

MCQ Questions for Just-in-Time Teaching in a Neurology Clerkship

Note: Questions are initially shown without explanation or correct answer, for easy deployment as an educational tool. The second half of this document contains the answers and explanations for each question.

Neuromuscular Medicine Questions

Question 1

A previously healthy 68-year-old male presents with progressive muscle weakness in his right hand, swallowing difficulty and difficulty with walking. He believes these symptoms occurred “out of the blue” and have worsened over the last 2-3 months. His temperature is 98.6 deg F (37 deg C), blood pressure 145/86 mmHg, pulse is 80/min, and respirations are 17/min. Neurologic examination is significant for mild dysarthria. He has atrophy of the thenar muscles of the right hand and forearm, and 2/5 strength on wrist extension and flexion, as well as 3/5 power in intrinsic hand muscles on right. He has some fasciculations in his right thigh, and mild (4+/5) weakness of hip flexors bilaterally. Tone is increased in both legs. Sensory examination is intact. 3+ patellar reflexes are noted on the left lower extremity. On gait testing, the patient has poor balance, and spastic gait. Which of the following is the most likely diagnosis?

- A. Guillain-Barre syndrome
- B. Amyotrophic lateral sclerosis
- C. Myasthenia gravis
- D. Multiple sclerosis
- E. Dermatomyositis

Question 2

A 58-year-old female, accompanied by her husband, presents with trouble walking. She describes her legs as being heavy and stiff, and at times experiences muscle spasms in her lower extremities. Her husband notices that she has been having trouble writing, and buttoning her shirt. These symptoms have progressively worsened over that past 4-5 months. Neurologic exam is significant for intrinsic hand weakness, and arm fasciculations. The lower extremity is hypertonic, with increased patellar reflexes. On gait testing, the patient has poor balance, moves slowly, and has issues with turning. Which of the following is the best treatment to prolong life?

- A. Pyridostigmine
- B. Botulinum toxin
- C. Prednisone
- D. Riluzole
- E. Intravenous Immunoglobulin

Question 3

A 33-year-old female presents with drooping of her eyelid that seem to occur while reading or watching television. This appears to get worse later in the day. She also reports that at times she sees “double.” A few weeks ago, she was prescribed an antibiotic medication for a urinary tract

infection. She does not recall the name of the antibiotic. On physical exam, bilateral ptosis, with the left affected more than the right is seen. Pupillary function intact. A glove is filled with ice, and subsequently applied to the patient's eyelid. After two minutes, the patient's ptosis has improved. Which of the following is most likely to yield rapid symptom improvement?

- A. Corticosteroids
- B. Plasma exchange
- C. Acetylcholinesterase inhibitor
- D. Thymectomy

Question 4

A 38-year-old female presents with muscle fatigue that is worse by the end of the day. She reports to have myalgias in the back of her neck, and at times her head "drops." She also states to see "double" when watching television, or reading for a prolonged period of time. On physical examination, ptosis is produced when asking the patient to look at the ceiling without blinking. Pupillary function is intact. Appropriate serologic testing is obtained. On repetitive nerve stimulation, the amplitude of the compound muscle action potential progressively declines. Which of the following is most likely the diagnosis?

- A. Botulism
- B. Lambert-Eaton myasthenic syndrome
- C. Acute inflammatory demyelinating polyradiculopathy
- D. Myasthenia gravis
- E. Multiple sclerosis

Question 5

A previously healthy 26-year-old male is brought to the emergency department due to muscle weakness. He reports mild weakness in his legs that has progressively worsened over a few days to the point that he can barely move his legs. He has some numbness in his legs and his arms feel weak. He has recently recovered from a respiratory infection. 1/5 muscle strength is noted throughout the lower extremities, as well as absent patellar and ankle reflexes. 3 to 4-/5 muscle strength is appreciated throughout his upper extremities. A lumbar puncture is performed, which shows the following: Cell count: 4 cells/mm³, Glucose: 67 mg/dL, Protein: 187 mg/dL Gram stain: no organisms Spirometry is performed, which shows a forced vital capacity of 0.85 L. Which of the following is the best next step in management?

- A. Intravenous (IV) immunoglobulin
- B. Intubation
- C. IV corticosteroids
- D. Immunomodulating agent
- E. Plasma exchange

Question 6

A 30-year-old female presents with muscle weakness in the lower extremities and palpitations. Her symptoms have been progressively worse over the course of a 2 weeks. She reports to be in great health, but had a period of abdominal pain and diarrhea approximately 5 weeks ago. Her

temperature is 98.9 deg F (37.2 deg C), blood pressure 117/82 mmHg, pulse is 102/min, and respirations are 16/min. On physical exam, there is 4-/5 muscle strength throughout the lower extremities. Bilateral patellar reflexes are 1+ and ankle reflexes are absent. Lumbar puncture was performed, and results are pending.

Part 1: What is the most likely diagnosis?

- A. Polymyositis
- B. Guillain-Barre syndrome
- C. Hypokalemia
- D. Myasthenia gravis

Part 2: What is the most appropriate initial treatment?

- A. High dose corticosteroids
- B. Intravenous immunoglobulin
- C. Potassium chloride
- D. Pyridostigmine

Question 7

A 44-year-old female presents with weakness. Her weakness becomes apparent when she picks up her youngest daughter, or when placing her nonperishable foods in the top shelf of her kitchen. She also reports difficulty when getting up from a chair. These symptoms began a few months ago, and have since worsened. On physical exam, there is an erythematous eruption on her eyelids, and erythematous papules on the dorsal aspect of her hands. Neurological examination is significant for symmetric muscle weakness of her shoulders and hips. Which of the following is most likely the diagnosis?

- A. Glucocorticoid-induced myopathy
- B. Myasthenia gravis
- C. Dermatomyositis
- D. Polymyositis
- E. Systemic lupus erythematosus

Question 8

A 39-year-old female presents with progressive weakness in her shoulders and hips over a period of two months. She states that getting up from a chair, climbing a flight of stairs, combing her hair, and picking up her groceries have become increasingly difficult. Family history is significant for colon cancer in her father, and systemic lupus erythematosus in the mother. Creatine kinase and LDH is elevated on laboratory testing. On physical examination, an erythematous rash in the periorbital region is seen. Mild swelling is noted in the small joints of the hand. Muscle tenderness is elicited upon palpation of the shoulders and hips. 4-/5 strength is appreciated in the deltoid, and hip. Which of the following is the best treatment for her symptoms?

- A. Methotrexate
- B. Prednisone
- C. Hydroxychloroquine
- D. Rituximab

E. Intravenous immunoglobulin

Cerebrovascular Disease Questions

Question 1

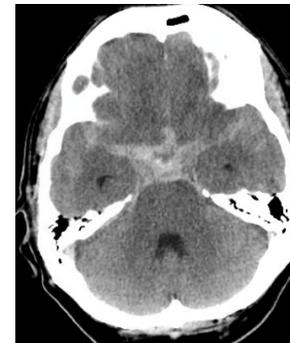
A 62-year-old male presents with headache, nausea, and vomiting. These symptoms occurred a few hours after returning from the grocery store. He has a history of hypertension treated with lisinopril, and type 2 diabetes mellitus treated with metformin. His temperature is 100.2 °F (38 °C), blood pressure 176/102 mmHg, pulse is 96/min, and respirations are 19/min. On physical exam, there is dysarthria, left-sided weakness and sensory loss. Non-contrast head CT is shown. Which of the following is most likely the cause of this patient's clinical presentation?



- A. Hypertension
- B. Amyloid angiopathy
- C. Cerebral aneurysm
- D. Vascular malformation

Question 2

A 38-year-old female presents with sudden, severe headache, nausea, and vomiting. She describes the headache as “the worst headache of my life.” She asks if the lights can be turned off as they have become very bothersome. She is a lawyer, and has been under a lot of stress due to an upcoming case she is preparing for. Past medical history is significant for hypertension and migraine headaches. She has been smoking a pack of cigarettes daily for 10 years. Physical examination is significant for very mild nuchal rigidity. Non-contrast head CT is shown. Which of the following is most likely the diagnosis?



- A. Tension-type headache
- B. Subarachnoid hemorrhage
- C. Migraine headache
- D. Intraparenchymal hemorrhage
- E. Epidural hematoma

Question 3

A 68-year-old male is brought to the emergency department by his wife. She reports that her husband has been unable to speak or move the right side of his body. She states that his symptoms occurred suddenly, while they were discussing vacation plans. He suddenly fell to the right, was unable to speak or follow commands, or move his right arm or leg. Past medical history is significant for hypertension and atrial fibrillation. He has smoked 1 pack of cigarettes daily for the past 40 years. His temperature is 100.4 deg F (38 deg C), blood pressure 186/108 mmHg, pulse is 109/min and irregularly irregular, and respirations are 17/min. On exam, he has a left-gaze preference, with marked weakness and sensory loss of the right side. EKG reveals atrial fibrillation. D-dimer level is 320 ng/mL (normal \leq 250 ng/mL). Head imaging shows an occlusion of the

proximal left middle cerebral artery. Which of the following is most likely the cause of this patient's clinical presentation?

- A. Embolism
- B. Thrombosis
- C. Aneurysm rupture
- D. Hypoperfusion

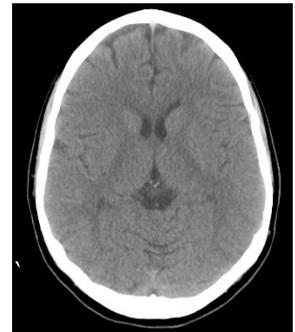
Question 4

A 72-year-old male presents with abnormal speech and right-sided weakness. He was last seen normal approximately 1 hour ago. Past medical history is significant for hypertension, hypercholesterolemia, and type 2 diabetes mellitus. Five years ago, he underwent coronary artery bypass grafting for the management of a myocardial infarction. On exam, his speech is non-fluent and sparse, with impaired repetition. He has difficulty naming even common objects. Comprehension is relatively intact. There is a right-sided mouth droop, with sparing of the forehead. Strength is 3/5 throughout the right upper extremity, and 4+/5 in the right lower extremity. Sensation appears intact. Which of the following is the best next step in management?

- A. Administration of aspirin
- B. Intravenous alteplase
- C. Mechanical thrombectomy
- D. Head CT

Question 5

A 65-year-old female is brought to the emergency department by her husband due to abnormal speech. She does not appear to be aware of her deficit. She was last normal 2 hours ago. Past medical history is significant for hypertension, coronary artery disease, and hypercholesterolemia. On exam, her blood pressure is 181/94, her speech is fluent, but empty, with paraphasic errors. Comprehension and repetition is impaired. There appears to be a visual deficit in the right upper quadrant. Non-contrast head CT is shown. Which of the following is the best next step in management?



- A. Aspirin
- B. Mechanical thrombectomy
- C. Tissue plasminogen activator
- D. IV Labetalol

Question 6

A 62-year-old male presents with left-sided weakness. He was last seen normal approximately 5 hours ago. Past medical history is significant for coronary artery disease and hypertension. On exam, there is 4+/5 strength in the left upper extremity, and 3/5 strength in the left lower extremity. He is unable to walk. Non-contrast head CT is negative for blood and a large territory infarct, and CT angiography shows an occlusion in the proximal portion of the anterior cerebral artery. Which of the following is the best next step in management?

- A. Tissue plasminogen activator

- B. Thrombectomy
- C. Heparin
- D. Warfarin

Question 7

A 70-year-old male presents with numbness of the left upper and lower extremity, as well as the right side of his face. He also reports dizziness and difficulty with swallowing. He was last seen normal approximately 6 hours ago. Two weeks ago he experienced acute head trauma due to a fall while jogging. No intracranial bleed was noted in the head CT performed at the time. Past medical history is significant for hypertension and hypercholesterolemia. His temperature is 100.4 deg F (38 deg C), blood pressure 180/102 mmHg, pulse is 97/min, and respirations are 16/min. Blood glucose level is 312 mg/dL. Physical exam is significant for ptosis and miosis (Horner's syndrome) on the right side. Nystagmus on rightward gaze. Uvula is displaced towards the left, and there is paralysis of the right-sided vocal cord. Right-sided hemisensory loss is noted in the trunk and extremities. There is also sensory loss on the right-sided face. Non-contrast CT shows no intracranial bleed. Which of the following is the best next step in management?



- A. Labetalol
- B. Alteplase
- C. Insulin
- D. 1/2 Normal saline

Question 8

A 69-year-old male presents with abnormal speech and right-sided weakness. While eating lunch with his wife, he suddenly could not move his right arm or leg, and was unable to speak. They arrived to the emergency department within minutes. His wife currently reports improvement from when the symptoms first began, and he is almost back to normal when examined 1 hour later. Past medical history is significant for hypertension and type 2 diabetes mellitus. He has smoked 1 pack of cigarettes daily for 45 years. Non-contrast head CT is shown. Diffusion-weighted image MRI shows no sign of infarction. CT angiogram of the neck shows 72% stenosis of the left internal carotid artery. Which of the following is most likely etiology of his transient ischemic attack?

- A. Artery to artery embolization
- B. Cardioembolism
- C. Small vessel disease
- D. Hypoperfusion

Headache Questions

Question 1

A 37-year-old female with migraine without aura presents with headaches of increased frequency that typically begin in the morning. She says that zolmitriptan and acetaminophen are no longer effective in treating her episodes. In a month, she experiences approximately 20 days of headaches, and in the past 3 months, she has used zolmitriptan 15 times per month, on average, and acetaminophen at least 20 days per month. Medical history is significant for migraine and asthma. Medications are zolmitriptan, over the counter acetaminophen, and an albuterol inhaler. Which of the following is the next best step in management?

- A. Switch from zolmitriptan to sumatriptan
- B. Add metoclopramide to current regimen
- C. Start a daily prophylactic agent and find an acute treatment that is reliably effective
- D. Begin oxycodone/acetaminophen treatment for the most severe headaches

Question 2

A 31-year-old female presents with throbbing right-sided headache that she rates as 8/10 in intensity. She states her pain began approximately 12 hours ago, and is accompanied by nausea. She finds some relief when sitting in a quiet, dark room. She reports that prior to the onset of her headache, she noticed a “bright spot” in her left lateral vision that later expanded to form a crescent with “zigzagging” lines of color that has made her feel as if she was “blind.” This lasted 30 minutes and then resolved, and was followed by the headache. She experiences similar episodes approximately once every two months. Physical exam is completely normal. Which of the following is the most appropriate initial step in management?

- A. Ondansetron
- B. Sumatriptan
- C. Propranolol
- D. Verapamil

Question 3

A 45-year-old male presents with recurrent severe left-sided head pain. The pain develops rapidly and feels as if someone is “stabbing” his eye. He reports his left eye gets red and watery and that his left eyelid “droops” during each episode. His headaches last approximately 30 minutes, and have been occurring a few times a day for the past 5 weeks; some of the attacks occur out of sleep and he feels like he can predict what time they will occur each day. He has tried over the counter acetaminophen, which provides no relief. He reports no visual abnormalities. Medical history is significant for a benign lung nodule. He has been smoking cigarettes for the past 25 years. During an attack, the patient appears restless and agitated.

[Left-sided miosis is appreciated on exam, as well as conjunctival injection on the left, with no focal neurological abnormalities—I am concerned that this line suggests the autonomic dysfunction persists outside of acute attacks; I think we can leave it out].

Which of the following is most likely the diagnosis?

- A. Migraine without aura

- B. Trigeminal neuralgia
- C. Cluster headache
- D. Acute angle closure glaucoma
- E. Short-lasting unilateral neuralgiform headache with conjunctival injection and tearing (SUNCT)

Question 4

A 29-year-old female lawyer presents with sharp, shock-like stabbing pain in her right jaw. She has experienced this pain for the past week, and occur approximately 15 times a day, with each episode lasting a few seconds. She notices that at times brushing her teeth, or smiling can trigger her pain. She has tried acetaminophen and ibuprofen, but these have not provided any relief. She has not experienced these symptoms before, but recalls a period of transient right arm weakness lasting a few days approximately 8 months ago, that she assumed was related to a “pinched nerve.” She reports to experience stress due to an upcoming case that can benefit her career. On physical exam, touching the right maxillary region reproduces the pain. There are no focal neurological deficits. What is the most appropriate initial treatment?

- A. Carbamazepine
- B. Sumatriptan
- C. Oxycodone and acetaminophen
- D. Gabapentin

Question 5

A 26-year-old male presents with moderate “tightening” bilateral headache. These headaches began approximately one week ago. He denies any sensitivity to light or sound, dizziness, fatigue, changes in memory and does not experience nausea or vomiting. Headache episodes last a few hours. He is stressed about a presentation he has to give to his company owners later this week. He remembers having occasional headaches with fatigue or stress dating back to his teenage years. There is no significant past medical history. Funduscopic evaluation is negative for papilledema, and there is pericranial muscle tenderness upon palpation. The remainder of his neurological examination is normal. Which of the following is most appropriate next step in diagnosis?

- A. MRI brain with and without gadolinium
- B. MRA head and neck
- C. CT sinuses
- D. No imaging is indicated

Question 6

A 9-year-old female patient is brought to the pediatrician because she says “a heart is in my head.” She reports bilateral headaches of pulsating quality, nausea, and has vomited 4 times. Her headache began approximately 6 hours ago, and says that lights worsen her symptoms. Her eyes are red teary and she reports nasal congestion. She is in the 4th grade, and does exceptionally well in school; her mother notes she was a colicky baby and is prone to car sickness. She has a cat at home that scratched her face earlier today. She is sitting on the exam table wearing sunglasses. She does not appear severely ill. Vitals signs are stable, and there are no focal neurological deficits. Which of the following is most likely the diagnosis?

- A. Corneal abrasion
- B. Migraine
- C. Tension type headache
- D. Seizure

Epilepsy Questions

Question 1

A 6-year-old girl is brought to the pediatrician by her parents due to periods of unresponsiveness that last approximately 10 seconds. The parents state that while performing a task, such as coloring, she would suddenly “freeze” and stare into space without falling onto the ground. After a few seconds, she would return to coloring, and not recall what has just happened. In a given day, she undergoes these brief episodes about a dozen times. On physical examination, the patient is mildly pale, but the exam is otherwise normal. When asking the patient to continuously blow at a pinwheel, she stares into space, and does not respond to her name. This lasts approximately 5 seconds, and she returns to blowing the pinwheel. On electroencephalogram (EEG), there is 3 Hz generalized spike-wave discharges in 6-10 second runs. Which of the following is the best initial treatment?

- A. Valproic acid
- B. Ethosuximide
- C. Phenytoin
- D. Carbamazepine

Question 2

A 27-year-old woman is brought to the emergency department by her co-workers after falling to the ground, followed by full-body shaking and jerking lasting less than 30 seconds. The event occurred after she received the news of the death of her grandmother. Just before falling, she felt lightheaded and nauseous. Her co-workers state she fell suddenly, her eyes rolled back, she had some groaning, and it looked like she had a “grand mal seizure” for 10-15 seconds. Shortly after the jerking stopped, she regained consciousness and got up from the ground within a minute or so. She was fully awake afterward. She had some mild urinary incontinence. On physical examination, the patient appears anxious. Heart auscultation reveals normal S1 and S2 without murmurs, rubs, or gallops. there is no evidence of a tongue bite. Which of the following is the best next step in management?

- A. 12-lead electrocardiogram
- B. Admission for video-EEG monitoring
- C. 1-hour EEG recording
- D. Head computed tomography (CT) scan

Question 3

A 14-year-old male presents with a witnessed generalized tonic-clonic seizure. Prior to the seizure event, he felt anxious, confused, and diaphoretic. Medical history is significant for recently diagnosed type I diabetes mellitus, and he has been struggling to control his blood glucose levels. His only medication is an insulin regimen administered via needle and syringe injections. He denies any alcohol or drug use. Laboratory tests were obtained. Which of the following is the best next step in management?

- A. Patient education
- B. Initiate an antiepileptic drug

- C. Lumbar puncture
- D. Repeat electroencephalogram

Question 4

A 42-year-old man presents with generalized tonic-clonic convulsions on day 2 of his hospitalization for the management of acute pancreatitis. Prior to the convulsive event, the patient felt anxious, tremulous, and agitated. Medical history is significant for alcohol-use disorder, with multiple hospitalizations for alcohol intoxication and acute pancreatitis. On physical examination, the patient is diaphoretic and convulsing. There is no evidence of stigmata of liver disease. The patient does not appear malnourished. Appropriate laboratory tests are obtained. Which of the following is the best initial treatment?

- A. Haloperidol
- B. Lactulose
- C. Phenytoin
- D. Chlordiazepoxide

Question 5

A 15-year-old female presents to the emergency department with a seizure. While she was eating her breakfast in the morning, her mother witnessed myoclonic jerks involving the upper extremities. Over a half-hour, the myoclonus became more dramatic, finally evolving into a generalized-tonic clonic seizure lasting 1-2 minutes. The patient reports sleeping 4-5 hours per night for the last few days due to upcoming midterm examinations. She denies alcohol or drug use. She is currently sexually active with her boyfriend and uses condoms as her only form of contraception. On physical exam, there is evidence of recent tongue biting, no focal neurological deficits, and normal intelligence. A sleep-deprived EEG is performed with interictal findings showing generalized 4-5-Hz polyspike and slow-wave discharges, with activation during photic stimulation (photoparoxysmal response). MRI of the brain is normal. Which of the following is the best treatment option for this patient?

- A. Valproic acid
- B. Phenobarbital
- C. Levetiracetam
- D. Phenytoin

Question 6

A 31-year-old woman is brought to the emergency department by her partner due to a convulsive episode after an argument. Her partner described the convulsive episode as being abrupt in onset, with asynchronous limb movements, and pelvic thrusting. The patient's eyes were closed throughout the episode and was unresponsive. The event lasted approximately 10-15 minutes, and would consist of bursts of movement followed by pauses, occurring in a stopping-and-starting fashion. The convulsive episode ended abruptly, with complete recovery. The patient said that during the event, she could sometimes hear what people were saying, but was unable to respond. She says she has seizures 2-3 times per week. Physical examination is unremarkable. On video-electroencephalogram (video-EEG), one of her typical events is recorded, without any abnormality on scalp EEG. What is the most appropriate treatment for this disorder?

- A. Fluoxetine
- B. Clonazepam
- C. Cognitive-behavioral therapy
- D. Massage

Movement Disorders Questions

Question 1

A 65-year-old male presents with constant falls and fatigue. His symptoms have progressively worsened throughout the years. He reports feeling unstable when standing, and has fallen 4 times in the past year. It takes him longer to perform certain activities of daily living, and describes himself as feeling weak. The patient denies any illicit drug or alcohol use. He smokes 2 packs of cigarettes daily for the past 25 years. He denies night sweats, or fever, but has lost 5 pounds over the course of 8 months. Medical history is significant for type 2 diabetes mellitus, hypertension, and recently diagnosed depression. The patient appears apathetic, with mild patchy scaling on the eyebrows. A mild right hand tremor is present at rest and tempered with voluntary movement. On gait testing, the patient has a stooped posture, and takes shorter steps as he moves forward. When firmly pulling the patient by the shoulders, he falls back. Which of following best explains this patient's clinical presentation?

- A. Cerebellar neuronal atrophy
- B. Alpha-synuclein deposition in nigrostriatal neurons
- C. Spontaneous neural depolarization in focal region of primary motor cortex
- D. Pharmacologically-induced dopaminergic antagonism
- E. Paraneoplastic syndrome secondary to pulmonary malignancy
- F. Neurotransmitter deficit in serotonin, norepinephrine, and dopamine

Question 2

A 54-year-old male presents with difficulty in eating and drinking, and worsening hand-writing. This has been stressful for him as he has been continuously working on a novel that is due for publishing in a few weeks. He notes that alcohol improves his symptoms and relieves his stress. Medical history is noncontributory. Family history is significant for similar symptoms in his father, but cannot recall the name of the diagnosis. Physical examination shows a tremor of the hand, of medium frequency that worsens with his arms outstretched. Mild titubation is also noted on exam. Which of the following is the best initial treatment option for this patient?

- A) Beta-blockade
- B) GABA transaminase inhibition
- C) Deep brain stimulation of thalamic nuclei
- D) Cleavage of SNARE protein
- E) Behavioral modification

Question 3

A 72-year-old male is brought by his wife due to unexplained weakness and fatigue. She describes his movements as "sluggish", and is concerned that he may be depressed. The patient reports difficulty with buttoning his shirt, and double clicking the mouse when using his computer. He states that the recent death of his mother has been difficult to accept, and has noticed his foods don't smell the same, and has been having difficulty with sleep. He does not smoke, but drinks 2-3

beers per week. He says his father suffers from a hand tremor, and his mother passed away from pancreatic cancer. On physical exam, a tremor affecting the right hand improves with purposeful movement. There is an increased resistance to passive movement at the right wrist joint. Which of the following is the best initial treatment?

- A. Primidone
- B. Botulinum toxin
- C. Levodopa
- D. Deep brain stimulation
- E. Clonazepam

Question 4

A 34-year-old woman presents with neck pain. She is accompanied by her husband, who says she appears to have right-turning, tremor-like movement of the neck. The patient describes the pain as muscle spasm-like, and states that her symptoms improve with rest and sleep. She has recently begun taking Citalopram due to being diagnosed with major depressive disorder. She denies any alcohol or illicit drug use. On physical examination, there is right head turning with left lateral head tilt. Jerky head tremor is noted, with spasm and hypertrophy of the left sternocleidomastoid muscle. Which of the following is most likely the diagnosis?

- A. Myoclonus
- B. Dystonia
- C. Huntington disease
- D. Tics

Question 5

5. A 14-year-old boy is brought to the pediatrician by his mother because of a 1-hour episode of intermittent jerking movements that began around the time he woke up this morning. He describes the movement as jerky, affecting both upper extremities and upper body, and arrhythmic. During the episode, the patient did not lose consciousness. The patient admits to sleeping approximately 4 hours per night due to upcoming final examinations. Physical examination is completely normal. Which of the following is the best initial treatment for this patient's symptoms?

- A. Valproic acid
- B. Ropinirole
- C. Primidone
- D. Trihexyphenidyl

Question 6

6. A 46-year-old man presents with restlessness, depression, and weight loss. Initially, he noticed increased clumsiness, and now has had involuntary, jerky-like movements of his upper extremity. He incorporates the involuntary movements into his purposeful movements so his wife does not notice. His father committed suicide, and his mother is currently healthy. He has been having difficulty with work due to problems with multi-tasking, and decision making. On physical examination, delayed saccadic initiation is appreciated, as well as difficulty with finger tapping, and maintaining steady grip.

Which of the following is most likely the diagnosis?

- A. Physiologic myoclonus
- B. Huntington disease
- C. Motor tics
- D. Multiple system atrophy

Neuro-Immunology Questions

Question 1

A 37-year-old African American woman presents to the emergency department with pain and vision loss in her right eye. These symptoms progressively worsened over the course of hours. She also reports muscle weakness and sensory changes in both upper extremities. This has never happened before. The patient has a history of ulcerative colitis treated with oral 5-aminosalicylate, and hypertension that is adequately controlled on hydrochlorothiazide. On physical exam, she has a visual acuity of 20/20 in the left eye and 20/200 on the right, a right relative afferent pupil defect, and symmetric motor and sensory deficits more pronounced in the upper extremity. An MRI of brain was normal. MRI spinal cord was obtained with findings shown to the right. Which of the following is most likely the diagnosis?



- A. Optic nerve glioma
- B. Multiple sclerosis
- C. Non-arteritic anterior ischemic optic neuropathy
- D. Neuromyelitis optica spectrum disorder

Question 2

A 31-year-old woman presents to her primary care physician for the evaluation of episodes of severe jaw pain. She states that these episodes began approximately one week ago, occur dozens of times a day, each time lasting only a few seconds. The pain is in the right jaw, has a sharp, stabbing component, and is 10/10 in severity. Brushing her teeth and placing lotion on her face exacerbate the pain. Upon further questioning, the patient reports that 6 months ago, she had an episode of left-sided lower extremity muscle weakness and numbness that lasted 2 weeks before it spontaneously resolved. On physical examination, palpating the jaw elicited pain, but there was normal sensation. Inspection of the oropharynx, and skin of the face is unremarkable. Neurological examination is normal. Which of the following is the best next step in management?

- A. Magnetic resonance imaging (MRI) of the brain and spinal cord
- B. Referral to a dentist
- C. Lumbar puncture
- D. Administration of acyclovir

Question 3

A 34-year-old woman is brought to the emergency department by her husband due to worsening lower extremity weakness. Her symptoms began approximately one week prior to presentation, when she experienced mild weakness of the left leg, causing her to limp. The lower extremity weakness progressed to the point of not being able to get out of bed. The patient also reports a period of left arm weakness and numbness eight months ago that spontaneously resolved over the course of a few days. Approximately two weeks ago, she experienced an upper respiratory infection that has resolved. Her temperature is 98.6°F (37°C), pulse is 74/min, respiratory rate 18/min,

blood pressure 129/75 mm Hg. Neurological exam is significant for 1/5 strength in both lower extremities and 3+ patellar tendon reflexes. A magnetic resonance imaging (MRI) of the brain and spine is performed. Which of the following is the best initial treatment?

- A. Interferon-beta
- B. Intravenous immunoglobulin (IVIG)
- C. Natalizumab
- D. Methylprednisolone
- E. Plasma exchange

Question 4

A 29-year-old African American woman presents with bilateral facial weakness. This symptom developed over the course of a few hours and has never happened before. Upon further questioning, the patient reports seeing her pulmonologist every 6 months to follow her lung function and seeing her ophthalmologist annually for an eye exam. Neurological exam is significant for the patient being unable to smile, or raise her eyebrows. There is also an erythematous and tender nodule affecting the pretibial surfaces of both legs. Magnetic resonance imaging (MRI) of the brain shows leptomeningeal enhancement. Which of the following is most likely the diagnosis in this patient?

- A. Neurosarcoidosis
- B. Lyme disease
- C. Guillain-Barre syndrome
- D. Myasthenia gravis

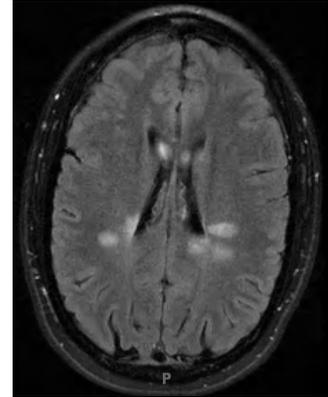
Question 5

An 8-year-old boy presents to the Emergency Department with altered mental status and weakness. The mother reports that her son had a fever and complained of a headache two days prior to presentation, along with upper extremity weakness. Earlier in the day, his headache worsened, he had vomiting, and appeared confused. The mother states that approximately one week ago, he had a viral illness but appeared to have fully recovered. Beyond this, he is neurologically normal at baseline. While performing the physical exam, he has a generalized tonic-clonic seizure, requiring benzodiazepine administration. Vital signs show that he is afebrile with a normal blood pressure. On physical exam, the patient has mild nuchal rigidity, a right relative afferent pupillary defect, right and left-sided weakness, and a bilateral Babinski reflex. Magnetic resonance imaging (MRI) showed diffuse white matter lesions. Which of the following is most likely the diagnosis?

- A. Viral meningitis
- B. Acute disseminated encephalomyelitis
- C. Neuromyelitis optica
- D. Multiple sclerosis
- E. Progressive multifocal leukoencephalopathy

Question 6

A 28-year-old woman presents to her primary care physician with diplopia on horizontal gaze, and dizziness. She reports that these symptoms began approximately 2 weeks ago, and has never happened before. Her double vision is only elicited when looking towards the left, but is absent with primary gaze. She states that approximately 4 months ago, she had right lower extremity weakness and numbness that lasted one week before being completely resolved. Medical history is significant for migraine headache with aura that is adequately treated with ibuprofen. On physical examination, there is impaired adduction of the right eye, with contralateral disassociated horizontal nystagmus of the abducting eye. There is normal convergence and diminished vertical gaze holding. A postural tremor is also noted on examination. Laboratory tests are significant for a normal B12 and thyroid-stimulating hormone (TSH) level, and normal white cell count. MRI of the brain is shown. What additional information is needed to make a diagnosis of multiple sclerosis?

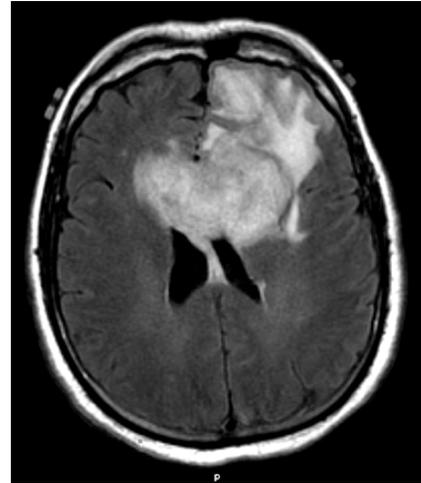


- A. A second MRI done 3 months later showing new enhancing lesions
- B. A second MRI done 3 months later showing new non-enhancing lesions
- C. An additional clinical attack, with an MRI showing a new enhancing lesion.
- D. No additional information is needed to make a diagnosis of multiple sclerosis

Neuro-Oncology Questions

Question 1

A 68-year-old man is brought to the Emergency Department immediately after a witnessed generalized tonic-clonic seizure. Prior to this seizure event, he had approximately 2 months of bifrontal headache that worsened when coughing or bending over. He also has worsening balance, resulting in 2 falls over the course of a few weeks. Medical history is significant for Myasthenia Gravis treated with oral prednisone for chronic immunotherapy. Social history is significant for smoking ½ a pack of cigarettes per day for 40 years and recent travel to South America. On physical examination, the patient is responsive but confused, has bilateral tongue laceration, with left pronator drift and slow foot-taps on the left side. Magnetic resonance imaging (MRI) of the brain is shown. Which of the following is most likely the diagnosis?



- A. Primary CNS lymphoma
- B. Abscess
- C. Glioblastoma
- D. Contusion
- E. Metastasis

Question 2

A 66-year-old man presents with progressively worsening headache that is most severe with sneezing and picking up heavy objects. The headache began approximately 3 months ago, is diffuse, non-pulsating, and associated with nausea and 2 episodes of vomiting. Medical history is unremarkable. A gadolinium-enhanced magnetic resonance imaging (MRI) of the brain shows a hyperintense serpentine irregularity of the margins. Pathology shows a hypercellular gliotic tumor with necrosis and high mitotic count. Preparations are made for radiation therapy with adjuvant chemotherapy. Which of the following is most likely the adjuvant chemotherapeutic agent used?

- A. Bevacizumab
- B. Temozolomid
- C. Carmustine
- D. Lomustine

Question 3

4) A 62-year-old man presents with progressive proximal lower extremity muscle weakness. He reports difficulty with climbing the stairs and getting up from a chair. He also reports that his mouth has been constantly dry. These symptoms began approximately 3 weeks prior to presentation. Medical history is significant for recently diagnosed small cell carcinoma of the lungs. On physical examination, there is no evidence of muscle atrophy. There is 4/5 strength bilaterally in the hip flexors and extensors, with absent patellar reflexes. When asking the patient to contract

both quadriceps for 10 seconds, his patellar reflexes become 2+. Which of the following is most likely to be found on serology?

- A. anti-acetylcholine receptor antibody
- B. anti-P/Q type voltage-gated calcium channel antibody
- C. anti-amphiphysin antibody
- D. anti-Hu antibody

Behavioral Neurology Questions

Question 1

1) A 62-year-old man is brought to the emergency department by his wife because “he’s been acting strangely.” She noticed that during social gatherings he would not say much, and would mostly sit by himself. He barely bathes. When left in place he would stay there until he is told to move. He would not seek his favorite activities including watching football but when sat in front of the TV he seemed to enjoy it. On the Montreal Cognitive Assessment (MoCA) testing, he could not complete the trails testing, his clock was disorganized, and he named only 3 items starting with the letter “F” in 60 seconds. His free recall was poor but improved with cuing. His visuospatial functioning was relatively spared. He had paratonia, but no other abnormalities on motor exam. Magnetic resonance imaging of the brain showed frontal atrophy, but no other focal abnormalities. Which of the following is most likely the diagnosis?

- A. Parkinson disease
- B. Major depressive disorder
- C. Frontotemporal dementia
- D. Alzheimer dementia
- E. Amyotrophic lateral sclerosis

Question 2

A 68-year-old woman is brought to her primary care physician by her son due to concerns about her behavior over the past 9 months. He reports that there were times she would leave the stove on after she finished cooking, causing her husband to always check the stove after meals. Even though he would tell the patient he will be visiting her in a few weeks, she completely forgets when he arrives. He has also noticed she is mildly irritable at things that usually would not bother her. Past medical history is unremarkable, and her only medication is a multivitamin. She is a retired secretary and currently lives with her husband. Her vital signs are unremarkable. Montreal Cognitive Assessment (MoCA) testing is significant for impairments in visuospatial function and memory (0/5 items on delayed recall, even with cues). The rest of the neurological exam is unremarkable. TSH and vitamin B12 tests are normal. Which of the following is most likely to be found on histology?

- A. Spongiform cortical changes
- B. Pick bodies
- C. Lewy bodies
- D. Neuritic plaques
- E. TDP-43 inclusion bodies

Question 3

A 66-year-old man presents with fluctuating cognitive dysfunction. He is accompanied by his wife, and she reports that at times, he seems almost normal, while at other times, he is very confused and disoriented. She also reports that he has gotten lost numerous times when driving home, and he has told her that he has seen “little children” running through their living room from time to time. Physical examination is significant for a hypophonic voice, bradykinesia and limb rigidity. Which of

the following is the mechanism of action of the appropriate medication used to treat this patient's condition?

- A. D2-receptor blockade
- B. Cholinesterase inhibition
- C. N-methyl-D-aspartate receptor blockade
- D. Selective serotonin reuptake inhibition

Question 4

During cognitive testing, a patient is asked to remember 5 items. He is able to repeat these items immediately afterward. When asked to recall the items 5 minutes later, he correctly repeats 2 of the 5 items. With category cues, he is not able to remember more items, and with a multiple-choice cue, he is able to remember one more item. What element of memory is most impaired in this patient?

- A. Registration
- B. Encoding
- C. Retrieval
- D. Consolidation