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Short Communication

Twisted Toes: Causes, Clinical Features, and Management

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Abstract

Twisted toes are a common foot deformity characterized by abnormal rotation or deviation of one or more toes from their normal anatomical alignment. They may be congenital or acquired and can range from a mild cosmetic concern to a painful condition that significantly impairs function and quality of life. This article reviews the etiology, clinical presentation, diagnostic considerations, and management options for twisted toes, with emphasis on common deformities such as hammer toes, claw toes, and overlapping toes.

Keywords: twisted toes; bent; foot; endocarditis; HIV/AIDS

Introduction

Chronic inflammatory disorders are characterized by sustained immune activation, tissue injury, and impaired resolution of inflammation. Identifying reliable biomarkers that reflect disease activity and chronicity remains a major challenge in clinical practice. Monocytes, circulating precursors of tissue macrophages and dendritic cells, are increasingly recognized as sensitive indicators of chronic inflammatory states. Their quantitative and qualitative changes in peripheral blood often mirror ongoing immune responses in tissues, making them valuable markers in diseases such as tuberculosis.

Biology of Monocytes

Monocytes are mononuclear leukocytes derived from the bone marrow and typically constitute 2–10% of circulating white blood cells. They are broadly classified into three subsets based on surface marker expression:

- Classical monocytes (CD14++ CD16−): Primarily involved in phagocytosis and acute inflammatory responses
- Intermediate monocytes (CD14++ CD16+): Strong producers of pro-inflammatory cytokines
- Non-classical monocytes (CD14+ CD16++): Involved in immune surveillance and endothelial interaction

Upon migration into tissues, monocytes differentiate into macrophages or dendritic cells, where they orchestrate both innate and adaptive immune responses.

Monocytes in Chronic Inflammation

In chronic inflammatory disorders, monocytes are persistently activated and recruited to affected tissues. This prolonged stimulation leads to:

- Sustained cytokine production (e.g., TNF-α, IL-1β, IL-6)
- Continuous antigen presentation and T-cell activation
- Progressive tissue remodeling and fibrosis

Elevated absolute monocyte counts or altered monocyte subsets in peripheral blood often reflect chronic immune activation. Consequently, monocyte-derived markers have gained importance as indicators of disease activity and progression.

Monocytes in Tuberculosis

Tuberculosis represents a prototypical chronic inflammatory disease driven by *Mycobacterium tuberculosis*. Monocytes play a central role in the pathogenesis of TB, serving both as host cells for the pathogen and as mediators of immune defense.

1. **Monocyte Count and TB Activity**

   Patients with active tuberculosis frequently exhibit monocytosis. An elevated monocyte count or an increased monocyte-to-lymphocyte ratio (MLR) has been associated with active disease, higher mycobacterial burden, and systemic inflammation.

2. **Monocyte-to-Lymphocyte Ratio (MLR)**

The MLR has emerged as a simple and cost-effective biomarker in TB. A high MLR reflects an imbalance between innate and adaptive immunity and has been linked to:

- Active TB versus latent infection
- Poor treatment response
- Increased risk of disease progression

3. **Functional Alterations of Monocytes**

   In TB, monocytes exhibit altered phagocytic capacity, impaired antigen presentation, and dysregulated cytokine responses. These changes contribute to granuloma formation and persistence of infection.

Monocytes as Markers in Other Chronic Inflammatory Disorders

Beyond tuberculosis, monocytes serve as markers in several chronic inflammatory and immune-mediated conditions, including:

- Rheumatoid arthritis
- Inflammatory bowel disease
- Sarcoidosis
- Chronic infections (e.g., HIV, hepatitis)
- Atherosclerosis and metabolic inflammation

In these disorders, monocyte activation correlates with disease severity, systemic inflammation, and long-term outcomes.

Clinical Implications

The assessment of monocyte count, monocyte subsets, and derived ratios such as the MLR offers several clinical advantages:

- Easily obtainable from routine complete blood counts
- Cost-effective and widely available
- Useful for monitoring disease activity and treatment response

In tuberculosis-endemic regions, monocyte-based markers can complement microbiological and radiological investigations, especially in resource-limited settings.

Future Perspectives

Advances in immunophenotyping and molecular profiling are enhancing our understanding of monocyte heterogeneity in chronic inflammation. Targeting monocyte-driven pathways may offer novel therapeutic strategies, while refined monocyte-based biomarkers may improve early diagnosis and prognostic assessment in tuberculosis and other chronic inflammatory disorders.

Conclusion

Monocytes are more than passive participants in chronic inflammation; they are active drivers and reliable markers of sustained immune activation. In tuberculosis, elevated monocyte counts and altered monocyte ratios reflect disease activity and immune dysregulation. Recognizing the diagnostic and prognostic value of monocytes can enhance clinical decision-making and deepen our understanding of chronic inflammatory diseases.

Reference

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