

ADVANCED PATHOPHYSIOLOGY EXAM 4 WITH UPDATED QUESTIONS AND ANSWERS WITH DETAILED EXPLANATIONS

The inability to smile symmetrically is a sign of cranial nerve VII dysfunction (facial nerve). The inability to open the mouth against resistance is related to a dysfunction of cranial nerve V (trigeminal nerve). Loss of a gag reflex correlates with dysfunction of cranial nerve IX (glossopharyngeal nerve). Deviation in tongue position when the patient extends it is a sign of cranial nerve XII (hypoglossal nerve) dysfunction.

The cerebellum is responsible for reflexive, involuntary fine-tuning of motor control and for maintaining balance and posture through extensive neural connections with the medulla and with the midbrain. The cerebrum is the site of higher brain function. The diencephalon controls vital functions and visceral activities and is closely associated with those of the limbic system. The brainstem contains the reticular formation which is a large network of diffuse nuclei that connect the brainstem to the cortex and control vital reflexes, such as cardiovascular function and respiration. It is essential for maintaining wakefulness and attention.

A patient has a spinal cord injury that included damage to the upper motor neurons. What assessment finding would the healthcare provider associate with this injury?

1. Permanent paralysis below the level of the injury
2. Initial paralysis, but gradual partial recovery later
3. Hemiplegia on the contralateral side of the body
4. Notable increase in the amount of cerebral spinal fluid (CSF)

ANS: B

Upper motor neurons (i.e., corticospinal tract) are the classification of motor pathways completely contained within the CNS. Their primary roles include directing,

influencing, and modifying reflex arcs, lower-level control centers, and motor and some sensory neurons. Damage or destruction to upper motor neurons generally results in partial paralysis that is followed by a gradual and partial recovery. Permanent paralysis is usually the result of lower motor neuron destruction. Hemiplegia is often due to an injury or obstruction of the anterior cerebral artery. Changes in CSF production are a known age-related change and are due to atrophy of epithelial cells and thickening of the basement membrane in the choroid plexus.

Where is the major relay station of sensory information located?

1. Basal ganglia
2. Midbrain
3. Thalamus
4. Hypothalamus

ANS: C

Where in the CNS does a person's learned pain response occur?

1. Cerebral cortex
2. Frontal lobe
3. Thalamus
4. Limbic system

ANS: A

What part of the brain provides the emotional response to pain?

1. Limbic system
2. Parietal lobe
3. Thalamus
4. Hypothalamus

ANS: A

The limbic and reticular tracts are involved in alerting the body to danger, initiating arousal of the organism, and emotionally processing the perceived afferent signals, not just as stimuli, but also as pain. This system is in the anterior temporal lobe, not the parietal lobe. The thalamus is the major relay station of sensory information. The hypothalamus, brainstem, and basal forebrain are involved in promoting wakefulness.

The major sleep center is located in which section of the brain?

1. Thalamus
2. Cerebellum
3. Frontal lobe
4. Hypothalamus

ANS: D

Which neurotransmitters inhibit pain in the medulla and pons? (Select all that apply.)

1. Norepinephrine
2. Serotonin
3. Glutamate
4. Tumor necrosis factor-alpha
5. Nitric oxide

ANS: A, B

Cognitive operations cannot occur without the effective functioning of what part of the brain?

1. Pons
2. Medulla oblongata
3. Reticular activating system
4. Cingulate gyrus

ANS: C

Which intracerebral disease process is capable of producing diffuse dysfunction?

1. Closed-head trauma with bleeding
2. Subdural pus collections
3. Neoplasm

4. Embolic infarct

ANS: D

What is the most common infratentorial brain disease process that results in the direct destruction of the reticulating activation system (RAS)?

1. Cerebrovascular disease
2. Demyelinating disease
3. Neoplasms
4. Abscesses

ANS: A

Infratentorial disorders produce a decline in arousal through a direct destruction of the RAS and its pathways

A healthcare professional reads in the patient's chart and notes the patient has Cheyne-Stokes respirations. What clinical finding would the professional correlate with this condition?

1. Sustained deep rapid but regular pattern of breathing
2. Crescendo-decrescendo pattern of breathing, followed by a period of apnea
3. Prolonged pause after the inspiratory period with occasional end-expiratory pause
4. Completely random, irregular breathing pattern with pauses

ANS: B

Vomiting is associated with central nervous system (CNS) injuries that compress which of the brain's anatomic locations?

1. Vestibular nuclei in the lower brainstem
2. Floor of the third ventricle
3. Any area in the midbrain
4. Diencephalon

ANS: A

Vomiting, yawning, and hiccups are complex reflexlike motor responses that are integrated by neural mechanisms in the lower brainstem.

Which midbrain dysfunction causes pupils to be pinpoint size and fixed in position? a.
Diencephalon dysfunction

2. Oculomotor cranial nerve dysfunction
3. Dysfunction of the tectum
4. Pontine dysfunction

ANS: D

A patient has damage to the lower pons and medulla. What finding does the healthcare professional associate with this injury?

1. Flexion with or without extensor response of the lower extremities
2. Extension response of the upper and lower extremities
3. Extension response of the upper extremities and flexion response of the lower extremities
4. Flaccid response in the upper and lower extremities

ANS: D

A flaccid state with little or no motor response to stimuli is characteristic of damage to the lower pons and medulla. Flexion of the upper extremities with or without extensor response in the lower extremities would signify hemispheric injury above the midbrain. Extension of both upper and lower extremities is seen in extensive midbrain, or upper pons injuries. Extension in the upper extremities and flexion in the lower extremities would be indicative of a pons injury.

10. Which hospitalized patient does the healthcare professional assess as a priority for the development of delirium?

1. An individual with diabetes celebrating a 70th birthday
2. c. An elderly male on the second day after hip replacement d. A man diagnosed with schizophrenia

ANS: C

Delirium is associated with autonomic nervous system overactivity and typically develops in 2 to 3 days, most commonly in critical care units, post surgically, or during withdrawal from CNS depressants (e.g., alcohol, narcotic agents).

12. A patient had a seizure that consisted of impaired consciousness and the appearance of a dreamlike state. How does the healthcare professional chart this episode?

1. Focal seizure
2. Complex focal seizure
3. Tonic-clonic seizure
4. Atonic seizure

ANS: B

A complex focal seizure results in impaired consciousness and a vague or dreamlike state. A focal seizure means a seizure that originates in one part of the brain and includes many types. A tonic-clonic seizure would consist of jerking and shaking movements and loss of consciousness.

13. A patient is in status epilepticus. In addition to giving medication to stop the seizures, what would the healthcare professional place highest priority on?

1. Facilitating a CT scan of the head
2. Providing oxygen
3. Assessing for brain death

ANS: B

4. What is the most critical aspect in correctly diagnosing a seizure disorder and establishing its cause?

1. Computed tomographic (CT) scan
2. Cerebrospinal fluid analysis
3. Skull x-ray studies
4. Health history

ANS: D

15. What area of the brain mediates the executive attention functions? a. Limbic

b. Prefrontal c. Parietal d. Occipital

ANS: B

The prefrontal areas mediate several cognitive functions, called executive attention functions (e.g., planning, problem solving, setting goals).

7. A patient's chart notes receptive aphasia. What does the healthcare professional understand about this patient's abilities related to speech?

1. Speak in made up words.
2. Produce verbal speech, but not comprehend language.
3. Comprehend speech, but not verbally respond.
4. Neither respond verbally nor comprehend speech.

ANS: B

The individual experiencing receptive aphasia may be able to produce verbal language, but language is meaningless because of a disturbance in understanding all language. Speaking in made up words is neologism, a type of aphasia. A patient who can comprehend speech but not respond verbally has expressive aphasia. A patient who cannot verbally respond or comprehend speech has global aphasia.

18. The healthcare professional notes that the patient's intracranial pressure is 12 mmHg. What action should the professional take?

1. Do nothing; this is a normal finding.
2. Give medications to immediately lower the pressure.
3. Give medication to immediately raise the pressure.
4. Repeat the reading because the first one was inaccurate.

ANS: A

Intracranial pressure is normally 5 to 15 mmHg or 60 to 180 cm water (H₂O). The healthcare professional does not need to do anything else based on the reading.

19. Cerebral edema is an increase in the fluid content of what part of the brain? a.

Ventricles b. Tissue

c. Neurons d. Meninges

ANS: B

20. What type of cerebral edema occurs when permeability of the capillary endothelium increases after injury to the vascular structure? a. Cytotoxic

b. Interstitial

c. Vasogenic d. Ischemic

ANS: C

Increased permeability of the capillary endothelium of the brain after injury to the vascular structure causes vasogenic edema. Cytotoxic cerebral edema is caused by a failure of active transport systems. Interstitial cerebral edema is most often seen in patients with noncommunicating hydrocephalus. Ischemia is a common cause of cytotoxic cerebral edema.

What is a communicating hydrocephalus caused by an impairment of?

1. Cerebrospinal fluid flow between the ventricles
2. Cerebrospinal fluid flow into the subarachnoid space
3. Blood flow to the arachnoid villi
4. Absorption of cerebrospinal fluid

ANS: D

22. Which dyskinesia involves involuntary movements of the face, trunk, and extremities? a. Paroxysmal

b. Tardive

c. Hyperkinesia d. Cardive

ANS: B

Tardive dyskinesia is the involuntary movement of the face, trunk, and extremities.

Paroxysmal dyskinesias are abnormal, involuntary spasms of movement. Hyperkinesia is an umbrella term that includes tardive and paroxysmal dyskinesias.

23. Antipsychotic drugs cause tardive dyskinesia by mimicking the effects of an increase of what?

1. Dopamine
2. Gamma-aminobutyric acid
3. Norepinephrine
4. Acetylcholine

ANS: A

The existence of regular, deep, and rapid respirations after a severe closed head injury is indicative of neurologic injury to what? a. Lower midbrain

Pontine area

2. Supratentorial
3. Cerebral area

ANS: A

Central reflex hyperpnea, which is a sustained deep and rapid but regular respiratory pattern that is the result of central nervous system (CNS) damage or disease, involves the lower midbrain and upper pons

25. What type of posturing exists when a person with a severe closed head injury has all four extremities in rigid extension with the forearms in hyperpronation and the legs in plantar extension?

a. Decorticate

- b. Decerebrate c. Spastic
- d. Cerebellar

ANS: B

Decerebrate posturing includes maintaining the position of all four extremities in rigid extension. Decorticate posturing includes bilateral flexion of elbows and wrists with shoulder adduction in upper extremities. Upper motor neuron paresis/paralysis is also known as spastic paresis/paralysis. Cerebellar damage can lead to hypotonia.

26. After a cerebrovascular accident, a patient has been diagnosed with anosognosia. What action by the healthcare professional would be most helpful?

1. Provide a white board for the patient to write on.
2. Ensure the patient has a safe environment.
3. Provide physical therapy for strengthening exercises.
4. Practice naming colors using flash cards.

ANS: B

Anosognosia is ignorance or denial of the existence of disease.

27. After a cerebrovascular accident, a man is unable to either feel or identify a comb with his eyes closed. What is this an example of?

1. Agraphia
2. Tactile agnosia
3. Anosognosia

4. Prosopagnosia

ANS: B

Tactile agnosia is the inability to recognize objects by touch as a result of damage to the parietal lobe. Agraphia is the loss of the ability to communicate through writing. Anosognosia is ignorance or denial of the existence of disease. Prosopagnosia is the inability to recognize familiar faces.

28. Most aphasias are associated with cerebrovascular accidents involving which artery?

1. Anterior communicating
2. Posterior communicating
3. Circle of Willis
4. Middle cerebral

ANS: B

29. A healthcare professional reads in a patient's chart that the patient shows behaviors suggestive of neurofibrillary tangles. What information does the healthcare professional plan to provide the spouse?

1. The patient will probably develop seizures.
2. The patient will lose all motor function.
3. The patient will have a gradual decline in function.
4. The patient's intracranial pressure will rise.

ANS: C

Amyloid plaques, neurofibrillary tangles, as well as neuronal and synaptic losses in the brain characterize Alzheimer disease. Patients with Alzheimer disease gradually lose nearly all functioning.

30. The body compensates for a rise in intracranial pressure by first displacing what?

1. Cerebrospinal fluid
2. Arterial blood
3. Venous blood
4. Cerebral cells

ANS: A

31. A patient is in the intensive care unit and has intracranial pressure (ICP) monitoring. The patient's ICP is 17 mmHg. The healthcare professional notes that the chart indicates the patient is now in stage 1 intracranial hypertension. What assessment finding does the professional associate with this condition?

1. Rapid spike in measured ICP
2. No significant change in ICP readings
3. Restlessness and subtle breathing and pupil changes
4. A widened pulse pressure and bradycardia

ANS: B

In stage 1 intracranial hypertension, vasoconstriction and external compression of the venous system occur in an attempt to decrease the ICP. This compensatory mechanism may work well enough to keep the ICP at the same level. A rapid spike in the ICP would indicate a worsening condition because the ICP is already slightly high.

Restlessness and subtle changes in pupils and respiratory pattern occur in Stage 2. A widened pulse pressure and bradycardia signify Stage 3.

32. Dilation of the ipsilateral pupil following uncal herniation is the result of pressure on which cranial nerve (CN)?

1. Optic (CN I)
2. Abducens (CN VI)
3. Oculomotor (CN III)
4. Trochlear (CN IV)

ANS: C

33. To quickly assess a patient's nervous system for dysfunction, what assessment should the healthcare professional perform as the priority?

1. Size and reactivity of pupils
2. Pattern of breathing
3. Motor response
4. Level of consciousness

ANS: D

34. What does diagnostic criteria for a persistent vegetative state include?

1. Absence of eye opening
2. Lack of subcortical responses to pain stimuli
3. Roving eye movements with visual tracking
4. Return of autonomic functions

ANS: D

35. When does uncal herniation occur?

1. The hippocampal gyrus shifts from the middle fossa through the tentorial notch into the posterior fossa.
2. The diencephalon shifts from the middle fossa straight downward through the tentorial notch into the posterior fossa.
3. The cingulate gyrus shifts under the falx cerebri.
4. A cerebellar tonsil shifts through the foramen magnum.

ANS: A

Uncal herniation (i.e., hippocampal herniation, lateral mass herniation) occurs when the uncus or hippocampal gyrus (or both) shifts from the middle fossa through the tentorial notch into the posterior fossa. This shift results in the compression of the ipsilateral third cranial nerve (CN), impairing parasympathetic function. When the diencephalon shifts from the middle fossa straight down through the tentorial notch it is termed a

central herniation. Cingulate gyrus shift occurs when the gyrus shifts under the falx cerebri. A cerebellar tonsil shift occurs in an infratentorial herniation.

36. Which assessment finding marks the end of spinal shock?

1. Return of blood pressure and heart rate to normal
2. Gradual return of spinal reflexes
3. Return of bowel and bladder function
4. Evidence of diminished deep tendon reflexes and flaccid paralysis

ANS: B

37. A patient demonstrates rippling under the skin on the arms. The patient's spouse asks the healthcare professional to explain why this occurs. What response by the professional is most accurate?

1. Loss of temperature regulation in distal, proximal, or midline muscles
2. Atrophy of primary motor neurons
3. Loss of sensation leading to flaccid paralysis
4. Spastic movements due to increased deep tendon reflexes

ANS: B

This phenomenon is known as fasciculation

38. A patient has finally been diagnosed with amyotrophic lateral sclerosis (ALS) after seeing several physicians. The patient expresses frustration that the diagnosis has taken so long. What information can the healthcare professional give to the patient about this situation?

1. Many diseases cause weakness and fatigue.
2. Only upper motor neurons are involved.
3. Several nerves are connected to each muscle.
4. Lack of sensation makes it hard to describe.

ANS: C

The weakness resulting from the segmental paresis and paralysis characteristic of anterior horn cell injury is difficult to recognize because two or more nerve roots supply each muscle. Many diseases do cause weakness and fatigue, but this answer is not specific for ALS. ALS involves both upper and lower motor neurons. The disease involves a disturbance in motor, not sensory function.

39. Parkinson disease is a degenerative disorder of which part of the brain?

1. Hypothalamus
2. Anterior pituitary
3. Frontal lobe
4. Basal ganglia

ANS: D

40. Clinical manifestations of Parkinson disease are caused by a deficit in which of the brain's neurotransmitters?

1. Gamma-aminobutyric acid
2. Dopamine
3. Norepinephrine
4. Acetylcholine

ANS: B

41. Tremors at rest, rigidity, akinesia, and postural abnormalities are a result of the atrophy of neurons in which part of the brain?

1. Caudate that produces serotonin
2. Putamen that produces gamma-aminobutyric acid
3. Substantia nigra that produces dopamine
4. Hypothalamus that produces acetylcholine

ANS: C

2. What do the clinical manifestations of Parkinson disease include? (Select all that apply.)

1. Fragmented sleep
2. Drooping eyelids