Behavioral Health & Nervous Systems/Special Senses

United States Medical Licensing Examination (USMLE) Step 1

10 to 14% of Step 1 · 9 sections · content outline and specifications

This system covers the brain, spinal cord, nerves, eye, and ear, and also mental health and substance use. It is one of the largest systems on Step 1. Questions give a patient story and ask you to find the lesion, the disease, or the mechanism. Neuroanatomy and lesion localization appear often. Psychiatry questions test DSM-5-TR diagnosis and how drugs work. Many questions need two steps: first the diagnosis, then the mechanism, cause, or adverse effect.

You should be able to: After this guide, a learner should be able to localize a nervous system lesion from a vignette, name the likely disease, and explain the mechanism of the drug or process involved.

Every section: the key point and the trap

1 Localizing a lesion in the brain, brainstem, and spinal cord

Ask first: one side or both, and upper or lower motor neuron signs.

Trap: Do not forget which tracts have crossed at the level of a lesion. In a spinal cord lesion, pain loss is on the opposite side, but weakness and vibration loss are on the same side.

2 Stroke, bleeding, head trauma, and intracranial pressure

Middle cerebral artery: face and arm weakness, aphasia (dominant side) or neglect (nondominant side). Anterior cerebral artery: leg weakness.

Trap: Do not choose the more common stroke by habit. Match each finding to a territory: aphasia and arm weakness point to the middle cerebral artery, while pure motor weakness of face, arm, and leg points to a lacune.

3 Infections and immune disorders of the nervous system

Bacterial meningitis: neutrophils, low glucose, high protein. Viral: lymphocytes, normal glucose. Fungal and tuberculous: lymphocytes, low glucose.

Trap: Normal pupils separate myasthenia gravis from botulism. Botulism affects acetylcholine release at all cholinergic nerves, so the pupils dilate.

4 Tumors and inherited disorders

Adults: glioblastoma (pseudopalisading necrosis, crosses the corpus callosum), meningioma (psammoma bodies, dural base), metastases (many lesions at the gray-white junction).

Trap: Use the age and the location together. A cerebellar mass in a child can be pilocytic astrocytoma or medulloblastoma; cystic with Rosenthal fibers is the first, solid with small blue cells is the second.

5 Dementia, delirium, movement and neuromuscular disorders

Delirium: sudden onset, poor attention, alertness that goes up and down, usually a medical cause. Dementia: slow decline with normal attention early.

Trap: Both delirium and Lewy body disease fluctuate. Delirium starts over hours to days with an acute cause; Lewy body disease develops over months to years with parkinsonism.

6 Seizures, headache, sleep, and pain syndromes

Absence seizures: brief staring, 3-Hz spike-and-wave, ethosuximide blocks T-type calcium channels in the thalamus.

Trap: Some sodium channel drugs make absence seizures worse. Match the drug to the seizure type, not just to the word seizure.

7 The eye and the ear

Open-angle glaucoma: high pressure, disc cupping, peripheral field loss. Beta-blockers and carbonic anhydrase inhibitors lower aqueous production; prostaglandin analogs increase outflow.

Trap: In conductive loss, Weber goes to the affected ear; in sensorineural loss, it goes to the healthy ear. Decide the type of loss with Rinne first.

8 Psychiatric diagnosis with DSM-5-TR

Psychosis by duration: brief psychotic disorder under 1 month, schizophreniform 1 to 6 months, schizophrenia 6 months or more.

Trap: Count the total duration, not only the active psychotic phase. Missing the early withdrawal phase leads to schizophreniform disorder instead of schizophrenia.

9 Psychopharmacology and substance use

Antipsychotics block D2 receptors. Acute dystonia: hours to days, treat with a muscarinic blocker. Tardive dyskinesia: months to years, VMAT2 inhibitors.

Trap: Neuroleptic malignant syndrome and serotonin syndrome both cause fever and confusion. Rigidity with slow onset after a dopamine blocker means NMS; clonus with fast onset after serotonergic drugs means serotonin syndrome.

Key terms

Lesion: An area of damage or disease in a tissue.

Upper motor neuron: A neuron from the brain to the spinal cord or brainstem; damage causes spasticity and brisk reflexes.

Lower motor neuron: A neuron from the spinal cord or brainstem to muscle; damage causes atrophy and weak reflexes.

Fasciculation: A small visible twitch of a group of muscle fibers.

Herniation: Brain tissue pushed out of its normal space by pressure.

Papilledema: Swelling of the optic disc caused by high pressure inside the skull.

Delusion: A fixed false belief that does not change with evidence.

Hallucination: A sensory experience, such as hearing a voice, without a real stimulus.

Extrapyramidal symptoms: Movement problems caused by dopamine blockade, such as dystonia, akathisia, and parkinsonism.

Withdrawal: Symptoms that appear when a person stops a substance the body has adapted to.

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