AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 02, Issue 5, 2024 ISSN (E): 2993-2149

Morthometric radiation–anatomy of brain structures with its volumetric formations of the cerebral and extra-cerebral location

Sh. Zh. Teshaev., R. R. Navruzov.
Bukhara State Medical Institute named after Abu Ali Ibn Sino.

Abstract. *In recent years, surgery, neurology, forensic medicine (and other clinical specialties) are increasingly developing as age-specific sciences, with the desire to strictly take into account the anatomical and physiological features of age, to differentiate the appropriate methods of diagnosis and treatment. It is known that not only the size, shape, and position of organs change with age, but also their internal design. Therefore, to study the structure and topography of organs regardless of certain age periods means to admit the clear possibility of erroneous medical conclusions.*
The most acute lack of data on age-related anatomy is felt when working with elderly and senile patients. Stable size and weight indicators of organs and their constituent parts are characteristic of mature age, so morphometric indicators of organs and individual body parts of this age period are the starting points (reference points) that allow not only to objectively see and correctly assess the severity of changes in postnatal ontogenesis, but also to analyze the dynamics of age-related structural transformations.
***Research methods.** The study was conducted on computer and magnetic resonance imaging in the radiology departments of BUKHGOSMI.*

Key words: *Brain, morphology, anatomy, MRI, tumor.*

Introduction

In the second half of the 20th century, clinicians and anatomists developed a new method of studying the human body – magnetic resonance imaging (MRI). The ability to obtain multi-slice images in any plane and the high resolution of soft tissue contrast have made MRI indispensable in medicine and a priority research method in нneurology and neurosurgery. MRI significantly exceeds computed tomography in sensitivity and specificity and has such advantages as the absence of radiation exposure and the ability to study in any plane [4, pp. 49-53].

In recent decades, surgery, neurology and other clinical specialties increasingly need more accurate information about the individual anatomical variability of a living person, which makes studies conducted using in vivo imaging methods relevant [6, p. 3].

An analysis of the literature indicates that there are few studies on the anatomical features of the brain and its structures, taking into account individual variability, as well as gender differences. Such data are in demand, first of all, as a basis for assessing changes in brain structures in tumor and other volumetric brain pathology. The relevance of radiation diagnostics of brain neoplasms is determined by the fact that these tumors affect mainly middle-aged people (30-60 years), often leading to disability and death of patients. Important, and sometimes decisive, is the anatomical location and size of the tumor, since it is precisely on which part of the brain is squeezed by a pathological formation that the clinical manifestations, type of treatment and prognosis depend. [6, p. 3].

From the point of view of information saturation of the image, much attention is paid to contrast. This parameter allows you to visually, albeit subjectively, set the boundaries of different areas on the image surface. Modern computer programs allow reproducing adequate calculated estimates of tissue contrast. The results of examination- of brain structures (SGM) are presented in the mm dimension, which in the physical interpretationindicates the presence of estimates of the volume of neural structures of the brain. This concept of the final result is created on the basis of ideas about a single element of a graphic image-a voxel. For this purpose, implement mathematical dependencies (models) that have the property of drawing the contours of the object, or formal mathematical models that have the property of describing the internal structure of the object, taking into account the observed external image or contour. [8, p. 23-29].

The internal structure of an object is created based on small elements that are set programmatically in three-dimensional space (1 × 1 × 1, mm). The article presents a systematic approach to the analysis of data obtained during MRI studies that allow obtaining visual images. Using the concepts and definitions of geometric modeling, a set of computational proceduresfor constructing and reproducingan illustrative image of fragments of a biological object in an interactive computer graphics mode is created. The possibility of conjugate positioning of informational visual images executed on the basis of different physical principles of image formation, which ensures the formation of an adequate medical judgment, is established. The clarity and clarity of the results obtained, reproduced on the model, can significantly increase the efficiency of the analysis ofneural structures of the brain. [8, p. 23-29].

In the diagnosis and treatment of a number of brain diseases, it is important to know its normal linear and angular dimensions. The weight, surface, linear dimensions, and volume of the brain have been studied in various aspects (ontogenesis, phylogenesis, individual variability, morphophysiological comparisons) by many scientists, but these studies were conducted on sectional material. It is known that changes in the size and structure of the brain under the influence of fixing fluids are influenced by the chemical composition, temperature, time after death, the amount of injected fluid, the duration of exposure to the fixator, and other factors [4, pp. 49-53].

Despite great progress in studying the pathogenesis of Alzheimer's disease and conceptualizing this disease, the issue of developing a method for early diagnosis of this condition remains relevant all over the world. The traditional approach to making a reliable diagnosis of Alzheimer's disease is based on autopsy results. Researchers are developing additional methods of in vivo diagnosis based on biological markers and instrumental data specific to this disease. In practical зhealth care, the diagnosis of Alzheimer's disease is verified based on a clinical assessment, in particular a clinical interview with the patient and caregiver, as well as the results of a neuropsychological examination. Neuropsychological testing allows you to determine the nature and severity of cognitive impairment in comparison with age norms. The tools used for neuropsychological diagnostics should be standardized, easy to implement, andsensitive to moderate cognitive deficits [1, p. 150-155].

Relapse ofthe hematoma was inevitably accompanied by the development of ischemic disorders, which allowed us to consider this sign as one of the risk factors. Ischemic disorders also naturally appeared in cases of persistent non-healing of the brain after removal of hematomas, despite persistent attempts to use intensive care methods and the absence of any other compressing agents [3, p. 45-48.].

In posterior localization tumors, the displacement of the posterior horn of the lateral ventricle on the affected side is determined up and forward. With this localization of the pathological process, a shift in the median structures is rarely observed. With large malignant tumors (30.0 mm or more), a decrease in the sagittal size of the cerebellum and an increase in the vertical size are determined (Fig. 8). In addition, changes in the fourth ventricle were observed in posterior tumors, which consisted in an increase in the sagittal size with an unchanged vertical one, which was a reflection of a violation of CSF dynamics [6, p. 14.].

When analyzing the results obtained, it was found that most of the projection distances depend on the shape of the skull. It can be noted that the distances in the sagittal plane, the so-called "anterior" and "posterior" in dolichocephals are greater than in brachycephals; the distances in the frontal plane, the so-called "transverse", are greater in brachycephals than in dolichocephals. The dependence of "vertical" distances on the shape of the skull is not noted. In mesocephals, the parameters studied are almost identical or slightly different from the average parameters of the group as a whole. Differences in projection distances are most pronounced in individuals with a dolichocephalic skull, while in brachycephals, a number of indicators (projection distances from the pineal gland to the scalp) are within normal values for the group as a whole. [6, p. 15.].

In patients with volumetric brain lesions, the most significant differences in the average values of projection distances were revealed by the following quantitative features: distances from the knee of the corpus callosum and interventricular openings to the skin of the frontal region, from the outer surface of the lentil nucleus to the skin of the temporal region, from the pineal gland to the skin of the parietal region. [6, P. 19.].

Some projection distances remained stable regardless of the localization of the volumetric process, such as the distances from the anterior pituitary surface to the anterior wall of the main sinus and from the interventricular openings to the skin of the occipital region (these indicators almost coincide or slightly differ from the average parameters of the group as a whole). When analyzing the projection distances in patients with volumetric brain lesions, it was found that the distances change most (decrease) in the lower-lateral and posterior localization of the tumor by 5-10% compared to normal values. [6, P. 19.].

The same effect on the formation of secondary posttraumatic cerebral ischemia was exerted by repeated lateral dislocations of the median structures that occurred despite decompressive trepanation. The total frequency of recurrent hematomas, repeated lateral dislocations, and persistent non-healing of the brain in patients with secondary ischemic disorders was 50%, which allowed us to consider these circumstances as prognostically significant and consider them as risk factors. Thus, CT allowed us to identify secondary focal ischemias in the acute period of TBI, establish their relationship with hemodynamic disorders, develop a typical CT syndrome, features of the course, as well as risk factors that increase the likelihood ofsecondary brain ischemia [3, pp. 45-48.].

Gender differences in morphometric parameters, expressed to varying degrees, have: corpus callosum, lateral and fourth ventricles, thalamus, bridge, cerebellum. Sex anatomometric differences in the pituitary gland, pineal gland, legs and water supply of the brain, and the long-term brain are not statistically significant [5, pp. 174-178.].

In posterior localization tumors, the displacement of the posterior horn of the lateral ventricle on the side of the lesion is determined up and forward. With this localization of the pathological process, the displacement of median structures is quite rare. With large sizes of malignant tumors (30.0 mm or more), a decrease in the sagittal size of the cerebellum and an increase in the vertical size are determined (Fig. 8). In addition, changes in the fourth ventricle were observed in posterior tumors, which consisted in an increase in the sagittal size with a constant vertical size, which was a reflection of a violation of CSF dynamics [5, Pp. 174-178.].

MSCT was also performed to monitor the dynamics of traumatic brain changes and to assess the scope and adequacy of surgical treatment. [7, pp. 31-33.].

The structure of morphometric measurements of the brain- correlates with the severity of its injury, the nature and severity of neurological symptoms, the localization of contusion foci, and the development of hydrocephalus. Morphometric data allow us to clarify the severity of a brain injury, conduct a clinical and morphometric analysis, and develop опти- optimal management tactics for victims, which helps reduce the degree of their disability. [11, p. 13-17.].

list of literature

1. Kolupaeva E. S., et al. Clinical significance of brain morphometric parameters for the diagnosis of Alzheimer's disease. Practical Medicine-Volume 18, No. 5. 2020-pp. 150-1-155.
2. Prokopenko S. V.Clinical case of PET use/CT in the early diagnosis of Alzheimer's disease. Clinical analysis. Volume 11 No. 4 2017-pp. 65-69.

3. Kuzibaev Zh. M., Makhkamov K. E. Possibilities ofcomputed tomography in the diagnosis of secondary ischemic brain damage in traumatic intracranial hemorrhages. Bulletin of Emergency Medicine, 2016, IX (1) p.45-48.
4. Magnetic resonance imaging in anatomical research and clinicalevaluation ofbrain structures under normal and tumor pathologyconditions. Orenburg Medical Bulletin, 2020, vol. I, no. 1 , pp. 49-53.
5. Shekhtman A. G., Malygina O. Ya.. Application of the method of magnetic resonance imaging in the clinical assessment of brain structures in normal and tumor pathology No. 5 (35) November 2014 medical almanac. pp. 174-178.
6. Malygina, Olga Yakovlevna. Anatomometric characteristics and topography of deep structures of the brain in normal conditions and with its volume lesions according to magnetic resonance imaging. Dissertation, p. 19.
7. Potemkin Ayelena Gennadievna. Optimization of radiological diagnostics of brain dislocation based on morphometry in severe traumatic brain injury. 2019. Dissertation, pp. 31-33..
8. Leonid Mikhailovich Makarov. Morphometric analysis of brain structures. Visualization in medicine. VOLUME 3 No. 3 2021. pp. 23-29
9. Makarov L. M.. Mri of the brain in the ontogenesis of the newborn fetus – a diagnostic basis for the model of dissipative systems. 2017. Saint Petersburg. , pp. 85-91..
10. Biryukov Alexander Nikolaevich. Clinical and morphometric analysis of neuroectodermal brain tumors. St. Petersburg 2007. Dissertation, pp. 3-17..
11. Seroukhov Alexey Serafimovich. Clinical and morphometric analysis of brain contusions based on magnetic resonance imaging. Nizhniy Novgorod. 2010. Dissertation, pp. 13-17.