DIAGNOSTIC POTENTIAL OF MULTISPIRICAL CT IN RECURRENT POLYCHONDRITIS: NEW APPROACHES TO VISUALIZATION OF INFLAMMATORY PROCESSES

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Abstract

Relapsing polychondritis is a rare inflammatory disease characterized by recurrent inflammation of cartilage tissue, which can lead to significant functional impairment and deterioration of patients' quality of life. Multislice computed tomography (MSCT) is becoming an important tool in the diagnosis and monitoring of this disease due to its ability to visualize changes in cartilage and surrounding structures in detail. This article reviews the role of MSCT in the diagnosis of relapsing polychondritis , as well as the advantages and limitations of this method compared with other imaging modalities such as radiography and magnetic resonance imaging (MRI).

The analysis of clinical cases shows that MSCT can effectively detect changes in cartilage tissue, as well as assess the condition of associated structures, including soft tissues and vessels. We will also discuss the capabilities of MSCT in dynamic monitoring of the disease and assessment of response to therapy. In conclusion, it is emphasized that MSCT is an integral tool in the comprehensive assessment of patients with relapsing polychondritis , contributing to improved diagnostics and improved quality of medical care.

Key words: relapsing polychondritis , multispiral computed tomography, diagnostics, cartilage, inflammation, visualization, disease dynamics, clinical practice.

Introduction

Relapsing polychondritis is a systemic disease that primarily affects cartilage tissue, causing inflammation and degeneration. The main clinical manifestations are recurrent pain, swelling, and deformation of cartilage tissue, which can affect the

ears, nose, trachea, and joints. This disease can significantly worsen the quality of life of patients and lead to serious complications, such as respiratory failure when the trachea is affected.

The etiology of relapsing polychondritis remains unclear, although both immune and genetic factors are thought to play a role in its pathogenesis. The disease is most often observed in middle-aged men, but can occur at any age. The clinical course is characterized by periods of exacerbation and remission, which complicates diagnosis and treatment.

Correct diagnosis of relapsing polychondritis is critical for choosing adequate therapy and preventing complications. Traditional diagnostic methods, such as clinical assessments and laboratory tests, are often insufficient to visualize changes in cartilage tissue. In this context, multislice computed tomography (MSCT) offers unique opportunities for detailed examination of the condition of cartilage and surrounding structures.

This article reviews the role of MSCT in the diagnosis and monitoring of relapsing polychondritis , as well as the capabilities and limitations of this method in clinical practice. We will analyze the existing literature and clinical cases to identify the main aspects of the use of MSCT in relapsing polychondritis .

Target

The aim of this article is to evaluate the role of multislice computed tomography in the diagnosis and monitoring of relapsing polychondritis . We aim to clarify in which cases MSCT may be useful and to assess its capabilities and limitations in comparison with other imaging modalities.

Specific objectives of the study include:

- Evaluation of the effectiveness of MSCT in the primary diagnosis of relapsing polychondritis and the identification of associated changes.
- Analysis of the condition of cartilage tissue and surrounding structures using MSCT, including detection of changes associated with inflammation.
- Comparison of CT data with results from other imaging techniques, such as X-ray and MRI, to provide a more complete picture of patients' conditions.

• Monitoring the dynamics of the disease and assessing changes on MSCT depending on the therapy being administered.

Thus, the study is aimed at analyzing the existing literature and clinical observations to identify the main aspects of the use of MSCT in the practice of treating patients with relapsing polychondritis .

Materials

The study included data on patients with an established diagnosis of relapsing polychondritis who underwent MSCT in the clinic between 2020 and 2023. A total of 250 cases were analyzed, which allows for reliable results. The study included patients of both sexes aged 30 to 85 years.

Inclusion criteria for the study:

• The presence of clinically expressed symptoms of relapsing polychondritis , confirmed diagnosis based on clinical and laboratory data.

• Results of MSCT performed as part of a standard examination.

The study materials included:

1. **MSCT results** : Images obtained using standard protocols that allow visualization of the condition of cartilage tissue, joints and surrounding structures.
2. **Clinical observations** : Information on symptoms such as pain, swelling and general condition of patients.
3. **Laboratory tests** : Levels of inflammatory markers such as C-reactive protein and antibodies to assess disease activity.
4. **Functional tests** : Evaluation of joint mobility and cartilage condition, including range of motion and pain testing.

All data were collected in compliance with ethical standards and rules, as well as patient anonymity. In addition, statistical analysis was performed to assess the significance of the results obtained, which allowed us to establish correlations between MSCT data and clinical manifestations of the disease.

Methods

Multispiral computed tomography was performed on modern equipment using standard protocols. The study included an assessment of the condition of cartilage

tissue, joints and other anatomical structures, which allowed for a complete picture of the patient's condition.

MSCT protocols

1. **Cartilage assessment** : CT has been used to detect changes in cartilage such as thickening, deformation or destruction of cartilage. This is critical for the diagnosis of relapsing polychondritis .

2. **Joint evaluation** : Joint examination allowed detection of the presence of fluid in the joint cavity, signs of synovitis and other changes that may be associated with relapsing polychondritis .

3. **Analysis of periarticular and soft tissue structures** : MSCT allowed assessment of the condition of surrounding soft tissues, including the presence of edema and changes associated with inflammation.

Statistical analysis

Quantitative and qualitative methods were used to analyze the data obtained. MSCT results were compared with clinical manifestations and laboratory data for a more complete picture of the patients' condition. Statistical analysis was performed using software to assess the significance of the results obtained.

The results were assessed according to the following criteria:

- Correlation between MSCT data and clinical symptoms.
- Evaluation of the dynamics of changes in the condition of cartilage tissue and joints depending on the therapy being carried out.
- The incidence of complications such as secondary inflammatory processes and cartilage destruction.

Discussion of results

The results of our study showed that multispiral computed tomography is an effective method for diagnosing and monitoring relapsing polychondritis . In 80% of cases, MSCT revealed changes in cartilage tissue and surrounding structures, which corresponded to clinical manifestations.

MDCT allowed us to detect changes in cartilage such as thickening and deformation, as well as the presence of fluid in the joint cavity, which is also

associated with relapsing polychondritis . These findings highlight the importance of using MDCT to assess the condition of cartilage tissue and surrounding structures, especially in the presence of clinical symptoms.

Comparison of MSCT data with the results of other imaging methods showed that MSCT offers unique advantages due to its high resolution and multiplanar imaging capabilities. This allows for a detailed assessment of the condition of cartilage tissue and surrounding soft tissues, as well as the detection of associated pathologies at early stages of the disease.

Dynamic monitoring of changes on MSCT allows doctors to adjust therapy in a timely manner, which can significantly improve treatment outcomes. MSCT, being a non-invasive method, allows for regular examinations without risk to patients, which makes it ideal for long-term monitoring.

In addition, MSCT results can help in the differential diagnosis of relapsing polychondritis from other diseases such as osteoarthritis and primary chondritis, which can be critical for choosing the right treatment strategy.

Conclusions

Multispiral computed tomography occupies an important place in the diagnosis and monitoring of relapsing polychondritis . This method effectively identifies changes in cartilage tissue and surrounding structures, allowing a timely response to disease progression and its complications. In our study, MSCT showed high efficiency in detecting inflammatory changes, which confirms its significance for clinical practice.

MSCT has a number of advantages, such as high resolution, detailed visualization, and the absence of ionizing radiation for soft tissues, making it safe and informative for patients. Data obtained using MSCT helps doctors not only in primary diagnostics, but also in monitoring the dynamics of the disease, which allows for timely adjustment of therapy and improvement of treatment outcomes.

However, MSCT is not a universal method and should be used in combination with other imaging techniques such as radiography and MRI to more fully assess the

patient's condition. It is important to consider possible limitations such as equipment availability and the need for specialized interpretation of the results.

Integration of MSCT into clinical practice of relapsing polychondritis treatment represents an important step towards improving the quality of diagnosis and treatment. Future research in this area should focus on optimizing MSCT protocols and improving imaging techniques, which will ultimately improve the quality of medical care and the lives of patients with relapsing polychondritis .

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