NEUROFUNCTIONAL TECHNIQUES

Maja Ukmar Department of Radiology University of Trieste

NEUROIMAGING



Ultrasound





Computed tomography

Angiography



Magnetic Resonance

• Computed Tomography

• Magnetic Resonance

- CT/MR angiography, digital angiography

NEUROFUNCTIONAL TECHNIQUES

- CT (CT perfusion)
- MRI (diffusion, DTI, perfusion, F-MRI, spectroscopy)
- Nuclear Medicine (SPECT, PET)

- Computed tomography (CT)
- The appearance is based on different densities



Magnetic resonance (MR)
multiparametric technique



















Supratentorial (anterior and middle cranial fossa)

- Cerebral hemispheres (frontal, parietal, temporal and occipital lobes, limbic and insular lobe)

- Basal ganglia (caudate, putamen, pallidus...)
- Midline structures (corpus callosum, anterior and posterior commissure)

Infratentorial (posterior fossa)

- Midbrain
- Brainstem (pons and medulla)
- Cerebellum





















Occipital lobe





- Lateral fissure (Sylvian)
- Precentral fissure
- Central fissure (Rolandic)
- Postcentral fissure
- Parieto-occipital fissure
- Calcarin fissure



Central fissure



Aaron Rutman, MD

Central fissure: frontal....parietal lobe





Central fissure: frontal....parietal lobe



The cortical homunculus is a representation of the anatomical subdivision of the primary somestetic area, where it takes the name of sensory or somestic or somatosensory homunculus, and of the primary motor area, where it takes the name of motor homunculus.





ALS

CBD

Supplementary motor area



Radiology Key























Involved in motor control, body perception, equilibrium, language, emotion.....

Language areas



Broca's area



Wernicke's area



Language areas





Corpus callosum





The largest commisural connection between the two hemispheres Rostrum, genu, body and splenium

Corpus callosum

- Genu fibers curve forward to connect frontal lobes
- Body fibres pass laterally, intresect with corona radiata fibers
- Most fibres from splenium curve into occipital lobes
- Anterior and posterior commisures

Corpus callosum







Basal ganglia

- Although the traditional term of basal ganglia is still in use, these structures are nuclei, not ganglia, as they consist of clusters of neuronal bodies within the CNS.
- Anatomically, they refer to subcortical structures formed by gray matter within the cerebral hemispheres (telencephalon). However, because the amygdala and claustrum are considered parts of the limbic system, the term basal nuclei currently refer to the caudate nucleus, putamen, ventral striatum (including nucleus accumbens), and globus pallidus. Moreover, due to the important connections between the anatomical basal nuclei and the subthalamic nucleus and substantia nigra, these two entities are engulfed functionally into the concept of basal nuclei, although anatomically they belong to the diencephalon and midbrain, respectively

Basal ganglia



Basal ganglia



Basal ganglia



Shams et Al, AJNR 2017

Infratentorial structures



The tentorium of the cerebellum, in Latin tentorium cerebelli, is an anatomical structure consisting of a flap of dura mater that separates the cerebellum from the occipital lobes of the brain.

Infratentorial structures









Occipital lobe

Infratentorial structures



Temporal lobe

pons

cerebellum

Infratentorial structures



cerebellum from the occipital lobes of the brain.

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Infratentorial structures



Infratentorial structures



Cranial nerves





VII-VIII CRANIAL NERVES

Cranial nerves









VII-VIII CRANIAL NERVES



V CRANIAL NERVE

CSF spaces and ventricles

The ventricular system is composed of two lateral ventricles which can be subdivided into the frontal horns, bodies, atria (or trigones), occipital and temporal horns. The lateral ventricles are continuous with a single midline third ventricle via the interventricular foramen of Monroe. Posteriorly, the third ventricle continues via the aqueduct of Sylvius, a singlesmall caliber channel connecting the third ventricle with the fourth ventricle.

CSF spaces and ventricles



CSF spaces and ventricles



CSF spaces and ventricles



CSF spaces and ventricles-. CISTERNS



Circle of Willis





Circle of Willis



Anterior cerebral artery
Middle cerebral artery
Posterior cerebral artery



Circle of Willis

A1 agenesis



Circle of Willis

Posterior comunicating artery agenesis



HR MR-angiography

MR angiography

Vertebral arteries and Basilar trunk

- Vertebral artery -> PICA
- Basilar artery AICA
 - Superior cerebellar artery
 - A. perforanti pontine





Vertebral arteries and Basilar trunk

