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THE ROLE OF PHARMACOTHERAPY IN THE TREATMENT OF ACUTE AND CHRONIC RESPIRATORY DISEASES IN CHILDREN

6th-year students of the Faculty of Pediatrics, Samarkand State Medical University

Khamdamov Botirjon Nusratullo o'g'li

Shafkatilloyeva Kamola G'anijon qizi

5th-year student of the Faculty of General Medicine, Samarkand State Medical University

Rajabova Marjona Nuriddin qizi

5th-year student of the Faculty of Pediatrics, Samarkand State Medical University

Tolibov Asomiddin

4th-year student of the Faculty of Pediatrics, Samarkand State Medical University

Elmurodova Noila Husniddin qizi

Abstract

Respiratory diseases remain one of the leading causes of morbidity and hospitalization among children worldwide. Both acute and chronic respiratory conditions significantly affect the quality of life, growth, and development of pediatric patients. Pharmacotherapy plays a central role in the management of these diseases, aiming to relieve symptoms, control inflammation, prevent complications, and improve long-term outcomes. This article reviews the current principles of pharmacological treatment of acute and chronic respiratory diseases in children, including bronchodilators, anti-inflammatory agents, antibiotics, mucolytics, and supportive therapies. Special attention is given to age-specific considerations, safety profiles, and rational drug use in pediatric practice. Understanding modern pharmacotherapeutic strategies is essential for optimizing treatment efficacy and minimizing adverse effects in children.

Keywords

Pediatric respiratory diseases; Pharmacotherapy; Bronchodilators; Anti-inflammatory drugs; Antibiotics; Children

Introduction

Respiratory diseases are among the most common health problems in childhood and represent a major public health concern globally. Acute respiratory infections, bronchitis, pneumonia, and chronic conditions such as bronchial asthma and chronic obstructive airway diseases account for a significant proportion of outpatient visits and hospital admissions in pediatric populations. Due to anatomical, physiological, and immunological differences between children and adults, respiratory diseases in children often have distinct clinical features and require specific therapeutic approaches.

Pharmacotherapy is a cornerstone in the management of both acute and chronic respiratory diseases in children. The primary goals of treatment include alleviation of symptoms, reduction

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of airway inflammation, eradication of infectious agents when present, prevention of disease progression, and improvement of overall quality of life. However, drug selection and dosing in pediatric patients must be carefully considered due to age-related pharmacokinetic and pharmacodynamic variations, as well as the increased risk of adverse drug reactions.

This article aims to provide a comprehensive overview of the role of pharmacotherapy in the treatment of pediatric respiratory diseases, highlighting commonly used drug groups, their mechanisms of action, clinical indications, and safety considerations.

Classification of Respiratory Diseases in Children

Respiratory diseases in children can be broadly classified into two major categories:

Acute Respiratory Diseases

Acute upper respiratory tract infections

Acute bronchitis

Bronchiolitis

Community-acquired pneumonia

Chronic Respiratory Diseases

Bronchial asthma

Chronic bronchitis

Cystic fibrosis

Bronchopulmonary dysplasia

Each category requires a tailored pharmacological approach depending on disease severity, etiology, and patient age.

Principles of Pharmacotherapy in Pediatric Respiratory Diseases

The fundamental principles of pharmacotherapy in children include:

Evidence-based drug selection

Age-appropriate dosing

Minimization of adverse effects

Use of the least invasive and most effective route of administration

Regular assessment of therapeutic response

Rational drug use is especially important in pediatrics to avoid polypharmacy and unnecessary exposure to medications.

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Bronchodilators

Bronchodilators are essential in the treatment of obstructive airway diseases.

β2-Adrenergic Agonists

Short-acting β2-agonists (e.g., salbutamol) are widely used for rapid relief of bronchospasm in acute asthma exacerbations. Long-acting β2-agonists are used in combination with inhaled corticosteroids for long-term control.

Anticholinergic Agents

Ipratropium bromide is commonly used as an adjunct therapy in acute severe asthma and bronchiolitis.

Methylxanthines

Although less commonly used today due to side effects, methylxanthines such as theophylline may be considered in selected cases.

Anti-Inflammatory Therapy

Inflammation plays a key role in the pathogenesis of many chronic respiratory diseases.

Inhaled Corticosteroids

Inhaled corticosteroids are the cornerstone of long-term asthma management in children. They effectively reduce airway inflammation and prevent exacerbations.

Systemic Corticosteroids

Short courses of systemic corticosteroids are indicated in severe acute exacerbations.

Leukotriene Receptor Antagonists

These agents are useful in mild to moderate asthma and allergic respiratory conditions.

Antibacterial Therapy

Antibiotics are indicated only in bacterial respiratory infections.

Commonly used antibiotics include penicillins, cephalosporins, and macrolides.

Empirical therapy should be guided by local resistance patterns.

Overuse of antibiotics contributes to antimicrobial resistance and should be avoided.

Mucolytics and Expectorants

Mucolytic agents help reduce sputum viscosity and improve airway clearance. They are commonly used in bronchitis and chronic suppurative lung diseases. Adequate hydration remains a key supportive measure.

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Supportive and Adjunctive Therapy

Supportive care includes:

Oxygen therapy

Antipyretics

Adequate nutrition and hydration

Physiotherapy

These measures enhance the effectiveness of pharmacological treatment and promote recovery.

Safety and Adverse Effects

Children are more susceptible to drug-related adverse effects. Common concerns include:

Growth suppression with prolonged corticosteroid use

Cardiac effects of bronchodilators

Gastrointestinal disturbances from antibiotics

Regular monitoring and dose adjustments are essential to ensure safety.

Conclusion

Pharmacotherapy plays a vital role in the management of acute and chronic respiratory diseases in children. A comprehensive, individualized approach that considers disease severity, patient age, and safety is crucial for achieving optimal therapeutic outcomes. Rational use of medications, combined with supportive care and preventive strategies, can significantly reduce morbidity and improve the quality of life in pediatric patients. Continuous updates in clinical guidelines and further research are essential to refine pharmacotherapeutic approaches in pediatric respiratory medicine.

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