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Use of Targeted Biologic Therapies in Asthma: Current Practice in India

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Abstract:- Asthma remains a significant public health issue in India, with a growing number of patients experiencing severe and uncontrolled forms of the disease. Targeted biologic therapies, including omalizumab, mepolizumab, benralizumab, reslizumab, and dupilumab, have emerged as advanced treatment options for patients with severe asthma, especially those with allergic or eosinophilic phenotypes. These therapies work by targeting specific immunological pathways involved in asthma pathogenesis, offering better symptom control and reducing exacerbation rates. However, the high cost of biologics, limited access, and inconsistent insurance coverage pose significant barriers to their widespread use in India. Despite these challenges, real-world data from Indian studies demonstrate promising clinical outcomes with biologic therapies in patients with difficult-to-treat asthma. This review examines the current landscape of biologic use in India, challenges related to cost and accessibility, and future prospects for integrating these treatments into routine asthma care, particularly through cost-reduction strategies and expanded healthcare coverage.

I. INTRODUCTION

Asthma is a chronic respiratory disease characterized by inflammation and narrowing of the airways, leading to wheezing, shortness of breath, chest tightness, and coughing. Globally, asthma affects an estimated 300 million individuals, and India accounts for a significant burden with over 17.2 million asthmatic patients [1]. In India, the management of asthma has traditionally relied on inhaled corticosteroids (ICS), bronchodilators, and oral medications [2]. However, a subset of patients with severe asthma does not respond adequately to standard treatments, leading to recurrent exacerbations, poor quality of life, and significant healthcare costs. For these patients, biologic therapies—targeting specific components of the inflammatory pathways—have emerged as an effective treatment option [3].

Biologic therapies target specific molecules involved in the pathogenesis of asthma, such as immunoglobulin E (IgE) and interleukins (IL-4, IL-5, IL-13). These therapies are tailored for patients with severe asthma, particularly those with allergic or eosinophilic phenotypes [4]. This article reviews the current landscape of biologic therapies in asthma management in India, the challenges to their adoption, and the future directions for their implementation.

II. MECHANISM OF ACTION OF BIOLOGIC THERAPIES IN ASTHMA

Asthma is a heterogeneous disease with varying clinical presentations and underlying inflammatory mechanisms. Biologic therapies focus on modulating the immune response by targeting specific molecules involved in asthma pathogenesis:

- Omalizumab: An anti-IgE monoclonal antibody, omalizumab binds to free IgE, preventing it from attaching to mast cells and basophils, which are central to the allergic response. It is prescribed for patients with allergic asthma who have elevated serum IgE levels [5].
- Mepolizumab, Reslizumab, and Benralizumab: These drugs target interleukin-5 (IL-5), which is crucial in the maturation, recruitment, and survival of eosinophils, a key cell type involved in eosinophilic asthma. These biologics reduce eosinophilic inflammation, lowering the frequency of exacerbations [6].
- Dupilumab: An anti-IL-4 receptor alpha monoclonal antibody, dupilumab inhibits IL-4 and IL-13 signaling, which are essential in both allergic and eosinophilic inflammation. It is effective for patients with severe asthma who have elevated eosinophil counts or evidence of Type 2 inflammation [7].

III. CURRENT PRACTICE OF BIOLOGIC THERAPIES IN INDIA

In recent years, biologic therapies have gained attention as a revolutionary option for managing severe asthma in India. However, their use remains limited due to various factors such as cost, access to specialized healthcare, and lack of awareness among healthcare providers and patients.

- Omalizumab: Introduced in India over a decade ago, omalizumab is the most widely available and prescribed biologic for asthma. It has shown efficacy in reducing exacerbations, improving lung function, and decreasing the need for oral corticosteroids in patients with allergic asthma [8]. However, its high cost remains a barrier, and it is generally limited to patients in tertiary care centers in metropolitan areas [9].
- Anti-IL-5 Therapies (Mepolizumab, Reslizumab, Benralizumab): These therapies have only recently become available in India and are primarily used in specialized respiratory centres. They are prescribed for patients with eosinophilic asthma who are inadequately

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controlled on standard therapies [10]. Although clinical outcomes have been promising, the high cost and limited availability restrict widespread use [11].

- Dupilumab: Dupilumab is a relatively new entrant in the Indian market and is mainly used in urban centres with access to specialized respiratory care. It has demonstrated benefits in both allergic and eosinophilic asthma, with a significant reduction in exacerbations and improved lung function [12]. However, like other biologics, cost remains a major limiting factor [13].

IV. CHALLENGES IN THE ADOPTION OF BIOLOGIC THERAPIES IN INDIA

- Cost and Accessibility: The high cost of biologic therapies is one of the primary barriers to their widespread adoption in India. Biologics are expensive compared to traditional asthma medications, and they are often not covered by health insurance. Additionally, access to these therapies is generally restricted to tertiary care centres, particularly in urban areas, limiting their availability to a broader population [14].
- Lack of Awareness and Specialized Training: Many healthcare providers in India, particularly in non-specialized settings, may not be fully aware of the availability and utility of biologic therapies in severe asthma management. There is a need for greater education and training to help clinicians identify eligible patients and initiate biologic therapy [15].
- Limited Diagnostic Infrastructure: Identifying the appropriate asthma phenotype for biologic therapy (e.g., allergic, eosinophilic, or mixed) requires advanced diagnostic tools such as serum IgE, blood eosinophil counts, and sputum analysis. Such diagnostic tests are not readily available in many parts of India, particularly in rural and semi-urban areas, making it challenging to select appropriate candidates for biologic therapy [16].

V. FUTURE DIRECTIONS FOR BIOLOGIC THERAPIES IN ASTHMA MANAGEMENT IN INDIA

- Increased Awareness and Education: Increasing awareness among healthcare providers and patients about the benefits of biologic therapies for severe asthma is crucial. Respiratory specialists, pulmonologists, and general practitioners need more training on identifying eligible patients, managing biologics, and understanding their long-term benefits [17].
- Expanding Access: Policymakers and healthcare institutions need to address the cost barrier by exploring options for subsidies, insurance coverage, or reduced pricing through negotiations with pharmaceutical companies. Public-private partnerships could also play a role in expanding access to these life-saving therapies across the country [18].
- Home-Based Administration: With the increasing focus on remote healthcare delivery, exploring home-based administration of biologics could help improve patient adherence and reduce the burden on healthcare facilities. Self-administered biologics, such as subcutaneous injections, can empower patients to take control of their condition [19].
- Telemedicine Integration: Telemedicine platforms could provide a framework for monitoring patients receiving biologic therapies, particularly in rural and remote areas. This would reduce the need for frequent hospital visits, making it easier for patients to adhere to their treatment plans [20].

VI. CONCLUSION

The introduction of biologic therapies represents a significant advancement in the management of severe asthma, offering hope to patients who are unresponsive to conventional treatments. However, in India, the widespread use of biologics remains constrained by cost, limited access, and diagnostic challenges. Overcoming these barriers will require a concerted effort involving healthcare providers, policymakers, and the pharmaceutical industry. By expanding access and increasing awareness, biologic therapies could become a game-changer for asthma management in India, improving outcomes and enhancing the quality of life for patients with severe asthma.

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