Advancements in Diagnosis and Management of Chronic Pulmonary Aspergillosis

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Chronic pulmonary aspergillosis (CPA) is a complex and heterogeneous fungal lung disease arising from the interaction between persistent Aspergillus infection and impaired local host immunity, most commonly in the setting of structural lung disease. While traditionally viewed as an indolent infection, CPA is increasingly recognised as a dynamic immunopathological process characterised by dysregulated antifungal immune responses and progressive tissue damage.
Diagnosis of CPA relies on the integration of clinical features, characteristic radiological abnormalities, and evidence of Aspergillus exposure or infection. The expanded use of Aspergillus-specific IgG assays has improved diagnostic sensitivity and facilitated earlier case identification. High-resolution computed tomography remains central to diagnosis and disease monitoring, with increasing emphasis on radiological phenotyping to reflect underlying pathological processes. Emerging approaches incorporating immunological biomarkers, cytokine profiling, and molecular diagnostics aim to better define disease activity, host susceptibility, and treatment response.
Management of CPA continues to rely on long-term antifungal therapy; however, outcomes are strongly influenced by host factors, drug exposure, and immune–pathogen interactions. Therapeutic drug monitoring and individualised azole dosing have improved efficacy and tolerability, yet relapse and resistance remain common, suggesting persistent fungal burden and incomplete immune control. Mechanistic studies exploring innate and adaptive immune dysfunction, including impaired macrophage function, altered T-cell responses, and cytokine dysregulation, will inform precision-based treatment strategies.