effect of an ischaemic stroke in the anterior, middle and posterior cerebral arteries?

   a) ACA: impaired judgment, upper limbs affected, paraesthesia MCA: hemiparesis of lower ipsilateral face, peripheral vision loss, PCA: dysphagia, ataxia, nystagmus.
   b) ACA: contralateral lower limb weakness MCA: hemiparesis of lower contralateral face, speech impairment, contralateral weakness, PCA: acute vision loss, memory loss
   c) ACA: confusion, limb weakness, hemiparesis, MCA: impaired judgment, nausea, language dysfunction, PCA: Gait apraxia, bitemporal hemianopia, deafness
   d) ACA: hemiparesis of lower contralateral face, speech impairment, contralateral weakness, MCA: acute vision loss, confusion, memory loss, PCA: contralateral lower limb weakness, urinary incontinence

10. What brain pathology results from the rupture of berry-aneurysms?

    a) Subarachnoid Haemorrhage
    b) Subdural Hematoma
    c) Extradural Haematoma
    d) Uncal herniation
    e) Meningitis

11. Which is the correct description of, and appropriate treatments for, Myasthenia Gravis?

    a) Autoimmune disease mediated by antibodies to muscarinic AChRs on the postsynaptic side of the NMJ, affecting mainly muscles of the proximal limbs. Tx: Azathioprine, paracetamol, hydrocortisone
    b) Reactive disease initiated by Neisseria meningitidis infection, resulting in the inappropriate production of IgG autoantibodies against nicotinic AChRs on the postsynaptic side of the NMJ. Tx: Pyridostigmine, prednisolone, thymectomy
    c) Autoimmune disease mediated by antibodies to nicotinic acetylcholine receptor (AChR) on the post-synaptic side of the neuromuscular junction, affecting mainly muscles of the eyes and face (NMJ). Tx: Pyridostigmine, prednisolone, thymectomy
    d) Acute inflammatory demyelinating polyneuropathy affecting Schwann cells of the PNS. Tx: IVIg, plasma exchange, supportive treatment.

12. Multiple sclerosis is an autoimmune demyelinating condition affecting the CNS. What cells are targeted?

    a) Schwann cells
    b) Oligodendrocytes
    c) Astrocytes
    d) Microglia
    e) Parafollicular cells

13. A 70-year-old man comes into your clinic with history of seizures. His wife attends with him and describes he lost awareness and was confused when he came round. During the period of lost awareness, she describes he was fiddling with the buttons on his jacket and was smacking his lip.

    What is the most likely diagnosis?

    a) Frontal lobe simple partial seizure
    b) Frontal lobe complex partial seizure
    c) Temporal lobe complex partial seizure
    d) Temporal lobe simple partial seizure
    e) Occipital lobe partial seizure

14. A 60-year-old man comes in with dysarthria, dysphagia and regurgitation of fluids which can sometimes result in choking. When he talks to you, his speech is quite nasal and hoarse. On examination, his tongue is flaccid, and jaw jerk is absent. His sensation is intact and normal.

    What is the most likely diagnosis?

    a) Cervical spine lesion
    b) Amyotrophic lateral sclerosis
    c) Multiple sclerosis
    d) Progressive bulbar palsy
    e) Bell's palsy

15. An 80-year-old woman comes in complaining of headaches, drowsiness and regular vomiting. She finds she is having issues with her coordination and her speech is slurred when she talks to you. She has a history of breast cancer.

    What is the most likely diagnosis and what investigation is contraindicated in this condition?

    a) Cerebellar tumour, lumbar puncture
    b) Cerebellar tumour, surgery
    c) Frontal lobe tumour, lumbar puncture,
    d) Frontal lobe tumour, surgery
    e) Parietal lobe tumour, surgery

16. A 25-year-old man comes into A&E, after a motorcycle accident. He is unable to open his right fist and extend his wrist.

    Which nerve is most likely to be affected?

    a) Median nerve
    b) Ulnar nerve
    c) Radial nerve
    d) Axillary nerve
    e) Femoral nerve

Neurology SBA Answers

Question	Answers
1. C	Common peroneal nerve palsy and L5 radiculopathy can both present with foot drop and weakness of toe extensors. However, in a peroneal nerve palsy ankle eversion is affected whereas in a L5 radiculopathy presents with weakness in ankle inversion. The symptoms described are not consistent with those associated in cauda equina syndrome where you would expect, lower back pain radiating down both legs, saddle anaesthesia, urinary incontinence and loss of anal tone to be some of the presenting features. Deep peroneal nerve damage would result in loss of sensation at the first dorsal webspace
2. A	Presence of the claw hand and pain in the elbow suggests damage to the ulnar nerve. The ulnar nerve supplies some of the flexor muscles of the forearm including flexor carpi ulnaris and flexor digitorum profondus. It also supplies the intrinsic muscles of the hand including palmaris brevis, medial lumbricals, hypothenar muscles and interossei muscles.
3. D	Jane has presented with symptoms suggestive of trigeminal neuralgia. It is thought to be caused by compression of the nerve and most presenting cases are of unilateral pain. It presents with intense facial pain that comes on spontaneously and last anywhere between a few seconds to hours. It is often described as an electricity-like shooting pain. Attacks often worsen over time. NICE recommend carbamazepine as a first lien treatment. Propranolol is used in the management of migraines Verapamil is used as a prophylactic treatment for cluster headaches
4. B	Granulomatosis with polyangiitis (GPA, previously known as Wegener granulomatosis) is a systemic vasculitis that affects both small sized vessels. In the upper respiratory tract, it can cause nose bleeds and sinusitis. Patients may present with a saddle shaped nose due to a perforated nasal septum. Lung involvement leads to haemoptysis, coughing and wheezing whilst kidney involvement leads to rapidly progressing glomerulonephritis. Diagnosis is based on laboratory testing (c-ANCA), imaging, and biopsy of affected organs, which demonstrate necrotizing granulomatous inflammation. GPA is treated with immunosuppressive drugs.
5. B	Prophylaxis is treatment for the prevention of an attack. Beta blockers (propranolol), amitriptyline, anticonvulsants (topiramate) and botulinum toxin type A are all used for this reason. Ibuprofen is an appropriate treatment for an acute attack migraine, but not as a preventative measure.
6. D	The MMSE, an MRI, and CSF analysis are all routine investigations for suspected dementia. You should also be ordering a confusion screen for every confused patient to rule out any reversible causes of confusion before advancing to dementia investigations. A CT scan is not routinely used for dementia, instead an MRI is more suitable.
7. C	The presenting symptoms are very generic to dementia; however, the stepwise deterioration is a hallmark of vascular dementia, making this the most likely diagnosis.

	Hallmarks of Alzheimer's are tau neurofibrillary tangles, beta-amyloid plaques and cortical atrophy. Hallmarks of dementia with Lewy Bodies are parkinsonism's, sleep disturbances and visual hallucinations. Hallmarks of fronto-temporal dementia are frontal and temporal lobe atrophy and TDP-43 positive inclusions. Severe infection can also cause confusion and dementia-like symptoms; however, you would expect them to present acutely with pyrexia.
8. E	The most immediate concern should be Huntington's disease. She is of the right age and without a family history a genetic analysis should be done as Huntington's has a 100% penetrance (it is a dominant condition). She is also presenting with hyperkinesia and chorea (irregular, involuntary, jerky movements). Depression and dementia can also be seen with Huntington's disease. Whilst you might be worried about psychosis, this can also occur in Huntington's. Parkinson's presents with depression and dementia; however, its hallmark is bradykinesia, not hyperkinesia. Meningitis can also result in hyperkinesia; however, you would expect a rash and pyrexia. The patient would also likely be younger.
9. B	This question assesses your ability to apply your phase 1 neuroanatomy knowledge into clinical context: the ACA supplies the medial portions of the frontal lobes and superior medial parietal lobes, which are involved in lower limb supply and - therefore occlusion to this artery will cause contralateral lower limb weakness. The MCA supplies areas of the frontal, temporal and parietal lobes including the areas responsible for facial, throat, and hand/arm innervation (both sensory and motor), hence occlusion causes speech impairment, contralateral weakness and hemiparesis of the lower contralateral face (this is forehead sparing due to the bilateral innervation of the frontalis muscle, indicating the UMN lesion caused by stroke). The PCA supplies the occipital lobe which is involved in visual processing, hence PCA stroke can present with acute vision loss. Memory impairment occurs due to hippocampal infarction (as the hippocampus is supplied by the PCA).
10. A	Berry aneurysm rupture causes sub-arachnoid haemorrhages, which present with the classic 'thunderclap headache'. Appears as a star-shaped hyperdense (pale) lesion on CT. Subdural haematomas can be caused by rupture of the bridging veins, and cause a 'banana/crescent' shaped lesion on CT. They present with worsening headache, confusion, personality changes and drowsiness. Epidural haemorrhages are most commonly caused by damage to the middle meningeal artery. Epidural haematomas are associated with a 'lucid interval' and, on CT, they are lemon-shaped (biconvex). Uncal herniation can occur due to raised ICP, and can be caused by rapidly expanding epidural / subdural haematomas.
11. C	Myasthenia Gravis (C) is an autoimmune disease caused by AChR antibodies that attack the postsynaptic side of the neuromuscular junction, which reduces muscle contraction. It is characterised by muscle weakness that worsens after periods of activity and improves with rest - it particularly affects the muscles that control eye and eyelid movement, the muscles of facial expression, and can affect chewing, swallowing and talking. Diplopia, drooping of the eyelids and ocular weakness are features. It is treated with thymectomy, prednisolone and a thymectomy (due to association with thymus tumours). Lambert-Eaton myasthenic syndrome (A) has a similar pathophysiology in that it is an autoimmune NMJ disorder, however this syndrome has a gradual onset in the proximal limb muscles. It is associated with small cell lung cancers. It tends to have the following natural history: proximal limbs i.e. shoulder muscles --> muscles of feet and hands --> speech & swallowing. There is no cure but it can be treated by treating lung cancer, pyridostigmine (an acetylcholinesterase inhibitor that increases ACh and therefore decreases muscle weakness). Pyridostigmine is also used to treat myasthenia gravis.

	Guillain-Barre syndrome is due to autoimmune attack of the PNS; it is an acute inflammatory demyelinating condition of the PMS which can cause acute-onset motor paralysis. Most cases occur a few weeks after previous infection, especially respiratory or GI. Symptoms are similar to those of MG but have a more acute onset, and can also be associated with difficulty breathing, paraesthesia and cramp-like pain. IVIG can be used to treat.
12. B	MS is a demyelinating condition characterised by the autoimmune destruction of the myelin sheath of the central nervous system, due to the autoimmune attack of oligodendrocytes, the cells that form the myelin sheath of the central nervous system. Symptoms include fatigue, visual problems, numbness and tingling, weakness, pain, depression, anxiety etc.
13. C	This is a temporal lobe seizure as you get automatisms such as lip smacking, chewing and fiddling. With a frontal lobe seizure you get motor features, such as peddling movements of the leg and 'Jacksonian march'. This is a complex partial seizure as his awareness is affected and he is confused after; simple partial seizures do not affect awareness and there are no post-ictal symptoms.
14. D	In progressive bulbar palsy you get lower motor neuron involvement of CN 9, 10, 11, 12 resulting in the typical presentation of dysarthria, dysphagia, nasal regurgitation of fluids and choking. There is LMN lesions of the tongue and muscles of talking and swallowing resulting in absent jaw jerk reflex, flaccid and fasciculating tongue, and change in speech. MS has sensory involvement and in motor neuron disease, there is no sensory loss. ALS has UMN and LMN signs, so you would see brisk reflexes, spasticity, wrist and foot drop, split hand sign and LMN wasting / fasciculation. A cervical spine lesion would present with UMN and LMN in the arms and legs, and there would be sensory involvement.
15. A	This lady has a cerebellar tumour – she has symptoms of raised ICP (headaches, drowsiness and vomiting) and she is presenting with cerebellar symptoms (DASHING – dysdiadochokinesis, ataxia, slurred speech, hypotonia, intention tremor, nystagmus, gait abnormality). The history of breast cancer suggests that this could be a metastases. Initially, the brain removes CSF from the ventricles into the spinal cord in order to offset the increase in pressure, but once the tumour becomes large enough there comes a point where no more CSF can be removed leading to a rapid rise in ICP. This leads to herniation of the brain – a lumbar puncture would be withdrawing CSF, and this may provoke immediate coning, which is why it is contraindicated.
16. C	The radial nerve opens the fist (muscles involved – BEST – brachioradialis, extensors, supinator, triceps) and is often damaged by compression against the humerus e.g., humerus fracture.

	Damage to the median nerve affects the precision grip muscles (LOAF) “can’t open jam jar”. There would be wasting of the thenar eminence and sensory loss / weakness of the abductor pollicis brevis. The ulnar nerve is vulnerable to elbow trauma and would lead to the claw sign, and the patient won’t be able to cross their fingers in a good luck sign. Damage to the axillary nerve would lead to weakness in shoulder abduction.

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