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CLINICAL AND GENETIC CHARACTERISTICS OF AVASCULAR NECROSIS OF THE FEMORAL HEAD ASSOCIATED WITH COVID-19

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Relevance

In recent years, it has been established that COVID-19 infection affects not only the respiratory system but also has negative impacts on many other body systems. Among the post-infection complications, pathologies related to the skeletal system have also been observed. One of these is avascular necrosis of the femoral head, which develops as a result of impaired blood supply to bone tissue. This process leads to the death of bone cells, destruction of bone structure, and dysfunction of the joint. Consequently, patients may experience severe pain, limited mobility, and disability.

The use of corticosteroid medications in the treatment of COVID-19, as well as the hypercoagulable state caused by the disease itself, may contribute to the development of avascular necrosis. In addition, recent studies highlight the significant role of genetic factors. In particular, polymorphisms in folate cycle-related genes such as MTHFR, MTR, and MTRR can lead to elevated homocysteine levels, resulting in thrombosis and microcirculatory disorders. This, in turn, exacerbates bone tissue ischemia and increases the risk of developing avascular necrosis. Therefore, studying the clinical course, diagnostic approaches, and mechanisms of development of avascular necrosis of the femoral head associated with COVID-19, as well as determining the role of genetic factors, is one of the urgent issues in modern medicine.

Objective of the study

To investigate the clinical course of avascular necrosis of the femoral head associated with COVID-19, to determine the significance of genetic factors in its development, and to improve diagnostic methods.

Materials and methods

The study was conducted on patients treated at the Republican Specialized Scientific and Practical Medical Center of Traumatology and Orthopedics. Patients diagnosed with avascular necrosis of the femoral head were selected as the study population.

The following examination methods were used in the study:

- clinical examinations and analysis of patient history;
- laboratory tests;
- radiological examination;
- magnetic resonance imaging (MRI);
- morphological research methods;
- molecular genetic analysis.

During genetic testing, polymorphisms of folate cycle-related genes MTHFR, MTR, and MTRR were analyzed. The obtained data were processed using statistical analysis methods and comparatively evaluated.

Results

The study results demonstrated an increased risk of developing avascular necrosis of the femoral head in the post-COVID-19 period. In most patients, the disease manifested with pain syndrome, limited joint mobility, and destructive changes in bone structure. Instrumental examinations, especially MRI, were found to be highly important for early diagnosis of the disease.
Genetic analysis revealed that certain gene polymorphisms may enhance hypercoagulability and impair blood circulation in bone tissue. This finding confirms that genetic factors also play a significant role in the development of avascular necrosis.

Conclusion

The study findings indicate that, along with clinical factors, genetic factors also play an important role in the development of avascular necrosis of the femoral head associated with COVID-19. In particular, polymorphisms in folate cycle-related genes may increase hypercoagulability and lead to impaired blood circulation in bone tissue. The combined use of MRI, clinical evaluation, and molecular genetic diagnostic methods is essential for early detection of the disease. This approach enables early diagnosis, prevention of complications, and the development of effective treatment strategies.