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MORPHOMETRIC FEATURES OF THE ADULT CEREBELLUM

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Objective. Cerebellum which translates as “little brain” is a part of CNS responsible for both motor and non-motor functions such as coordination of movement, emotions and cognition. Located in the posterior cranial fossa, inferior to the tentorium cerebelli, it consists of right and left hemispheres connected by vermis, three main lobes, two prominent fissures and an important angle named cerebellopontine angle (CPA) where three cranial nerves pass through. CPA is the most susceptible site for intracranial tumors in the CNS. Human cerebellum varies morphometrically and morphologically. The data of the asymmetry and morphometrical features of of the human cerebellum can be useful in the field of neurosurgery during the surgical operations in this region and thereby reduce post-operative complications.

Aim: to discover morphological and morphometric variants of the adult human cerebellum.

Materials and methods. The study was performed on 10 adult human brains fixed in formalin available at the Department of Normal Anatomy, BSMU. The peculiarities of the shape of the cerebellum are noted. The transverse, antero-posterior (AP), vertical diameters, cerebellopontine angle and the length and depth of the horizontal fissure of the left and right hemispheres of the cerebellum were measured using a morphometric method using the flexible millimeter scale and copper wire.

Results and discussion. The study found three different shapes of the cerebellum: cone 20%, bell 20% and flat bell 50%. Furthermore, an abnormally shaped cerebellum was observed due to damage.

The transverse diameter of the right hemisphere is 51.1±3.3mm, the transverse diameter of the left hemisphere is 55.7±2.8mm this concludes that transverse diameter of the right hemisphere is smaller than the left hemisphere ($t=-3.14$, $p=0.005$). The AP diameter of the right hemisphere is 31.7±4.5mm and the AP diameter of left hemisphere is 32.0±4.9mm. The vertical diameter of the right hemisphere is 61.3±2.8mm and the vertical diameter of the left hemisphere is 59.6±3.2mm. The right cerebellopontine angle is 11.0±4.8º and left cerebellopontine angle is 9.2±3.9º. There is no statistically significant difference between other left and right hemispherical measurements.

The Spearman's rank-order correlation was ran to determine the relationships. The results show that there is a very strong positive statistically significant correlation between vertical diameter of the right hemisphere and transverse diameter of cerebellum ($rs=0.92$, $p<0.05$). Strong positive statistically significant correlation between vertical diameter of the left hemisphere and transverse diameter of cerebellum ($rs=0.78$, $p<0.05$) was revealed. Strong positive statistically significant correlation was observed between the length of left horizontal fissure and depth of the left horizontal fissure ($rs=0.76$, $p<0.05$). Strong positive statistically significant correlation was found between the length of right horizontal fissure and vertical diameter of the right hemisphere ($rs=0.73$, $p< 0.05$).

Conclusion. Thus, as a result of the study, three variants of the shape of the cerebellum were established and morphometric features and asymmetry of the right and left hemispheres were revealed.