What Are Cerebral Circulation Territories?

Worksheet

Cerebral circulation territories are the brain regions supplied by each major artery: the ACA supplies the medial frontal/parietal lobes (leg/foot motor-sensory cortex), the MCA supplies the lateral hemisphere (face/arm motor-sensory cortex, language areas), and the PCA supplies the occipital lobe and medial temporal lobe (visual cortex, memory structures).

Questions

1. Which artery supplies the leg/foot motor-sensory cortex?

A) MCA
B) ACA
C) PCA
D) Vertebral artery

2. A stroke causing face/arm weakness plus aphasia most likely involves which artery?

A) ACA
B) PCA
C) MCA
D) Basilar artery

3. Which artery supplies the primary visual cortex?

A) ACA
B) MCA
C) PCA
D) Anterior communicating artery

4. What structure connects the anterior and posterior cerebral circulations?

A) Circle of Willis
B) Cavernous sinus
C) Superior sagittal sinus
D) Foramen magnum

5. A stroke causes contralateral leg weakness that is worse than arm weakness, with relatively preserved face strength. Which artery territory is most likely involved?

6. A patient presents with contralateral face and arm weakness plus expressive aphasia. Which vessel is occluded and why?

7. A patient has a sudden contralateral homonymous hemianopia with macular sparing but no motor weakness. Which artery is affected?

8. Define: What does the ACA (anterior cerebral artery) supply?

9. Define: What does the MCA (middle cerebral artery) supply?

10. Define: What does the PCA (posterior cerebral artery) supply?

Answer Key

1. B) ACA - The ACA supplies the medial surface of the hemisphere, including the leg/foot cortical area.

2. C) MCA - The MCA supplies the lateral cortex - face/arm motor area and language areas.

3. C) PCA - The PCA supplies the occipital lobe, home of the primary visual cortex.

4. A) Circle of Willis - The Circle of Willis is the anastomotic ring joining the carotid (anterior) and vertebrobasilar (posterior) systems.

5. The ACA supplies the medial surface of the frontal and parietal lobes, including the leg/foot area of the motor homunculus. The MCA supplies the lateral surface, including the face and arm areas. Leg-predominant weakness with spared face/arm points to ACA territory infarction.

6. Face and arm weakness localize to the lateral motor cortex - MCA territory. Expressive (Broca's) aphasia localizes to the posterior inferior frontal gyrus, also in the MCA territory (dominant hemisphere). Both findings together point to a left MCA occlusion (assuming left-hemisphere language dominance).

7. Homonymous hemianopia results from damage to the visual pathway posterior to the optic chiasm - here, the occipital (visual) cortex. The PCA supplies the occipital lobe; macular sparing occurs because the occipital pole often has dual supply from MCA collaterals. No motor weakness fits, since the PCA does not supply the primary motor cortex - this localizes to a PCA territory infarct.

8. The medial frontal and parietal lobes, including the leg/foot motor-sensory cortex.

9. The lateral cerebral hemisphere - face/arm motor-sensory cortex and, in the dominant hemisphere, language areas (Broca's, Wernicke's).

10. The occipital lobe (visual cortex) and medial temporal lobe (including hippocampus/memory structures).