

Advances in Combination Therapy for Asthma: A Personalized Approach

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DESCRIPTION

Asthma is a chronic respiratory disease that affects millions of people worldwide, leading to breathing difficulties, wheezing and recurring bouts of airway inflammation. The heterogeneity of asthma, with its wide range of symptoms and triggers, makes treatment a complex challenge. In response to this complexity, combination therapy has become a key strategy in asthma management. By targeting different pathways involved in the disease, combination therapy can provide more comprehensive control over symptoms and reduce the frequency of exacerbations. Recent advances in the field have pushed the boundaries of asthma treatment, enabling more personalized approaches that improve patient outcomes. This article discusses about the role of combination therapy in asthma management, its benefits, recent advances and the potential for personalizing treatments to meet the specific needs of each patient. Asthma is characterized by chronic inflammation of the airways, leading to bronchoconstriction (narrowing of the airways), increased mucus production and hypersensitivity to environmental triggers such as allergens, smoke or infections. Patients with asthma experience a range of symptoms, including shortness of breath, coughing, wheezing and chest tightness. While some individuals experience mild, intermittent symptoms, others have severe, persistent asthma that significantly impairs their quality of life.

Approach to traditional asthma treatment

Traditional asthma treatment follows a stepwise approach based on the severity of symptoms. For mild asthma, Short-Acting Beta-Agonists (SABAs) such as albuterol are used as rescue medications to provide quick relief during acute attacks. As symptoms become more severe, controller medications are introduced to prevent exacerbations. These include:

Inhaled Corticosteroids (ICS): The fundamental of asthma treatment, ICS reduces inflammation in the airways.

Long-Acting Beta-Agonists (LABAs): These bronchodilators are used to relax airway muscles and provide longer-lasting relief.

Leukotriene Receptor Antagonists (LTRAs): These medications block leukotrienes, inflammatory molecules that contribute to asthma symptoms.

Theophylline: A bronchodilator used less frequently due to side effects but still relevant in some cases of severe asthma. While single-drug therapies can help control symptoms, many patients require a combination of medications to achieve optimal asthma control. Combination therapy is particularly important for patients whose asthma remains uncontrolled on a single medication, or those at risk of exacerbations.

Benefits of combination therapy

The benefits of combination therapy in asthma management are by tackling different aspects of asthma's pathophysiology, combination therapy offers more comprehensive symptom control than single-drug therapies. This results in fewer asthma attacks, less reliance on rescue inhalers and a reduced risk of hospitalization due to exacerbations. ICS remains the most effective anti-inflammatory treatment in asthma, but its benefits are enhanced when combined with LABAs, which prevent bronchospasm. Combination therapy targets both inflammation and bronchoconstriction, two characteristics of asthma. Advances in biologics have enabled the development of more targeted therapies that specifically tackles the immune pathways involved in asthma. Combination therapy that includes biologics can be customized to the unique immunological profile of each patient, offering personalized care for those with severe, refractory asthma. Using a single inhaler that combines multiple medications can improve treatment adherence, as patients are more likely to use a single device consistently than manage multiple treatments.

Advances in combination therapy for asthma

In recent years, significant advancements in combination therapy have revolutionized the management of asthma, particularly for patients with moderate-to-severe disease. These advances include the development of modern medications, inhaler devices and biologic therapies that allow for a more personalized approach. Biologics have revolutionized the treatment of severe asthma, especially for patients whose disease is driven by specific immune pathways. These therapies target cytokines and immunoglobulins that play key roles in allergic and eosinophilic asthma. Targets immunoglobulin E, which is elevated in allergic asthma.

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Blocks interleukin-5, a cytokine that promotes the survival of eosinophils, which contribute to airway inflammation. Targets the interleukin-4 and interleukin-13 pathways, which are involved in allergic inflammation. Combining biologics with standard treatments like ICS has shown significant improvement in asthma control for patients with severe, difficult-to-treat asthma. Moreover, biologic treatments allow for a precision medicine approach, where treatment is customized to the patient's specific immune profile. Advances in understanding the molecular and genetic mechanisms of asthma have led to a personalized approach to combination therapy. Phenotyping asthma patients based on their specific triggers, immune response and inflammation type enables clinicians to select the most appropriate combination of therapies for each individual. For example, patients with eosinophilic asthma may benefit from anti-IL-5 biologics, while those with allergic asthma may respond better to anti-IgE therapy. Digital health tools, such as smart inhalers and mobile apps, are now being integrated into asthma management. These tools allow for real-time monitoring of

medication use, lung function and symptoms, providing both patients and healthcare providers with valuable data to optimize treatment plans. For combination therapy, these advances ensure patients are adhering to their regimen and allow for early intervention if symptoms worsen. Combination therapy has emerged as a fundamental in the management of asthma, offering patients better control over their symptoms, reduced exacerbations, and an improved quality of life. Advances in inhaler technology, biologic therapies and personalized medicine have expanded the possibilities for treating even the most severe cases of asthma. As researchers continue to analyze modern combinations and develop more targeted therapies, the future of asthma care is moving toward a personalized, patient-centered approach that manages the specific needs of each individual. With continued innovation and a focus on individualized treatment, combination therapy will remain a strong tool in the fight against asthma, helping patients breathe easier and live improved lives.