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Review

Childhood Mixed Connective Tissue Disease: A Literature Review

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ABSTRACT

Mixed Connective Tissue Disease (MCTD) is a rare autoimmune condition characterized by overlapping clinical manifestations of systemic lupus erythematosus, scleroderma, and polymyositis, associated with high titers of anti-U1 RNP antibodies. In children, MCTD presents specific diagnostic and therapeutic challenges due to the variability of clinical manifestations and a distinct immune response compared to adults.

Keywords: Autoimmune; Antibodies; Corticosteroids; Connective Tissue; Rheumatology

Introduction

Mixed Connective Tissue Disease (MCTD) was first described in 1972 as an autoimmune condition with clinical features overlapping systemic lupus erythematosus (SLE), scleroderma, and polymyositis[1-3]. The diagnosis is based on the presence of high titers of anti-U1 RNP antibodies, associated with a heterogeneous clinical presentation. In children, MCTD is even rarer and, therefore, less studied[4]. Pediatric MCTD can present with varied clinical manifestations, including Raynaud's phenomenon, arthritis, myositis, skin changes, and interstitial lung disease[5]. The severity and progression of symptoms can differ significantly among patients, highlighting the need for an individualized approach[6]. Despite advancements in the understanding of autoimmune diseases, pediatric MCTD still has gaps concerning pathogenesis, treatment response, and long-term prognosis[7,8].

Objectives

This review article aims to compile updated information on pediatric MCTD, addressing aspects related to clinical features, diagnosis, management, and prognosis.

Materials and Methods

A bibliographic review was conducted using articles published in the PUBMED, ScienceDirect, and Scielo databases to support the study.

Discussion

MCTD in children represents a significant clinical challenge due to symptom overlap and unpredictable disease progression[9]. Reviewed studies suggest that Raynaud's phenomenon is often the first clinical sign in pediatric patients, followed by arthritis and skin manifestations. The presence of high titers of anti-U1 RNP antibodies remains an essential diagnostic criterion, but its specificity for childhood MCTD is debated, as these antibodies can also be found in other autoimmune conditions[10]. Another relevant aspect is pulmonary involvement, which can range from mild symptoms to progressive interstitial lung disease, being one of the leading causes of morbidity and mortality in MCTD patients. Regular monitoring through pulmonary function tests and imaging exams is recommended[11,12].

The therapeutic management of MCTD in children typically involves corticosteroids and immunosuppressants, such as methotrexate and azathioprine. However, treatment response varies widely, and the long-term adverse effects of medications are a significant concern. Recent studies have explored the role of biological therapies, such as tumor necrosis factor (TNF-α) inhibitors and anti-IL-6 agents, but their effectiveness in children with MCTD remains limited due to a lack of robust data[13]. A multidisciplinary approach involving rheumatologists, pulmonologists, dermatologists, and other specialists is essential to optimize patient management. Additionally, psychological support and family assistance are crucial, given the emotional impact of a chronic condition on both the child and caregivers[14].

In the research context, there is an urgent need for longitudinal studies investigating prognostic factors and response to specific therapies in children[15,16]. Moreover, developing specific diagnostic criteria for pediatric MCTD could improve diagnostic accuracy and early management.

Conclusion

Childhood Mixed Connective Tissue Disease is a rare and complex condition with significant challenges in diagnosis and management. Clinical manifestations vary widely, and prognosis depends on early recognition and appropriate intervention. Despite advancements in autoimmune disease understanding, pediatric MCTD remains an area with substantial knowledge gaps. Management should be multidisciplinary and patient-centered, considering not only medical aspects but also the psychosocial impact of the disease.

The introduction of new biological therapies represents a promising possibility but requires validation in studies specific to this population. Furthermore, fostering research that explores pathogenesis, risk factors, and long-term outcomes is fundamental.

With an integrated approach and research advancements, the goal is to improve the quality of life of children with MCTD and reduce associated complications. Future studies should prioritize the development of specific diagnostic and therapeutic guidelines for pediatric patients, contributing to more effective and personalized management.

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