THE ROLE AND BIOMARKER VALUE OF IL-17 AND IL-23 CYTOKINES IN LABORATORY DIAGNOSIS OF AXIAL SPONDYLOARTHRITIS

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ABSTRACT

Axial spondyloarthritis (axSpA) is a chronic inflammatory rheumatic disease characterized by predominant involvement of the spine and sacroiliac joints. The disease is associated with inflammatory back pain, stiffness, enthesitis, and progressive structural changes including syndesmophyte formation and ankylosis. Recent studies highlight the important role of the IL-23/IL-17 inflammatory axis in the pathogenesis of axSpA.

IL-23 produced by antigen-presenting cells promotes differentiation and proliferation of Th17 lymphocytes, which subsequently produce IL-17 and other pro-inflammatory mediators. IL-17 stimulates inflammatory cascades, enhances neutrophil recruitment, and contributes to bone remodeling processes through activation of osteoclastogenesis.

The aim of this study is to evaluate the diagnostic significance and biomarker potential of IL-17 and IL-23 cytokines in axial spondyloarthritis. Evidence from recent clinical investigations suggests that serum concentrations of these cytokines are

elevated in patients with active axSpA and show moderate correlation with disease activity indices such as BASDAI and ASDAS.

However, the diagnostic accuracy of IL-17 and IL-23 as independent biomarkers remains limited, indicating that these cytokines should be considered complementary indicators rather than primary diagnostic markers. Clinical trials investigating targeted therapies have demonstrated that IL-17 inhibitors such as secukinumab and ixekizumab significantly improve clinical outcomes, supporting the pathogenic relevance of this inflammatory pathway.

Further research integrating cytokine profiling with genetic and microbiome factors may improve early detection and individualized treatment strategies in axial spondyloarthritis.

Keywords: axial spondyloarthritis, IL-17, IL-23, cytokines, biomarkers, laboratory diagnostics

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INTRODUCTION

Axial spondyloarthritis (axSpA) represents a group of chronic inflammatory diseases affecting the axial skeleton, particularly the sacroiliac joints and spine. The disease spectrum includes radiographic axSpA (ankylosing spondylitis) and non-radiographic axSpA.

Patients commonly present with inflammatory back pain, prolonged morning stiffness, reduced spinal mobility, and enthesitis. Extra-articular manifestations such as uveitis, psoriasis, and inflammatory bowel disease are also frequently observed.

The global prevalence of axSpA ranges between 0.5–1%, and the disease is strongly associated with HLA-B27, which is detected in a significant proportion of patients.

Recent advances in immunology have demonstrated that the IL-23/IL-17 pathway plays a central role in disease development. IL-23 stimulates differentiation of Th17 cells, leading to increased production of IL-17, which contributes to inflammatory responses and tissue damage. IL-17 also induces production of pro-inflammatory cytokines including IL-6, TNF-α, and IL-1β, thereby amplifying inflammatory processes.

Despite advances in imaging methods such as MRI, early diagnosis of axSpA remains challenging. Conventional inflammatory markers such as ESR and CRP are

not elevated in all patients, which emphasizes the need for additional laboratory biomarkers.

RELEVANCE OF WORK

Early detection of axial spondyloarthritis remains difficult because initial clinical manifestations often overlap with mechanical back pain. Diagnostic delay may reach 5–7 years, which may lead to irreversible structural damage.

Traditional laboratory markers, including ESR and CRP, demonstrate limited sensitivity. Several studies indicate that cytokines involved in the Th17 immune pathway, particularly IL-17 and IL-23, may reflect underlying inflammatory activity.

Elevated serum IL-17 concentrations have been associated with increased disease activity and inflammatory burden in patients with axSpA. These cytokines may therefore serve as potential indicators of disease activity and therapeutic response. The development of biologic therapies targeting IL-17 further supports the clinical relevance of this pathway. These agents have demonstrated significant improvement in symptoms, functional status, and imaging outcomes in patients with active disease.

Understanding the role of cytokine biomarkers may contribute to more personalized approaches to diagnosis and treatment, which represents an important direction in modern rheumatology.

PURPOSE

The aim of this study is to analyze the diagnostic significance of IL-17 and IL-23 cytokines in axial spondyloarthritis and evaluate their potential use as laboratory biomarkers.

The objectives of the study include:

• evaluating the role of the IL-23/IL-17 inflammatory pathway in the pathogenesis of axSpA

• assessing correlations between cytokine levels and disease activity indices

• analyzing the potential diagnostic value of IL-17 and IL-23 compared with traditional inflammatory markers

• reviewing the clinical significance of cytokine-targeted therapies

RESULTS AND DISCUSSION

Recent studies have demonstrated that patients with axial spondyloarthritis often exhibit higher serum levels of IL-17 and IL-23 compared with healthy individuals.

Elevated concentrations of IL-17 have been associated with increased inflammatory activity and may correlate with clinical indices such as BASDAI.

IL-17 is produced not only by Th17 cells but also by other immune cells including γδ T cells, innate lymphoid cells, and mucosal-associated invariant T cells. These cells contribute to inflammatory responses at entheseal sites and may play a role in the persistence of inflammation.

Genetic studies have identified polymorphisms in the IL23R gene that may influence susceptibility to spondyloarthritis, supporting the importance of the IL-23/IL-17 signaling pathway.

Clinical trials have shown that inhibition of IL-17 with biologic agents such as secukinumab and ixekizumab can significantly reduce disease activity and improve clinical outcomes in patients with axSpA.

Nevertheless, the diagnostic value of IL-17 and IL-23 remains moderate. Their levels may be influenced by various factors including metabolic conditions and other inflammatory diseases. For this reason, cytokine measurements should be interpreted in combination with clinical findings, imaging data, and genetic markers.

CONCLUSION

IL-17 and IL-23 cytokines play an important role in the immunopathogenesis of axial spondyloarthritis and contribute to inflammatory processes and structural changes in the disease.

Although elevated levels of these cytokines are associated with disease activity, their diagnostic performance as independent biomarkers remains limited. Integration of cytokine profiling with clinical, genetic, and imaging data may enhance diagnostic accuracy and support more personalized treatment strategies.

Further large-scale studies are required to clarify the clinical utility of these cytokines in the diagnosis and management of axial spondyloarthritis.

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