

Section 10: Neurology

CHAPTER 60: HEADACHE

Q.1. A 28-year-old female has a throbbing, one-sided headache three times a month. It occurs suddenly, persists for two days and sometime causes her to miss work. She has been having the headaches intermittently for six years and associates it with lack of sleep and stress. This is what type of headache?

- A. Migraine with aura
- B. Migraine without aura
- C. Tension-type headache
- D. Cluster headache

Answer: B. This headache is a migraine without aura. The pain is throbbing, unilateral, incapacitating, and has clear precipitants. A young female is the typical host. Cluster headaches would involve parasympathetic activity and would not last two days. Tension-type headaches are not typically incapacitating.

Q.2. A 31-year-old male presents to your office reporting that he has the onset of a severe, unilateral headache that has been intermittent for one week, usually occurring at night after he goes to sleep. The pain awakens him and forces him to "pace the floor." He has also been experiencing a "runny nose and runny eye" with this. Past medical history is otherwise unremarkable. He is taking no medications. His family history is hypertension in both parents. He denies tobacco or drug use, but drinks two to three beers on weekend nights. His physical exam is normal. What is the likely diagnosis?

- A. Migraine without aura
- B. Tension headache
- C. Cluster headache
- D. Subarachnoid hemorrhage
- E. Trigeminal neuralgia

Answer: C. This patient presents with a cluster headache. The host for cluster headaches is usually male. The headaches are severe, unilateral, and "cluster" for periods of time and have a circadian or nightly pattern. The parasympathetic overactivity is also part of this type of headache. Migraine without aura typically does not have the parasympathetic features and patients tend to want to rest in a dark room. Tension-type headaches are typically not as incapacitating. Subarachnoid hemorrhage is not usually associated with parasympathetic features. Trigeminal neuralgia typically involves only the second or third division of the trigeminal nerve.

Q.3. A 58-year-old female with a history of poorly controlled hypertension, hypercholesterolemia, and osteoporosis is asking about her headache therapy. She has had throbbing, unilateral headaches occurring every three months for years. Because of their severity, she is unable to work when she has one. She is asking for something stronger than ibuprofen for pain relief. Medications include prnivil, zocor, and aspirin. Physical examination is normal. What would you prescribe?

- A. Injectable sumatriptan
- B. Ergotamine with caffeine
- C. Midrin (isometheptene/acetaminophen and dichlorphenazone)
- D. Oxycodone
- E. 100% oxygen

Answer: C. This woman might benefit from Midrin. Her history highlights the contraindications of sumatriptan and ergotamines. Both are vasoconstrictors and are inadvisable if coronary artery disease or poorly controlled hypertension is present. 100% oxygen is the treatment for cluster headaches. Avoidance of a narcotic as first choice is also suggested.

Q.4. A 45-year-old female with a 15-year history of migraine headaches is now having two months of a daily headache she now attributes to job stressors. She has been taking an ergotamine preparation for acute treatment for her headaches but is now getting no relief. She is unable to work because of the pain. Your next recommendation should be

- A. Try injectable form of sumatriptan for the headache
- B. Increase the dose of the ergotamine
- C. Institute a low dose of a β -blocker
- D. Stop the ergotamine
- E. Add a tricyclic for prophylaxis

Answer: D. This is an example of medication-overuse headache from the ergotamine. Stopping the offending agent is the best choice. After this is achieved, reevaluation of the headache frequency and severity is warranted and then a prophylactic agent may be necessary.

Q.5. A 60-year-old female with a 30-year history of migraine headaches with visual auras presents for her clinic visit. She takes ibuprofen for her headaches and has never taken prophylaxis medications. She reports that her headaches have become more frequent over the last three months and notes stiffness in her shoulders and neck that she thinks is just "old age." What would you suggest next?

- A. Start a beta-blocker as prophylaxis

- B. Refer for MRI of brain
- C. Send her for audiology testing
- D. Ask her to discontinue any nonsteroidal medications she is taking
- E. Measure an erythrocyte sedimentation rate (ESR)

Answer: E. The change in headache pattern in this older patient should warrant further evaluation. Her systemic symptoms may be suggestive of giant cell arteritis and obtaining an ESR would be helpful. Brain MRI would be helpful if symptoms persisted. A workup for vasculitis is not warranted at this time.

Q.6. A 23-year-old female with a 10-year history of migraines is having headaches five times a month that keep her from working. She asks you for something to help prevent the headaches. Which of the following would *not* be an appropriate first option?

- A. Atenolol 50 mg by mouth daily
- B. Start a migraine diary to identify triggers
- C. Dietary modifications
- D. Amitriptyline 50 mg by mouth at bedtime
- E. Nifedipine 30 mg by mouth daily

Answer: E. Nifedipine has not shown efficacy for this indication. The other options are all reasonable first steps for headache prevention.

Q.7. A 30-year-old man with a history of migraines since adolescence has been having daily headaches over the past few months despite taking an average of four Fiorinal (aspirin/butalbital/caffeine) on a daily basis. Which of the following should you recommend?

- A. Replace Fiorinal with oxycodone
- B. Start verapamil in addition to the Fiorinal
- C. Replace Fiorinal with sumatriptan
- D. Discontinue all medications

Answer: D. This is an example of medication-overuse headache. The offending medication should be discontinued. Starting verapamil as a preventative therapy for migraine headaches may be helpful but the Fiorinal should be stopped. Narcotics should be avoided.

Q.8. A 34-year-old man has a history of mild to moderately severe headaches, which occur once a month, have associated nausea, and last about a day. He rarely takes medication and wants to know what medicine he should use when he gets the headaches. Your recommendation would be to try

- A. Ergotamine by mouth
- B. Intramuscular sumatriptan
- C. Ibuprofen by mouth
- D. Intranasal dihydroergotamine (DHE)

Answer: C. For mild to moderate intensity headaches, analgesics such as nonsteroidals, acetaminophen, or aspirin may be used. For more severe headaches, triptans or intranasal DHE may be tried. Ergotamines are less commonly used because of their increased side effects (vasoconstriction, rebound headaches).

Q.9. Which of the following would be appropriate for a patient with migraines who is suffering from medication-overuse headaches?

- A. Sumatriptan IM
- B. Ergotamine by mouth
- C. Caffeine
- D. Acetaminophen plus aspirin
- E. Discontinue all medications

Answer: E. All of the other choices may cause medication-overuse or rebound headaches. The best approach would be to identify the medication that is causing the headaches and taper the patient off of it.

Q.10. A 50-year-old female with a 25-year history of migraine headaches with visual auras presents for her clinic visit. She has never taken prophylaxis for the migraines because she "didn't want to take any medicines." When you ask her how her headaches have been she reports that over the past month she has been having them more frequently (once a week) and has a new "ringing" in her ears when she gets the headaches. She is on no medications, and physical exam is entirely normal. What would you suggest next?

- A. Start a beta-blocker as prophylaxis for the headaches
- B. Refer for MRI of brain
- C. Send her for audiology testing
- D. Ask her to discontinue any NSAID or aspirin if she is taking them for pain relief

Answer: B. The change in headache character in a patient above age 50 and new neurologic symptoms (tinnitus) would be considered "red flags" of a possible underlying pathology for the headaches. Neuroimaging would be warranted.

Q.11. A patient presents with a headache 20 days of the month and is taking acetaminophen/propoxyphene and ergotamine/caffeine when the headaches are extremely intense. What would be your next suggestion?

- A. Start sumatriptan for severe headache
- B. Try a β -blocker
- C. Stop all medications
- D. Refer to a psychiatrist

Answer: C. The drugs the patient is taking may be causing analgesic, overuse headaches or rebound headaches. Stopping the medications may ultimately improve the headache pattern.

CHAPTER 61: CEREBROVASCULAR DISEASE AND SEIZURE DISORDERS

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- Q.1.** A 55-year-old diabetic man presents with two days of severe right supraorbital pain. Examination reveals complete right ptosis and a 5-mm fixed pupil, with inability to move the eye vertically or inward. Outward movement is spared. The left eye is normal, as is the rest of the examination. The most likely diagnosis is
- A. Diabetic third nerve palsy
 - B. Anterior communicating artery aneurysm
 - C. Posterior communicating artery aneurysm
 - D. Small brainstem stroke
 - E. Impending cerebral herniation

Answer: C. Posterior communicating aneurysms (one of the most common locations for aneurysms of the circle of Willis) can present with headache and third nerve palsy. In a diabetic third nerve palsy, there is usually sparing of pupillary reaction.

- Q.2.** A 60-year-old woman with type 2 diabetes presents with several episodes of uncontrollable left arm twitching, sometimes spreading to the left face. The last episode occurred shortly before arrival to the emergency room. Neurologic examination reveals mild left face and arm weakness. Vital signs are normal. Laboratory studies reveal a serum glucose of 600 mg/dL. What is the most likely diagnosis?
- A. Lacunar infarction involving the internal capsule
 - B. Basal ganglia intracerebral hemorrhage
 - C. Cardioembolic stroke with secondary seizure
 - D. Partial seizure caused by hyperglycemia
 - E. Partial seizure caused by infection

Answer: D. Hyperglycemia is commonly associated with partial seizures.

After several episodes of seizure, one may expect a Todd's paralysis with residual weakness in the affected part of the body lasting minutes to hours. Lacunar infarcts are generally not associated with seizures, but this could also be the presentation of a small cortical infarct with secondary seizures.

Q.3. An 87-year-old man with long-standing dementia presents with a sudden loss of consciousness and a fall. In the emergency room, he is lethargic with an obvious right hemiparesis. A head CT scan reveals a large left frontal lobar hematoma. He has no previous history of hypertension, but did have a prior intracerebral hemorrhage in a different location eight months earlier, from which he recovered. The most likely diagnosis is

- A. Intracerebral hemorrhage from amyloid angiopathy
- B. Intracerebral hemorrhage from rupture of an AVM
- C. Intraparenchymal rupture of a cerebral aneurysm of the circle of Willis
- D. Frontal lobe contusion
- E. Intracerebral hemorrhage from metastatic tumor

Answer: A. Amyloid angiopathy is a condition associated with older age and particularly with Alzheimer's disease. Amyloid deposition in the cerebral vessels leads to fragmentation and weakening of the vessel walls, resulting in lobar hemorrhages, which are often recurrent. AVMs and aneurysms are more common causes of intracranial hemorrhage in younger patients. Metastatic tumor can cause multiple lobar hemorrhages, but it is unlikely a patient would recover from such a hemorrhage because the tumor would likely continue to grow.

Q.4. The most definitive diagnostic test for the headache patient described in the preceding question would be

- A. Sedimentation rate
- B. Lumbar puncture
- C. CT scan of the brain
- D. MRI of the brain
- E. Cerebral angiography

Answer: E. Cerebral angiography is the definitive test to rule out an aneurysm. MRI may show a large aneurysm, but lacks sensitivity if there is a high index of suspicion. Given a mortality rate of up to 50% with aneurysmal rupture, early detection and clipping of the aneurysm can be lifesaving.

Q.5. A 63-year-old diabetic man presents with a new stroke involving the left cerebral hemisphere. Examination shows a dense aphasia, neglect, and motor

paralysis. Clinical exam suggests a large hemispheric infarct. He becomes drowsy and difficult to arouse 48 hours later. Possible cause(s) is/are

- A. Pulmonary embolus
- B. Hemorrhagic transformation of an ischemic stroke
- C. Poststroke cerebral edema
- D. Herniation syndrome
- E. All of the above

Answer: E. Answers A, B, C, and D are all common reasons for a worsening clinical examination after a large hemispheric infarction.

Q.6. A 58-year-old woman with type 2 diabetes presents with several episodes of uncontrollable left arm twitching, sometimes spreading to the left face, and alteration of consciousness. The last episode occurred shortly before arrival at the emergency room. The ER evaluation shows an unresponsive woman with recurrent generalized tonic-clonic seizures. Vital signs are normal. Laboratory studies reveal a serum glucose of 40 mg/dL. What is the best treatment?

- A. 1000 mg of IV Dilantin
- B. 2 mg IV lorazepam
- C. Stat EEG
- D. Thiamine and one amp of D50
- E. CT/LP

Answer: D. Hypoglycemia is the most common cause of recurrent seizures and status epilepticus. Antiepileptic medications work poorly in most metabolic seizures.

Q.7. An 83-year-old man who is otherwise in good health presents with a fall and is found to have a small cortical stroke involving the right brain. A loud bruit is heard on the right side. A carotid duplex doppler ultrasound shows an 80% ICA stenosis. The best treatment would be

- A. Carotid endarterectomy after six weeks
- B. Warfarin only
- C. Carotid stent after six weeks
- D. Aspirin
- E. Stain medication

Answer: A. CEA is superior to medical therapy in patients who have symptomatic, greater-than-70% carotid stenosis and are good surgical candidates. Anticoagulation or antiplatelet agents would be appropriate for less severe stenosis.

- Q.8.** A 56-year-old woman with a history of atrial fibrillation presents with three hours of acute onset aphasia, hemiparesis, neglect, and forced gaze deviation. A head CT shows no significant abnormalities and no evidence of stroke. The most common reason for this is
- A. Malingering
 - B. CT scans are often normal in the first six hours after stroke
 - C. The etiology is a hemorrhage that does not show up on CT scan
 - D. This is not stroke but status epilepticus

Answer: B. Conventional CT can be normal for hours after an acute stroke. Signs of stroke can be very subtle. MRI with diffusion-weighted imaging can identify strokes within minutes of onset.

- Q.9.** A 24-year-old graduate student is brought to the emergency room by her roommate because of a single, generalized tonic-clonic seizure. She is normal in the ED. She admits to recent significant sleep deprivation and started buprion approximately one month ago. She has no history of prior seizures and is otherwise well. The most reasonable intervention would be
- A. Administration of intravenous phenytoin
 - B. Administration of intravenous lorazepam
 - C. Administration of ampicillin and ceftriaxone
 - D. CT/LP, and if no abnormalities found no treatment
 - E. Administration of amphotericin

Answer: D. Sleep deprivation and medications like buprion are known etiologies for a first-time seizure. Such seizures, with no abnormalities on EEG, or evidence of a CNS lesion or encephalitis, can be followed conservatively. A majority of first-onset induced seizures never recur.

- Q.10.** A 68-year-old man with a history of hypertension and tobacco use presents with an episode of loss of vision in the right eye lasting approximately two minutes. His eye examination is now normal. On further questioning, he noted a spell of difficulty producing language and right-sided weakness two weeks before, and previous to that a spell of dense sensory loss on the right side. His neurologic examination is normal. The most likely cause of his symptoms is
- A. Cardio-embolic stroke
 - B. Lacunar stroke
 - C. Carotid artery stenosis
 - D. Complicated migraine
 - E. Hypercoaguable state

Answer: C. Carotid or other large artery stenosis can be differentiated from cardiac source transient ischemic attacks (TIAs) as carotid source TIAs are always on the same side. Cardio-embolism TIAs can affect either side and tend to have dense deficits that recover less well and completely. Amaurosis fugax is a classical carotid stenosis syndrome.

Q.11. In which of the following epilepsy scenarios is the drug of choice being administered?

- A. A 17-year-old boy suffering with petit mal seizures is being treated with carbamazepine
- B. A 22-year-old woman with focal seizures that spread to tonic-clonic activity with loss of consciousness is placed on phenytoin
- C. A 26-year-old man with altered consciousness preceded by lip-smacking and agitation is prescribed valproate
- D. A 16-year-old with juvenile myoclonic epilepsy is placed on gabapentin
- E. A 22-year-old man always describes an unusual odor before staring into space and becoming unresponsive is given ethosuximide

Answer: B. The key to this question is to recognize the type of seizure and then to know the appropriate first-line therapy. The correct answer is B, the scenario of a generalized seizure being treated with phenytoin. Answer A is incorrect, as petit mal seizures (absence seizures) are best treated with ethosuximide. Answers C and E describe partial complex seizures that should be treated first with carbamazepine. Valproate is used to treat juvenile myoclonic epilepsy (answer D).

Q.12. A 66-year-old woman presents to the emergency room with five hours of right-sided face and arm numbness and weakness. She has mild aphasia. Her right side is uninvolved, as is her left leg. Her past medical history is notable for hypertension and peptic ulcer disease. Her current medications are a β -blocker, calcium, and a multivitamin. In the emergency room, her examination confirms both a sensory and motor deficit involving the left face and arm. Because her symptoms do not resolve, she is admitted to the hospital. Which of the following statements is true regarding her condition?

- A. Antiplatelet therapy is a reasonable choice for treatment
- B. The lesion is most likely located in the thalamus
- C. The lesion is most likely located in the internal capsule
- D. If carotid dopplers reveal a right-sided stenosis of 50%, she would definitely benefit from carotid endarterectomy
- E. First-line treatment is tPA administered immediately

Answer: A. This woman is suffering from an acute infarct. Given involvement of unilateral face and arm but sparing of the leg, it is likely to be a cortical stroke resulting from embolization from carotid artery atherosclerosis. Antiplatelet therapy with aspirin or clopidogrel is a reasonable course of action. A thalamic lesion would most likely produce a unilateral sensory deficit but not a motor deficit as in this patient. An internal capsule lesion would involve motor weakness of the leg in addition to the face and arm. Carotid endarterectomy is most beneficial in symptomatic patients with carotid stenoses of 70% or greater. Finally, the patient's presentation after five hours of symptoms would preclude her from receiving tPA (it should be given within three hours of the onset of symptoms for the benefit to outweigh the risk).

Q.13. A 34-year-old woman with no past medical history other than a miscarriage five years ago presents with new right-sided hemiparesis and slurred speech for the past two hours. She has no cardiac risk factors. Her symptoms slowly resolve while in the emergency department. Which of the following is an appropriate course of action?

- A. No further testing is necessary, as this is her first transient ischemic attack
- B. Check protein C and protein S levels
- C. Check for antiphospholipid antibodies
- D. Check factor VIII levels
- E. Both B and C

Answer: E. Stroke or transient ischemic attack (TIA) in a young patient with no cardiac risk factors always deserves further evaluation. Patients should have a hypercoagulable workup, including antithrombin III levels, proteins C and S levels, lupus anticoagulant, antiphospholipid antibodies, and homocysteine level. Factor VIII levels are not part of the screen for hypercoagulability (rather a deficiency, hemophilia A, leads to bleeding and not to thrombosis). Other related factors should also be considered, such as cocaine or stimulant use.

Q.14. You have been following a patient with systemic lupus erythematosus for years. She also has hypertension and a remote history of a miscarriage. Her medications are hydroxychloroquine and hydrochlorothiazide. She now presents to the emergency room with new left face, arm, and leg numbness. Her symptoms gradually resolve after 20 minutes, leaving no deficit. Labs are notable for an aPTT of 56 seconds (control is 22.2–33.4 seconds). Her other coagulation studies are normal. What therapy should be instituted?

- A. None, as she only had a transient ischemic attack and not a stroke
- B. Antiplatelet therapy with 325 mg of aspirin a day
- C. Warfarin, with a goal INR of 2.5–3.5

D. Warfarin with a goal INR of 2.0–3.0

E. Antiplatelet therapy with clopidogrel

Answer: C. Many patients with antiphospholipid antibody syndrome never have clinical manifestations and therefore may not require treatment. This patient, however, clearly has symptoms as evidenced by her history of miscarriage and transient ischemic attack. The standard therapy for antiphospholipid antibody syndrome requires anticoagulation with warfarin, as antiplatelet therapy is not adequate. The goal INR is higher (2.5–3.5) than for other conditions necessitating warfarin.

CHAPTER 62: MOVEMENT DISORDERS

Q.1. A 45-year-old man with frequent but vague gastrointestinal complaints has been doing well on a combination of added fiber, ranitidine, and metoclopramide. He has no new complaints. He appears to be chewing gum, but examination reveals nothing in his mouth, and he does not appear to be able to suppress the movements. He is unaware of the movements, but his spouse noted their progressive appearance during the past six months. The most likely cause of his problem is

A. Whipple's disease

B. Chronic oral tic disorder

C. Drug-induced tardive dyskinesia

D. Normal aging

Answer: C. Tardive dyskinesia often appears as chewing movements. The most common cause is chronic neuroleptic use, but chronic use of antiemetics with dopamine receptor antagonist activity can also cause tardive dyskinesia. Whipple's disease can rarely present with abnormal mouth movements, but these do not resemble chewing. Tics are not likely to go unnoticed by the patient, and they are at least partly suppressible. Movements resembling chewing can be seen in normal elderly, but most often in the edentulous state or with poorly fitting dentures.

Q.2. An 86-year-old woman with Alzheimer's disease has been using donepezil for her ailing memory. Risperidone was added recently for progressively agitated behaviors. Several months later, she appears slow and has had several falls. Examination reveals a shuffling gait, stooped posture, and slowed movements. Otherwise, her examination is unchanged. Appropriate management includes

A. Starting levodopa/carbidopa for possible Parkinson's disease

B. Starting an antidepressant for suspected depression

- C. Discontinuing risperidone
- D. Discontinuing donepezil

Answer: C. Neuroleptic agents can improve agitated behaviors in patients with dementia, but they must be used with caution because of potential side effects of parkinsonism or tardive dyskinesia. This patient is experiencing drug-induced parkinsonism caused by the addition of risperidone. Drug-induced parkinsonism is characterized by slowness and stiffness, but resting tremor is often absent. Claims that "atypical" antipsychotics do not cause parkinsonism or tardive syndromes are not accurate. All antipsychotics cause these problems, though with lower frequency than classic antipsychotics. These side effects are very rare with clozapine, but a 1% incidence of agranulocytosis limits its use. Among the other atypical antipsychotics, quetiapine is considered the least likely to produce parkinsonism or tardive dyskinesia.

- Q.3.** A 51-year-old woman taking paroxetine for depression says her mood is better, but she complains of trouble sleeping. Her legs feel irritated as soon as she lies down. She feels compelled to get up and walk, as she finds she cannot keep her legs still in bed. Her spouse found her nighttime behavior distracting, so he now sleeps in another bedroom. She recalls her mother often spent a lot of time pacing the hallways at night, but she does not know why. The most appropriate next step would be to
- A. Increase the paroxetine to more effective doses
 - B. Change the antidepressant to an alternative because paroxetine is not working
 - C. Refer for psychological counseling to address the possibility of marital discord
 - D. Ask her to try low-dose pramipexole and report back in a week

Answer: D. The clinical history is compatible with restless legs syndrome, which is often inherited. A few days on pramipexole or another dopamine-related medication (ropinirole or levodopa/carbidopa) is likely to have a dramatic effect. Patients with restless legs syndrome often complain bitterly of years of psychiatric misdiagnoses before the diagnosis of restless legs syndrome is considered and the remarkable efficacy of the dopamine-related medications is discovered.

- Q.4.** An otherwise healthy 43-year-old woman presents complaining of neck pain and inability to hold her head straight for the past six months. Examination reveals a tendency for her to hold her head tilted to the right and her chin turned to the left. She can voluntarily straighten it, but it then reverts to the abnormal position spontaneously. The most useful treatment is
- A. Physical therapy
 - B. Soft cervical collar
 - C. Botulinum toxin injection

D. Oral anticholinergics

Answer: C. This patient most likely has cervical dystonia (torticollis), the most common focal dystonia of adults. An underlying cause is usually not discoverable, and the condition is considered idiopathic. Conservative management with physical therapy or a cervical collar may provide partial symptomatic benefit, but is rarely sufficient. Oral anticholinergics traditionally provided the only therapeutic options, but their efficacy is poor. The treatment of choice for this condition is local injection of botulinum toxin, which can eliminate neck pain and restore the head to a near-normal position.

- Q.5.** A 26-year-old woman presents with neck pain and stiffness, which has gradually worsened over the past several weeks. She reports that her mother often tells her she doesn't hold her head straight and she thinks now she has strained her neck. On exam her neck is held rotated to the left and slightly flexed. Palpation of the sternocleidomastoid muscle on the left reveals it to be contracted and slightly tender. She has been previously well. She had her vaccinations updated before she started graduate school last year. Possible treatments include
- A. Botulinum toxin
 - B. A benzodiazepine
 - C. Trihexyphenidyl
 - D. All of the above

Answer: D. This woman has a form of acute dystonia or torticollis. Torticollis causes sustained contraction of neck muscles resulting in an abnormal position of the head. Usual onset is between 25 and 55 years of age and onset is often gradual. A patient's family members often comment on the abnormal posture first. Benzodiazepines or trihexyphenidyl are medications often used in treatment of acute dystonias. If medical treatment fails, botulinum toxin injection can provide relief.

CHAPTER 63: SELECTED TOPICS IN NEUROLOGY

- Q.1.** A 59-year-old woman presents with subacute onset of tingling in her toes, which she says has been slowly worsening. She notes no sensory loss but she is occasionally "tripping." Her cranial nerve, motor, and sensory examination are normal. She is admitted after she falls leaving the emergency room. Over two days she develops a rapidly ascending paraparesis without bowel or bladder issues. Her reflexes are depressed with downgoing toes. The finding that suggests most strongly that this is Guillain-Barré syndrome and *not* a spinal cord problem is
- A. Her age

- B. The subacute onset
- C. The dropped reflexes
- D. The lack of bowel or bladder incontinence

Answer: D. Her age is noncontributory. The subacute onset suggests more of a nerve problem than spinal cord issue but spinal cord lesions can present this way. Dropped reflexes typically occur with nerve problems but spinal shock can present with spinal cord lesions that result in acute and subacute dropped reflexes. Bowel and bladder incontinence occurs late in Guillain-Barré syndrome and usually when patients are quadriplegic and intubated. Bowel/bladder incontinence is common in spinal cord lesions.

Q.2. A 48-year-old woman presents with subacute onset of weakness in her legs and falls. She notices that she has been having some difficulty with losing control of urine. She was recently diagnosed with metastatic lung cancer. On examination she has normal mental status and cranial nerves. On motor examination, she presents with bilateral mild arm weakness with increased tone, bilateral lower extremity significant weakness, sensory loss level at the umbilicus and down, increased reflexes, and up going toes in arms and legs. This is an upper motor neuron problem. The most appropriate test would be

- A. Lumbosacral MRI scan
- B. Cervical-thoracic MRI scan
- C. EMG/NCS
- D. Test for a ruptured L4 disk

Answer: B. A cervical spinal cord lesion can present with a sensory loss level at the abdomen. The clue to the area of the spinal cord lesion is the arm weakness and increased reflexes. This is a cervical spinal cord lesion causing a quadraparesis, and, as C6–C8 innervate the hands and arms, the lesion must be here or higher. Therefore an MRI of thoracic spinal cord or higher is needed. This patient's sensory level is not localizing; it defines the lowest level the lesion might be. A lumbosacral MRI will look at the bottom of the cord and roots. There can be no arm weakness and increased tone/reflexes with a lumbosacral lesion.

Q.3. An 87-year-old man presents with numbness and tingling in his right hand. He describes it involves the whole hand. He notes that he has some problems holding objects. He states that he does have shooting pain and numbness in the whole arm. Exam shows normal mental status. His cranial nerve examination is normal. On motor examination he has weakness of biceps and dropped biceps reflex. On sensory examination he has loss of sensation in the thumb and forefinger of that hand. Which portions of the history and physical examination suggest a C6 radiculopathy specifically over a carpal tunnel syndrome?

- A. Dropped biceps reflex
- B. Loss of sensation in thumb and forefinger
- C. Biceps weakness
- D. Radiating discomfort
- E. B and D
- F. A and C
- G. A and D

Answer: F. Both carpal tunnel and a C6 radiculopathy can present with sensory loss in the thumb and forefinger. Carpal tunnel syndrome (CTS) is a median nerve lesion that should not result in the loss of any reflexes. C6 lesions present primarily with dropped biceps jerk and weakness of biceps muscle. Radiating discomfort can occur with both radiculopathy and carpal tunnel. It is fairly classic to have a shooting pain in the arm with CTS, but only with hard sensory loss in the hand.

Q.4. A 30-year-old woman fell asleep with her legs crossed during a graduate lecture. When she awoke, she noted that the right foot was tingling. She stood to walk and noted the foot was "slapping" on the ground. You evaluate her and find that she has weakness on dorsiflexion of the right foot. There is also some sensory loss between the first and second toes. She had normal reflexes, normal tone, and down going toes. These symptoms most likely represent which of the following?

- A. Cauda equina syndrome
- B. Guillain-Barré syndrome
- C. Peroneal nerve palsy
- D. L5 radiculopathy

Answer: C. She has developed a compressive neuropathy of the peroneal nerve at the level of the fibular head. Cauda equina syndrome presents with bowel and bladder dysfunction, and flaccid lower extremity paralysis. Guillain-Barré syndrome presents as an areflexic motor paralysis, with or without a sensory disturbance. An L5 radiculopathy represents a more proximal process.

Q.5. A 45-year-old man presents to your office reporting diplopia in all directions. There is no eye movement abnormality to your examination. He describes some proximal muscle weakness, although strength testing in your office is normal. He complains that his jaw gets weak when eating steak. His jaw muscles and action are normal in your office. You are able to elicit vertical diplopia by making him look up with his eyes. The diplopia begins after 30 seconds. His examination is otherwise normal. He has a history of hypothyroidism. Blood work and brain MRI are entirely normal. What would you do next?

- A. Write in his chart that he is malingering
- B. Schedule him for a lumbar puncture
- C. Consider Guillain-Barré syndrome
- D. Schedule him up for an EMG/NCV study with repetitive stimulation, CT scan of the chest, and anti-acetylcholine receptor antibody level

Answer: D. Because this patient presents with myasthenia gravis with bulbar involvement you should schedule him for an EMG/NCV study with repetitive stimulation, a CT scan of the chest, and an anti-acetylcholine receptor antibody level. An EMG/NCV study and anti-acetylcholine receptor antibody assay should provide confirmatory results, while the chest CT scan seeks evidence of a thymoma. He is not malingering. Spinal fluid will not provide the disease-specific findings found by an EMG/NCV study and anti-acetylcholine receptor antibody screen. Guillain-Barré syndrome presents as an areflexic motor paralysis, with or without a sensory disturbance.

- Q.6.** A 68-year-old man is in the ICU. He has been there for four weeks for a COPD flare. During his hospital stay he developed sepsis from a urinary source. He has been intubated and paralyzed for an extended period of time. There has been no luck weaning him from the ventilator. The MICU attending tells you the respiratory issues are solved and there is no pulmonary reason that he cannot be weaned from the ventilator. He has normal cranial nerve function. He is areflexic and has high CPKs. EMG/NCV study shows a severe neuropathy, of both demyelinating and axonal forms. The reason for failure to wean is *least* likely to be
- A. Critical illness myopathy/neuropathy
 - B. Myasthenia gravis
 - C. Occult spinal cord damage secondary to intubation
 - D. Guillain-Barré syndrome

Answer: B. Myasthenia gravis is an unlikely reason for failure to wean this patient from the ventilator, given the findings on the EMG/NCV study. All of the other options remain possibilities.