

Neurology SAQ 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. Alice is a 32-year old female that has presented to A+E by ambulance with her husband. A collateral history obtained from her husband indicates that Alice is pregnant and has been having persistent headaches and periods of vomiting over the last few days. Her husband also informs you that she has been sitting in dark rooms over the last few days as light has been particularly irritating to her. On examination you note slight neck stiffness and elicit a positive kernig's sign.

a) What pathogen is most likely responsible for Alice's presentation? (1 mark)

b) What is the first line investigation for Alice's presentation? (1 mark)

Following a normal CT scan a lumbar puncture is performed and CSF analysis is obtained.

c) From CSF analysis, name 2 factors that would indicate that the causative pathogen is bacterial as opposed to viral. (2 marks)

d) Name 3 contraindications to performing a lumbar puncture. (3 marks)

e) What prophylactic antibiotic treatment would you offer to her husband? (1 mark)

2. James is a 60-year old male that has presented to the GP with a unilateral headache and tiredness in his jaw when he eats for the past month. When questioned he tells you that he has been experiencing pain in his scalp when brushing his hair and has noticed that his clothes are a little looser.
- From the history what do you suspect James has presented with? (1 mark)
 - A further discussion about his symptoms reveals that he sometimes experiences blurring of his vision. James also describes experiencing a feeling of a curtain coming down on his eyes. What is the medical term for this? (1 mark)
 - You arrange a biopsy to be performed in order to diagnose James' condition. What artery will the biopsy be taken from and describe the appearance of the cells you expect to see. (2 marks)
 - Name what medication should be urgently prescribed to James (1 mark)
 - If James was to suddenly stop taking his medication what would he be in danger of experiencing. (1 mark)
3. A 40-year-old female presents to A+E with a severe unilateral right sided headache that is present around her orbital region. She describes a boring pain that started an hour ago and it is excruciating, she also mentions that she has vomited twice since it started. From inspection you notice that her right eye is blood shot and there is a slight ptosis.
- What type of headache has she presented with? (1 mark)
 - Name 2 other features that would be seen on examination to indicate what type of headache this is. (2 marks)
 - What is the acute treatment for her? (2 marks)
 - What drug class would you provide as a form of prophylaxis? (1 mark)

4. Rachel is a 72-year-old female that has come to A+E with her son via ambulance following a seizing episode. Her son informs you that she has not been her usual self these past few days, she has had a lot of issues with her memory and had a sudden period of confusion a few hours ago. On examination you note that her temperature is 38 and find that she has a reduced GCS. You suspect that Rachel may have encephalitis.
- a) What is encephalitis? (2 marks)
 - b) What is the most common infective cause of encephalitis in immunocompetent patients? (1 mark)
 - c) What would be the diagnostic investigation in a patient with encephalitis? (2 marks)
 - d) What would be the route and treatment provided to Rachel? (1 mark)
5. You see a 25 year old lady in clinic who is complaining of a recurring headache. She tells you that the pain is unilateral and is worse on movement. She gets some nausea with the headaches and sometimes also gets scotomas before they happen.
- a) What is your most likely diagnosis for this patient? (1 mark)
 - b) Name 3 triggers for this type of headache. (3 marks)
 - c) What would your immediate medical management be? You should give a named example of each. (4 marks)
6. You are an F2 on your neurology rotation. You see a 67 year old man with his wife during your morning clinic. The patient is unable to communicate effectively with you, so his wife provides most of the information. She tells you that her husband has been finding it difficult to find the correct words recently, as well as becoming quite withdrawn and apathetic. She tells you that this is very unlike him and she is very concerned as their GP has referred them to this clinic. You suspect Alzheimer's is the probable cause of this man's symptoms.
- a) What are 2 risk factors for developing Alzheimer's disease? (2 marks)
 - b) You examine the patient's CSF, do some bloodwork and an MRI. You see hallmark features of Alzheimer's. What would you be expecting to see? (4 marks)

- c) A few weeks later, a formal diagnosis has been made and you would like to start the patient on some medication to help control his symptoms. What are you going to prescribe? (1 mark)
7. You are reviewing a patient who presented with a resting tremor, depression and both urinary frequency and constipation. The tests results for this patient show Lewy bodies and dopaminergic neuronal loss.
- a) What is your suspected diagnosis? (1 mark)
- b) Give 3 other symptoms that would typically present with this diagnosis. (3 marks)
- c) How would you treat this patient? (3 marks)
8. You are a final year medical student on placement and you see a 47 year old woman with diagnosed Guillain-Barre syndrome. Your supervisor asks you to talk to her to gain a greater understanding of this condition.
- a) List 3 causes of Guillain-Barre syndrome. (3 marks)
- b) What 4 clinical features would you expect to see with this patient? (4 marks)
- c) How would her diagnosis have been made? (1 mark)
- d) What treatment would you expect her to be receiving? (2 marks)

9. A 62-year-old male patient comes into A&E complaining of severe lower back pain that radiates down to his buttocks. He is reluctant to tell you that he has been incontinent of urine in the last hour, and has no sensation in his area of genitalia. He has a past medical history of metastatic prostate cancer. PR examination shows a lack of anal tone.

- a) What is the most likely diagnosis given this man's history and presentation? (1 mark)

- b) In the history, this man has no sensation in his genital area. What is this phenomenon known as? (1 mark)

- c) Why is the past medical history of metastatic prostate cancer relevant? (2 marks)

- d) What is the most appropriate treatment? (1 mark)

10. A 60-year-old male patient comes into A&E with acute onset unilateral facial drooping. He takes amlodipine for hypertension, and has recently had a viral infection.

- a) What are your top three differential diagnoses? (3 marks)

- b) On examination, you notice that the forehead wrinkles on both sides when the patient is asked to lift their eyebrows. Which differential diagnosis does this exclude, and why? (3 marks)

- c) Within 24 hours, the facial drooping has resolved, and the patient has no other symptoms. What is your diagnosis? (1 mark)

- d) List four risk factors for stroke and TIA? (4 marks)

- e) What type of medication should be added to his current prescription? (2 marks)

11. Some parents were referred to developmental clinic by the health visitor due to their son, Adam, struggling to stand or walk. Adam's movements are weak, and on examination his muscle weakness is confirmed, though his calf muscles are large. Adam's maternal grandfather had similar symptoms as a child and died when she was very little, so his mother is not sure what the condition was called. A genetic test is done and he is diagnosed with Duchenne Muscular Dystrophy.

a) What is the inheritance pattern of this condition? (1 mark)

b) Why does it almost exclusively affect boys? (1 mark)

12. A 68-year-old man with a past medical history of hypertension, diabetes mellitus type 2, congestive heart failure and previous heart attack presents to A&E with a speech difficulty. His BMI is 35 and he has smoked a pack and a half of cigarettes a day since he was 18. He has a family history of vascular disease.

a) What is this man's pack-year history? (1 mark)

b) If you looked at his GP record, what medications would you likely see? Name 3. (3 marks)

c) When you speak to this patient, he appears to understand what you are saying, but is struggling to speak and is slurring his words. What type of aphasia is this? (1 mark)

d) Which aspects of the history are risk factors for vascular disease? (8 marks)

13. A 65-year-old woman with history of type 2 diabetes comes into A&E with sudden onset numbness and unilateral weakness in her right leg. When questioned, she described a sudden loss of vision in right eye and felt as though a 'curtain came down'. These symptoms lasted for about 2 hours.

a) Which artery has been affected? (1 mark)

b) What is the phenomenon with her eye called? (1 mark)

c) List 2 differentials (2 marks)

d) What is this woman's ABCD2 score, what is an ABCD2 score, and what is the significance of her score? (3 marks)

14. An 18-year-old female comes in having had a two seizures in the last 24 hours. Her mother describes she just dropped to the floor with no warning and started 'fitting' where she would tense and then contract and relax rapidly. She lost control of her bladder and bit her tongue. She was confused both times for several hours after.

a) What type of seizure is this? (1 mark)

b) What test is used to confirm the clinical suspicion? (1 mark)

c) List 2 medications that could be used for this type of seizure for this patient. (2 marks)

d) What are the 2 big differentials for epilepsy? (2 marks)

15. A 23-year-old man comes into A&E from a car accident, with a brief loss of consciousness but improved temporarily, but is deteriorating again. He has a headache, his pupil is dilated, his breathing has become deep and irregular and he is confused.

a) What type of haemorrhage is this likely to be? (1 mark)

b) What artery is likely to be damaged? (1 mark)

c) What would you see on the CT scan? (2 marks)

d) How would you treat the raised intracranial pressure? (1 mark)

16. A 20-year-old female comes in after a night out and fell asleep on her stomach. She woke up with numbness and tingling in her hand and it was relieved by dangling it over the edge of the bed and shaking it out.

a) What is this syndrome called? (1 mark)

b) What nerve is affected? (1 mark)

c) Give 2 examination tests for this syndrome. (2 marks)

d) What are the roots for this nerve? (4 marks)

Total Marks (117)

Neurology SAQ Answers

Question	Answers
1.	<p>a) <i>Listeria monocytogenes</i></p> <p>b) Blood cultures</p> <p>c) Increased neutrophils, increased protein levels, decreased glucose levels, cloudy CSF appearance</p> <p>d) Signs and causes of raised intracranial pressure, coagulopathy, focal neurology, cardiovascular compromise (bradycardia and HTN), infection at the site of LP, decreased GCS</p> <p>e) Oral ciprofloxacin</p> <p>Explanation</p> <p>Alice has presented with meningitis, as she is pregnant the most likely causative pathogen is <i>Listeria monocytogenes</i> a bacteria that is commonly found in cheese. Photophobia, neck stiffness and a headache are signs of meningism and indicate meningeal irritation.</p> <p>First line investigation for suspected meningitis is to obtain blood cultures, a lumbar puncture is second line but this is only performed if no contra-indications are present and following a normal CT scan. Identifying if the causative pathogen is bacterial or viral can be done through CSF analysis, in response to bacteria the immune system will increase neutrophil cell levels and lymphocyte cell levels will increase in response to a viral infection. Furthermore, bacteria utilise glucose and release proteins into the CSF whereas viruses will release a small amount of protein but will use up no glucose.</p>
2.	<p>a) Giant cell arteritis</p> <p>b) <i>Aspergillus fumigatus</i></p> <p>c) Temporal artery, multinucleated giant cells</p> <p>d) Prednisolone</p> <p>e) Adrenal crisis</p> <p>Explanation</p> <p>GCA is a systemic vasculitis of the medium and large arteries.</p> <p>It typically presents with symptoms that affect the temporal arteries – headache, scalp tenderness and jaw claudication. Other associated symptoms include weight loss, fatigue, and muscle aches.</p> <p>Investigations can include bloods which would show elevated ESR and CRP levels, however diagnosis is obtained from a temporal artery biopsy which shows multinucleated giant cells.</p> <p>High dose steroids should be initiated immediately before diagnosis is confirmed to reduce the risk of permanent vision loss in these patients.</p> <p>Aspirin – 75mg reduces the risk of strokes and a PPI should also be initiated as a form of gastric prevention following steroid initiation. Patients should be warned not to suddenly withdraw from steroid treatment as they are at risk of adrenal crisis, once symptoms have resolved gradual weaning off the steroids is required.</p>

3.	<p>a) Cluster</p> <p>b) Rhinorrhoea, lid swelling, lacrimation, miosis, sweating</p> <p>c) 100% O2 and SC sumatriptan</p> <p>d) Calcium channel blocker</p> <p>Explanation She has presented with a cluster headache – this is an abrupt onset headache that presents with excruciating pain localised to the orbital/supraorbital region. The pain can last from 15minutes to 3 hours and is associated with autonomic features such as lacrimation and nasal congestion. Diagnosis is from a clinical examination and history. Treatment of acute attacks involves 100% O2 through a non-rebreathing mask and SC sumatriptan. Long term prophylaxis involves calcium channel blockers such as verapamil.</p>
4.	<p>a) Inflammation of the brain parenchyma usually caused by viruses</p> <p>b) Herpes simplex virus – type 1</p> <p>c) Lumbar puncture with CSF viral PCR testing</p> <p>d) IV Acyclovir</p> <p>Explanation Encephalitis is inflammation of the brain that typically presents with altered consciousness, altered cognition, unusual behaviour, acute onset of focal neurological symptoms and in some cases a fever. It is typically caused by the herpes simplex virus however other viral causes may occur such as varicella zoster virus from chickenpox. A lumbar puncture with CSF viral PCR testing is diagnostic but if it is contraindicated then a CT scan can also be performed. Treatment is via IV acyclovir which is usually started empirically in suspected encephalitis until results are available.</p>
5.	<p>a) Migraine</p> <p>b) Cheese, OCP, Caffeine, Alcohol, anxiety/stress, travel, exercise, sleep (too much or too little)</p> <p>c) Simple analgesia e.g., paracetamol (1 + 1 correct example) Triptans e.g., sumatriptan (1 + 1 correct example)</p>
6.	<p>a) Down syndrome, reduced physical or cognitive activity, depression or loneliness</p> <p>b) Extracellular deposition of beta amyloid plaques Tau neurofibrillary tangles Damaged synapses Cortical atrophy (hippocampus)</p> <p>c) Acetylcholinesterase e.g., donepezil, galantamine, rivastigmine, memantine</p>

7.	<ul style="list-style-type: none"> a) Parkinson's disease b) Bradykinesia, rigidity, dementia, disordered sleep c) Levodopa, dopamine agonists, COMT/MAO-B inhibitor d) IV Acyclovir
8.	<ul style="list-style-type: none"> a) Campylobacter infection (other post infection causes – CMV, EBV, mycoplasma) b) Motor weakness – often distal and ascending Paraesthesia Respiratory involvement Autonomic involvement – HR changes, BP changes, urinary control symptoms c) Lumbar puncture with raised CSF proteins d) IV immunoglobulins, plasma exchange, supportive care in HDU/ITU
9.	<ul style="list-style-type: none"> a) Cauda equina syndrome b) Saddle anaesthesia c) Prostate cancer can metastasize to the spine via the venous blood flow in this area. Compression of the spinal cord by metastatic tumours (below L1 level, where the cauda equina begins) can result in cauda equina syndrome, the medical emergency described in this patient's history. d) Decompressive surgery of the spine e.g., lumbar laminectomy
10.	<ul style="list-style-type: none"> a) Bell's palsy, stroke, TIA b) This examination finding excludes Bell's palsy from your differentials, as, though it usually occurs post-viral infection Bell's palsy is a LMN lesion of the facial nerve, so is not forehead sparing. Stroke and TIA are forehead sparing due to the bilateral innervation of the temporalis muscle (as stroke/TIA have UMN signs) c) TIA – transient ischaemic attack d) Smoking, HTN, obesity, hyperlipidaemia, diabetes mellitus, atrial fibrillation, high alcohol intake, male, FHx, >55 years of age e) Antiplatelet – aspirin or clopidogrel
11.	<ul style="list-style-type: none"> a) X-linked recessive – you can tell this because the maternal grandfather is affected but the mum isn't b) Boys only need one copy of the gene for the disease to manifest as they only have one X-chromosome, whereas girls need both copies due to the recessive nature of the condition

12.	<p>a) $50 \times 1.5 = 75$ pack years</p> <p>b) Amlodipine/verapamil/diltiazem Atvorvastatin/simvastatin Aspirin/clopidogrel/apixaban – the xa in apixaban indicates it's a factor Xa inhibitor Metformin Spironolactone/furesemide Bisoprolol/propranolol</p> <p>c) Expressive aphasia / Brocca's aphasia – this occurs in strokes affecting the blood supply to the frontal lobe (MCA strokes) due to a lack of perfusion to the area of the brain that controls the nerves that innervate the muscles involved in speech production.</p> <p>d) Male, >55 yrs, HTN, T2DM, previous MI, overweight, smoking, FHx</p>
13.	<p>a) Anterior cerebral artery</p> <p>b) Amaurosis fugax</p> <p>c) Stroke, Todd's paralysis, retinal / vitreous haemorrhage, giant cell arteritis</p> <p>d) Score = 6, calculates risk of stroke after TIA, score of 6 or more strongly predicts a stroke and should be referred to a specialist immediately</p> <p>Explanation</p> <p>90% of TIAs occur in the anterior cerebral circulation, and this woman had leg weakness, and a temporary reduction in the retinal ophthalmic / ciliary blood flow (amaurosis fugax) – this all points to the ACA territory.</p> <p>Stroke symptoms would last for more than 24hrs, so this is not a stroke. Todd's paralysis is transient weakness of the arm, hand or leg after a seizure. This could be a retinal or vitreous haemorrhage, but as she also has leg weakness, it is more likely to be a TIA. You can get vision loss in one eye in giant cell arteritis, but you would also get pain and headaches, but no leg weakness.</p> <p>ABCD2 score: Age > 60yrs =1. Blood pressure > 140/90mmHg = 1. Clinical features (Unilateral weakness = 2. Speech disturbance without weakness = 1). Duration of symptoms (>1hr = 2. 10-59min = 1). Diabetes = 1.</p>

<p>14.</p>	<p>a) Generalised tonic-clonic seizure</p> <p>b) Electroencephalogram (EEG)</p> <p>c) Lamotrigine, carbamazepine, levetiracetam</p> <p>d) Syncope, non-ectopic seizure</p> <p>Explanation:</p> <p>Tonic clonic seizures – loss of consciousness, tonic phase where muscles suddenly tense up, followed by the clonic phase, where muscles rapidly contract and relax. Eyes remain open and tongue is often bitten. Incontinence of urine / faeces. Followed by a period of drowsiness, confusion or coma for several hours post-ictally.</p> <p>EEGs are used to assist in the classification of epilepsy and to confirm clinical suspicion.</p> <p>The medications used for tonic-clonic seizures are: sodium valproate, lamotrigine, carbamazepine, levetiracetam. However for females of childbearing age you would not give sodium valproate as it is teratogenic.</p> <p>In syncope, you lose consciousness usually would get a warning such as nausea and feeling faint. There are no but is deteriorating again. He has a headache, his pupil is dilated, his breathing has become deep and irregular and convulsions either. In a non-epileptic seizure you would not get incontinence or tongue biting, but you do get pelvic thrusting</p>
<p>15.</p>	<p>a) Extradural haemorrhage</p> <p>b) Middle meningeal artery</p> <p>c) Hyperdense mass that is biconvex shaped and adjacent to the skull</p> <p>d) IV mannitol – this is an osmotic diuretic</p> <p>Explanation</p> <p>This man has had a head trauma, and the loss of consciousness, improvement and then deterioration is called the lucid interval which is characteristic of extradural haemorrhages. He also has signs of brainstem compression which is caused by pressure on the brain from the blood leading to herniation.</p> <p>The middle meningeal artery is the most likely to be damaged by serious head trauma, especially at the pterion which is the spot where the frontal, parietal, temporal and sphenoid bones join together.</p> <p>In a subarachnoid haemorrhage you would see a 'star shaped lesion' as the blood fills in the gyro patterns around the brain and ventricles. Subdural haemorrhages can be hyperdense (acute) or hypodense (chronic) or both, but it is not always biconvex. In extradural the blood pools between the skull and the external layer of the dura mater forming a biconvex shape.</p> <p>IV mannitol is used to treat increased ICP.</p>

16. a) Carpal tunnel syndrome
b) Median nerve
c) Phalen's test, Tinel's test
d) C6, C8, T1

Explanation:

The median nerve goes through the carpal tunnel, and pressure and compression on it can cause numbness and tingling. It is often relieved by the 'wake and shake'.

Phalen's test – the patient can only flex their wrist for maximum of one minute. Tinel's test – tapping on the nerve at the wrist induces tingling.

The median nerve originates from the brachial plexus from C6,7,8, T1.

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