Advanced Pharmacology: Psychopharmacology for Psychiatric-Mental Health Nurse Practitioner NR546

1. Frontal Lobe Dysfunction

Scenario: A 45-year-old man shows poor impulse control, socially inappropriate comments, and risky decisions after a head injury.
Question: Which brain region is most likely damaged?
a) Right parietal lobe
b) Left inferior frontal gyrus (Broca's area)
c) Orbitofrontal cortex (frontal lobe)
d) Occipital lobe
Answer: c) Orbitofrontal cortex (frontal lobe)

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2. Executive Dysfunction

Scenario: A patient struggles to organize and complete tasks but speech remains fluent. Which lobe is likely affected?
a) Temporal lobe
b) Frontal lobe
c) Parietal lobe
d) Occipital lobe
Answer: b) Frontal lobe

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3. Expressive Aphasia

Scenario: A stroke patient cannot speak fluently but understands language. Which area is damaged?
a) Wernicke's area
b) Broca's area
c) Occipital cortex
d) Hippocampus
Answer: b) Broca's area

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4. Hemineglect

Scenario: Patient ignores left side of space after a right hemisphere stroke. Which lobe is damaged?
a) Left parietal lobe
b) Right parietal lobe

c) Frontal lobe
d) Temporal lobe
Answer: b) Right parietal lobe

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5. Gerstmann Syndrome

Scenario: Patient has finger agnosia, agraphia, and left-right disorientation after stroke. Which lobe?
a) Left parietal lobe
b) Right parietal lobe
c) Occipital lobe
d) Frontal lobe
Answer: a) Left parietal lobe

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6. Left-Right Disorientation

Scenario: Difficulty reading and identifying left vs right after stroke. Which brain area?
a) Right parietal lobe
b) Left parietal lobe
c) Temporal lobe
d) Occipital lobe
Answer: b) Left parietal lobe

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7. Receptive Aphasia

Scenario: Fluent but nonsensical speech with poor comprehension. Which area is damaged?
a) Broca’s area
b) Wernicke’s area
c) Hippocampus
d) Amygdala
Answer: b) Wernicke’s area

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8. Auditory Hallucinations

Scenario: Patient hears voices without external stimuli. Which brain area is implicated?
a) Primary auditory cortex (temporal lobe)
b) Occipital lobe
c) Parietal lobe

d) Frontal lobe
Answer: a) Primary auditory cortex (temporal lobe)

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9. Anterograde Amnesia

Scenario: Patient cannot form new memories due to bilateral hippocampal damage. What type of amnesia?
a) Retrograde amnesia
b) Anterograde amnesia
c) Global amnesia
d) Procedural amnesia
Answer: b) Anterograde amnesia

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10. Visual Field Deficit

Scenario: Patient has blindness in left visual field of both eyes, but eyes are normal. Lesion location?
a) Left occipital lobe
b) Right occipital lobe
c) Corpus callosum
d) Parietal lobe
Answer: b) Right occipital lobe (contralateral to visual field loss)

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11. Visual Agnosia

Scenario: Patient can see objects but cannot recognize them. Area affected?
a) Primary visual cortex
b) Visual association cortex
c) Parietal lobe
d) Temporal lobe
Answer: b) Visual association cortex

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12. Parkinsonism

Scenario: Patient shows rigidity, resting tremor, and slow movements. Site of pathology?
a) Hippocampus
b) Substantia nigra (basal ganglia)
c) Cerebellum

d) Thalamus
Answer: b) Substantia nigra (basal ganglia)

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13. Chorea

Scenario: Patient exhibits jerky, involuntary movements and a family history of Huntington's disease. Structures involved?
a) Substantia nigra
b) Caudate and putamen (basal ganglia)
c) Cerebellum
d) Thalamus
Answer: b) Caudate and putamen (basal ganglia)

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14. Emotional Dysregulation

Scenario: Patient has aggression and emotional instability after trauma. Brain region?
a) Hippocampus
b) Amygdala
c) Frontal lobe
d) Parietal lobe
Answer: b) Amygdala

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15. PTSD Neuroanatomy

Scenario: PTSD patient shows hyperactive fear response and decreased control over emotions. Which brain changes?
a) Hypoactive amygdala, hyperactive prefrontal cortex
b) Hyperactive amygdala, hypoactive medial prefrontal cortex
c) Hippocampal hypertrophy
d) Basal ganglia degeneration
Answer: b) Hyperactive amygdala, hypoactive medial prefrontal cortex

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16. Thalamic Stroke

Scenario: Patient has sensory loss and altered consciousness after stroke. Main function of affected brain area?
a) Movement coordination
b) Sensory and motor relay
c) Memory formation

d) Emotion regulation
Answer: b) Sensory and motor relay (thalamus)

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17. Cerebellar Ataxia

Scenario: Patient presents with intention tremor and poor coordination. Area damaged?
a) Basal ganglia
b) Cerebellar hemispheres
c) Occipital lobe
d) Frontal lobe
Answer: b) Cerebellar hemispheres

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18. Vertigo and Nystagmus

Scenario: Patient has vertigo and nystagmus after lesion to cerebellar area. Which lobe?
a) Flocculonodular lobe
b) Vermis
c) Cerebellar hemispheres
d) Thalamus
Answer: a) Flocculonodular lobe

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19. Corpus Callosum Disconnection

Scenario: Split-brain patient cannot name object placed in left hand but can identify by touch. What is this called?
a) Apraxia
b) Anomia
c) Disconnection syndrome
d) Hemineglect
Answer: c) Disconnection syndrome

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20. Autonomy in Psychosis

Scenario: Psychotic patient refuses medication believing it is harmful. How should psychiatrist proceed?
a) Force medication immediately
b) Respect autonomy; provide information and encourage informed consent
c) Ignore refusal and discharge

d) Prescribe placebo
Answer: b) Respect autonomy; provide information and encourage informed consent

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21. Dementia & Consent

Scenario: Patient with dementia lacks capacity for consent. Which ethical principle guides decisions by guardian?
a) Autonomy
b) Justice
c) Beneficence
d) Non-maleficence
Answer: c) Beneficence

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22. Placebo in Psychiatric Trials

Scenario: Placebo-controlled trial in psychosis when effective treatment exists. Ethical concern?
a) Autonomy
b) Justice
c) Use of placebo may cause harm (non-maleficence)
d) Beneficence
Answer: c) Use of placebo may cause harm (non-maleficence)

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23. Epigenetics & Trauma

Scenario: Patient with childhood trauma develops depression. How does epigenetics contribute?
a) Permanent DNA mutation
b) Methylation changes altering gene expression
c) Neurotransmitter depletion only
d) No genetic effect
Answer: b) Methylation changes altering gene expression

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24. BDNF Gene Methylation

Scenario: Methylation of which gene is linked to depression?
a) Serotonin transporter gene
b) BDNF gene
c) Dopamine receptor gene

d) Glucocorticoid receptor gene
Answer: b) BDNF gene

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25. Environmental Stress & Anxiety

Scenario: How do stressors increase anxiety vulnerability via epigenetics?
a) DNA sequence change
b) Epigenetic modifications of stress response genes
c) Immediate neurotransmitter depletion
d) None of the above
Answer: b) Epigenetic modifications of stress response genes

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26. Clozapine & Smoking

Scenario: Patient on clozapine who smokes heavily has poor response. Why?
a) Smoking inhibits CYP1A2, increasing clozapine levels
b) Smoking induces CYP1A2, lowering clozapine levels
c) Smoking has no effect
d) Smoking increases clozapine absorption
Answer: b) Smoking induces CYP1A2, lowering clozapine levels

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27. Fluoxetine & Risperidone

Scenario: Fluoxetine is started in patient taking risperidone. What happens?
a) Fluoxetine induces CYP2D6 → lower risperidone
b) Fluoxetine inhibits CYP2D6 → higher risperidone levels
c) No interaction
d) Fluoxetine increases risperidone clearance
Answer: b) Fluoxetine inhibits CYP2D6 → higher risperidone levels

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28. Carbamazepine & Oral Contraceptives

Scenario: Carbamazepine added to patient's meds. What effect on oral contraceptives?
a) Increased contraceptive levels → toxicity
b) Decreased contraceptive efficacy → risk of pregnancy
c) No effect
d) Increased bleeding risk
Answer: b) Decreased contraceptive efficacy → risk of pregnancy

29. CYP450 Enzymes

Scenario: Which enzyme metabolizes many SSRIs and TCAs and is inhibited by fluoxetine?
a) CYP1A2
b) CYP2D6
c) CYP3A4
d) CYP2C19
Answer: b) CYP2D6

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30. CYP3A4 Inducers & Benzodiazepines

Scenario: Carbamazepine is a CYP3A4 inducer. Effect on benzodiazepine plasma levels?
a) Increase levels → toxicity risk
b) Decrease levels → reduced efficacy
c) No effect
d) Increase half-life
Answer: b) Decrease levels → reduced efficacy

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31. Aripiprazole Mechanism

Scenario: Aripiprazole is a partial dopamine D2 agonist. What is its clinical effect?
a) Full dopamine blockade
b) Stabilizes dopamine activity by partial agonism
c) Dopamine receptor downregulation
d) No effect on dopamine
Answer: b) Stabilizes dopamine activity by partial agonism

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32. Haloperidol Action

Scenario: Haloperidol is a D2 antagonist. Effect on dopamine signaling?
a) Increases dopamine release
b) Blocks dopamine receptors → decreases dopamine effects
c) Increases dopamine receptor sensitivity
d) No effect
Answer: b) Blocks dopamine receptors → decreases dopamine effects

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