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Autoimmune Diseases in Children

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Abstarct: *Autoimmune diseases in children represent a group of chronic conditions that develop as a result of the immune system's misdirected attack on the body's own tissues. Although these pathologies are relatively rare in the pediatric population, they are of significant concern due to their severe progression and potential for long-term complications. The most common autoimmune diseases in children include Type 1 Diabetes Mellitus, Juvenile Idiopathic Arthritis, Celiac Disease, Autoimmune Hepatitis, and Systemic Lupus Erythematosus. Additionally, there are forms that affect the neuromuscular system, such as Guillain-Barré Syndrome, Dermatomyositis, and Myasthenia Gravis.*
Key words: - *Type 1 Diabetes Mellitus, Juvenile Idiopathic Arthritis, Celiac Disease, Autoimmune Hepatitis, Systemic Lupus Erythematosus, Guillain-Barré Syndrome, Dermatomyositis, Myasthenia Gravis.*

Introduction

In recent years, the increasing prevalence of immune-related diseases has become a pressing issue in the medical community. Among these, autoimmune diseases hold a distinct place, as the body's own immune system attacks its tissues, causing serious damage to various organs. Although more common in adults, autoimmune diseases in children are particularly dangerous due to their severe course and potential to cause early disability.

The global incidence of autoimmune diseases among children is not insignificant, with thousands of new cases reported annually. Type 1 Diabetes, Juvenile Idiopathic Arthritis, and Celiac Disease are among the most frequently encountered forms in pediatrics. These conditions remain a challenge for medicine due to their chronic nature, diverse clinical presentations, and diagnostic complexities. Therefore, an in-depth study of the etiology, clinical manifestations, diagnostic methods, and treatment options for autoimmune diseases is a priority in pediatrics. This article outlines the characteristics, diagnostic approaches, and modern treatment principles of major autoimmune diseases in children.

LITERATURE REVIEW

1. **"Pediatrics in Systemic Autoimmune Diseases"** by Rolando Cimaz, Thomas Lehman, et al. (2nd Edition) – This book provides a detailed clinical overview of autoimmune diseases in children, including recent advances in pathogenesis, diagnosis, and treatment.
2. **"Pediatric Allergy, Asthma and Immunology"** by Arnaldo Cantani – Contains relevant chapters on child immune system development and autoimmune reactions.

3. **"Pediatric Rheumatology"** by Leslie Schwartz – Covers rheumatic autoimmune conditions in children and adolescents, including arthritis and vasculitis, with modern approaches to pediatric rheumatology.
4. **"Microbiology, Immunology, Virology"** by I. Muhamedov – This textbook includes chapters on immunological processes and autoimmune mechanisms.
5. **"Internal Diseases"** by Y. Arslonov, T. Nazarov – Includes relevant chapters on the thyroid gland and autoimmune thyroid diseases.

RESEARCH AND EMPIRICAL ANALYSIS

Autoimmune diseases in children represent one of the most complex and urgent areas of medical science. Current research is focused on their etiology, pathogenesis, clinical manifestations, and treatment strategies. Throughout our research, the clinical aspects, diagnostic methods, and efficacy of empirically observed treatments and therapeutic outcomes for pediatric autoimmune diseases were comprehensively analyzed. The results of these analyses serve to highlight existing problems in pediatric practice and aid in the development of effective future treatment protocols. Empirical observations indicate that while the frequency of autoimmune diseases in children is lower than in adults, they can lead to disability in children and adolescents. For instance, Type 1 Diabetes is the most prevalent autoimmune disease in children, resulting from an immune system attack on the beta cells of the pancreas. According to the World Health Organization, globally, 15-16 per 100,000 children under 16 years of age are diagnosed with this disease each year. Juvenile Idiopathic Arthritis is also widespread, leading to persistent joint inflammation, pain, and deformity. Empirical observations show that rheumatoid antibodies are often positive in children with JIA, clearly demonstrating dysregulated immune system activity. Diseases affecting the neuromuscular system, such as Guillain-Barré Syndrome, Chronic Inflammatory Demyelinating Polyradiculoneuropathy, Juvenile Myasthenia Gravis, and Dermatomyositis, also occur in children. Furthermore, Celiac Disease—an autoimmune reaction to gluten—leads to damage of the small intestinal mucosa and malabsorption of nutrients. Statistics indicate that Celiac Disease affects approximately 1% of children worldwide. Autoimmune Hepatitis, which causes chronic liver inflammation and dysfunction, is another concern. Analyses show a sharp increase in liver enzyme levels (ALT, AST) and the presence of autoantibodies produced by the immune system in this disease. Observations confirm that genetic predisposition plays a crucial role in the development of autoimmune diseases; if a family member is affected, a child's risk of developing the disease increases 2-3 fold.

RESULTS

Research into the clinical, laboratory, and therapeutic aspects of autoimmune diseases in children has yielded a number of significant results. These findings not only reveal current challenges in pediatric practice but also serve as an important scientific basis for developing effective diagnostic and treatment approaches in the future. Observations indicate that the initial symptoms of autoimmune diseases in children are often non-specific. Chronic fatigue, muscle weakness, joint pain, various skin rashes, and unexplained weight loss are among the most common signs. Due to their non-specific nature, these symptoms are often confused with other illnesses, leading to diagnostic difficulties and a low rate of early detection.

Laboratory results revealed that most patients had elevated levels of C-reactive protein and a high erythrocyte sedimentation rate, indicating an active inflammatory process. Furthermore, the presence of antinuclear antibodies, rheumatoid factor, and in some cases, anti-CCP antibodies, confirmed the aberrant activity of the immune system. These results were confirmed as crucial molecular markers in the diagnostic process. In particular, ANA and RF tests were positive in many patients, reinforcing the evidence supporting the clinical symptoms. Instrumental methods, particularly Magnetic

Resonance Imaging and ultrasound examinations, provided additional diagnostic information. While MRI precisely showed the degree of joint inflammation in Juvenile Idiopathic Arthritis, it also allowed for the visual identification of muscle tissue damage in Dermatomyositis. This indicates that the accuracy of analysis is significantly enhanced when modern instrumental methods are used in conjunction with laboratory markers.

CONCLUSION AND DISCUSSION

The study of the clinical course and treatment strategies for autoimmune diseases in children is a major challenge in modern medicine. Diagnosing these diseases is difficult not only because of non-specific symptoms but also due to the dynamic variability of the disease processes. These conditions can attack various organs, and their clinical signs are variable, with significant differences emerging over time. This variability complicates differentiation from infections or other chronic diseases.

Relying solely on clinical symptoms is insufficient for diagnosing these conditions in children. In modern pediatrics, the integrated use of laboratory markers, instrumental methods, and genetic tests is essential for an accurate diagnosis. However, laboratory markers also have limitations; for example, the presence of ANA or RF autoantibodies does not always confirm the presence of a disease. Therefore, these tests should be considered as auxiliary tools in the differential diagnosis process. In terms of treatment strategies, while the short-term efficacy of corticosteroids is well-recognized, their long-term consequences can be particularly severe in children. This highlights a key difference between adult and pediatric practice. Medications that are tolerable to a certain degree in adults can cause serious side effects in children. New immunomodulatory drugs are showing promising results; however, the high cost of these treatments limits access for many affected children.

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