THE DIAGNOSIS OF BRAIN DISEASES USING MAGNETIC RESONANCE IMAGING TECHNIQUES

Berdiyev Behzod Shomurodovich
Bukhara Innovative Education and Medical University.
assistant of the Department of clinical and pre-clinical sciences
berdiyev09xm@gmail.com (97) 8530107
Djumayev Akbar Anvarovich
Bukhara Innovative Education and Medical University.
assistant of the Department of clinical and pre-clinical sciences
djumayev.biti.22@gmail.com (91) 4092136

Annotation. The function of magnetic resonance imaging in the diagnosis of neurodegenerative illnesses is reviewed in this article. The problem's applicability and the potential of several approaches are developed. Magnetic resonance imaging techniques, both conventional and unconventional, are discussed. This review looks at contemporary MRI methods for early brain illness detection.

Keywords: Magnetic resonance imaging (MRI); neurodegenerative diseases; diagnostics.

Relevance. The most common brain diseases associated with neurodegeneration are: Alzheimer's disease, Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis and multiple sclerosis. The identification of these diseases is especially difficult in the early stages, so the issues of early diagnosis of neurodegenerative diseases and their differentiation are relevant. In recent years, many powerful methods that have made it possible to visualize the structure and functions of various human organs. One such neuroimaging technique is magnetic resonance imaging (MRI), which visualizes in detail the structure and measures the functioning of individual areas of the human brain and as a result plays a crucial role in clinical and research applications.

Results. When making a diagnosis based on MRI images, the clarity and accuracy of the differences between all morphological formations of the object under study play a huge role. Contrast in MRI is influenced by a large number of factors that can be manipulated to achieve the desired image quality. A special

feature of magnetic resonance imaging in comparison with other tomography methods is the possibility of changing the conditions for obtaining initial data for the construction of images can change the local intensity of the received signal depending on various parameters characterizing nuclear magnetic resonance. Changing the appearance of NMR images in this case is called image contrast by parameter. There are so-called true images of the spatial distribution of the parameter, and parameter-weighted images [1]. In the first case, the parameter value is calculated from the obtained data on the measured local values of the nuclear magnetization as a function of coordinates, which is displayed as a two-dimensional distribution. In the second case, the spatial distribution of the magnetization values themselves is displayed. In this case, the brightness of the image is determined not only by the parameter of interest, but also by all other factors affecting the intensity of the NMR signal. Nevertheless, in many applications, parameter-weighted images provide the necessary information about the object. At the same time, it is possible to use simplified methods, which significantly saves time [2].

Areas with abnormal MR signal intensity can represent both acute and chronic foci. In the presence of foci of different ages, T1-weighted images best differentiate acute foci from chronic ones. Acute and subacute foci are characterized by small the amount of demyelination and, as a rule, show a smaller signal change on T1-weighted images, where they are isointensive or only minimally hypointensive. In addition, such foci are usually poorly outlined in T1 images and are much better detected in T2 images [3]. Chronic foci reflect demyelination and gliosis and are visible as areas. There is a weaker signal in T1 images compared to sharp foci, which are more sharply defined and are usually easily detected in T1 images. They are also visible in T2 images, which show a strong signal. The accumulation of hypointensive foci (the so-called "black holes") correlates with the progression of the disease and the degree of disability [4]. Recently, the relationship between the accumulation of metals, mainly iron

complexes, in the brain and neurodegenerative diseases such as Parkinson's disease, Alzheimer's disease, dementia, and a number of others . Determining the content of metal complexes in brain tissues is extremely important for the early diagnosis of these diseases. In MRI, there are various techniques for both qualitative and quantitative assessment of the metal concentration in the tissue [5].

Conclusion. Thus, MRI plays a crucial role in the diagnosis of brain diseases. Along with its higher sensitivity and resolution compared to X-ray computed tomography (CT) and positron emission tomography (PET), MRI makes it possible to assess the dynamics of the disease and the effectiveness of treatment.

REFERENCES

1. Усманова Д. Д., Наджмитдинов О. Б. Роль нейронспецифических белков в патогенезе развития диабетической полинейропатии у женщин в постклимактерическом периоде //Проблемы биологии и медицины. – 2020. – №. 3. – С. 116-119.

2. Наджмитдинов О.Б. результаты лабораторных данных некоторых цитокинов на развитие хронической ишемии мозга у пациентов с сахарным диабетом 2 типа // Экономика и социум. 2022. №11-2 (102). URL: https://cyberleninka.ru/article/n/rezultatylaboratornyh-dannyh-nekotoryh-tsitokinov-na-razvitie-hronicheskoy-ishemiimozga-u-patsientov-s-saharnym-diabetom-2-tipa (дата обращения: 30.01.2024).

3. Мадаминов О.Р, Наджмитдинов О.Б. роль радиологических исследований при диагностике нарушений в билиарном тракте // Экономика и социум. 2023. №2 (105). URL: https://cyberleninka.ru/article/n/rol-radiologicheskih-issledovaniy-pri-diagnostikenarusheniy-v-biliarnom-trakte (дата обращения: 30.01.2024).

4. Абдиолимов М.Х, Наджмитдинов О.Б. использование магнитнорезонансной томографии при диагностике протрузии // Экономика и социум. 2023. №2 (105). URL: https://cyberleninka.ru/article/n/ispolzovanie-magnitno-rezonansnoy-tomografiipri-diagnostike-protruzii (дата обращения: 30.01.2024).

5. Наджмитдинов О.Б., Набиев Р.Р., Шокиров Ш.Т. ИСПОЛЬЗОВАНИЕ КОМПЬЮТЕРНОЙ ТОМОГРАФИИ ПРИ ДИАГНОСТИКЕ ЗАБОЛЕВАНИЙ СЕЛЕЗЁНКИ // Экономика и социум. 2022. №12-1 (103). URL: https://cyberleninka.ru/article/n/ispolzovanie-kompyuternoy-tomografii-pridiagnostike-zabolevaniy-selezyonki (дата обращения: 30.01.2024).