Journal of Medical Genetics and Clinical Biology
Homepage : https://journal.silkroad-science.com/index.php/JMGCB
Email : admin@antispublisher.com

e-ISSN : 3032-1085
JMGCB, Vol. 1, No. 11, November 2024
Page 50-55

Modern Use of Drugs in Bronchopulmonary Pathology

Rihsi Abdumavljanovna Azizova[1], Tamila Abdulazizovna Valieva[2]
[1,2]Department of Family Medicine 2 Clinical Pharmacology, Tashkent Pediatric Medical Institute

DOI : 10.61796/jmgcb.v1i11.1042

Sections Info

Article history:
Submitted: November 10, 2024
Final Revised: November 10, 2024
Accepted: November 11, 2024
Published: November 11, 2024

Keywords:
Bronchitis
Disease
Recurrence
Treatment
Children

ABSTRACT

Objective: *This study aims to evaluate the rational pharmacotherapy for bronchopulmonary diseases in children with recurrent bronchitis, focusing on treatment effectiveness and safety.* ***Methods:*** *A retrospective analysis of 28 children aged 1.5 to 10 years, diagnosed with acute bronchitis, recurrent bronchitis, and pneumonia, was conducted. The patients were treated at a pulmonology department and underwent clinical, laboratory, and radiological assessments. Treatment regimens included third-generation cephalosporins, glucocorticoids, and antihistamines, administered according to age-based standards.* ***Results:*** *The study revealed that all patients exhibited moderate symptoms upon admission, with many presenting coexisting conditions such as chronic ENT diseases and iron-deficiency anemia. Clinical laboratory tests indicated iron deficiency anemia and mild leukocytosis across all groups, suggesting impaired oxygen delivery and ongoing inflammation. The pharmacotherapy was generally well-tolerated, with notable improvements in respiratory function and recovery in most children.* ***Novelty:*** *This study highlights the importance of personalized pharmacotherapy in managing recurrent bronchitis in children, particularly considering comorbid conditions. It emphasizes the role of comprehensive treatment protocols integrating antibiotics, glucocorticoids, and antihistamines for effective management.*

INTRODUCTION

Worldwide, more than 100 million cases of bronchopulmonary diseases are recorded among people of different ages, affecting not only adults but also children. Respiratory diseases currently account for over 50% of all illnesses among both children and adults. According to statistical data, there is a significant rise in bronchopulmonary diseases among preschool and school-aged children. The World Health Organization (WHO) defines the rational use of medicines as ensuring that patients receive medications appropriate to their clinical needs, in the right doses according to their individual requirements. [1], [2], [3], [4], [5].

One of the significant issues is the frequent occurrence of bronchopulmonary diseases, which often leads to the chronic progression of these conditions, thus acquiring medical and social relevance. Recurrent bronchitis in children has a higher prevalence in the structure of bronchopulmonary diseases compared to adults. Due to the anatomical and physiological characteristics of the respiratory tract in children, acute viral bronchitis predominantly affects those in early childhood and preschool years, and less frequently school-aged children, especially in cases with predisposing factors and specific immune system conditions. Recurrent bronchitis is characterized by multiple episodes of acute bronchitis throughout the year, often in the context of acute respiratory infections. The

criteria for diagnosing acute disease correspond to the clinical and radiological signs of acute bronchitis—fever, dry cough (sometimes productive), and diffuse dry and mixed moist rales in the lungs. Radiologically, changes include an altered lung pattern without infiltrative or focal changes. According to various authors, recurrent bronchitis can occur in any age group, including adolescents and adults, though it is most common in children under six years old [6] , [2], [7], [8]. Some studies also suggest that boys are more frequently affected than girls [1], [2], [9].

In the etiology of bronchitis, various aggressive physical and chemical actions of aspirates play a role, as well as gram-positive flora from the oropharynx and gram-negative intestinal flora. However, respiratory viruses (e.g., influenza viruses, parainfluenza types 1 and 3, adenoviruses, and respiratory syncytial virus), along with chlamydial, mycoplasma, and occasionally bacterial pathogens such as pneumococcus and Haemophilus influenzae, are considered major contributors to recurrent bronchitis [3,5,16]. Additionally, numerous studies on young children have highlighted that adverse environmental factors—such as pollution (both outdoor and indoor air quality), inadequate living conditions, and more—can promote the development of recurrent bronchitis [2], [10], [6], [11].

These pathological changes are known to be accompanied by fever, driven by infection and intoxication of the body. Consequently, alongside antibacterial drugs, other medications are widely used in practical medicine for both adults and children. Recurrent bronchitis in children has a higher prevalence in the structure of bronchopulmonary pathology than in adults. Among infants and young children, chronic food aspiration can lead to a specific type of bronchitis known as aspiration bronchitis, while acute viral bronchitis is mainly seen in early childhood and preschool years, with lower frequency in school-aged children. According to various studies [4], [12], [8], [13], recurrent bronchitis can occur across all age groups, including adolescents and adults; however, it is most commonly observed in children under six. Some publications also indicate that boys tend to be more frequently affected than girls [1], [2], [14].

This research objective is study aims to assess rational pharmacotherapy for bronchopulmonary diseases in children with recurrent bronchitis, evaluating the effectiveness and ensuring the safety of the treatment administered.

RESEARCH METHOD

The study examined the medical records of 28 children aged 1.5 to 10 years who were treated in a pulmonology department with a diagnosis of recurrent bronchitis. Diagnoses included acute bronchitis (10 children), recurrent bronchitis (9 children, who experienced bronchitis episodes 3-4 times per year), and pneumonia (9 children) [15]. Upon examination, all patients presented with a moderate overall condition due to endogenous intoxication. The study grouped patients as follows: 10 children with acute bronchitis in the first group, 9 children with recurrent bronchitis in the second group, and 9 children with pneumonia in the third group. All children showed moderate symptoms

at admission, with accompanying conditions such as chronic ENT diseases (tonsillitis, chronic otitis, chronic sinusitis), acute rhinopharyngitis, allergic rhinitis, vegetative-vascular dystonia, and iron deficiency anemia of grade 1–2. In the first group (acute bronchitis), 10 children included 7 children (70%) aged 1.5 to 5 years, and 3 children aged 6 to 12 years. In the second group (recurrent bronchitis), there were 9 children, with 5 (66%) aged 2 to 5 years and the remaining 4 (34%) up to 12 years. The third group (pneumonia) included 9 patients, of whom 6 (67%) were under 5 years, and the remaining 3 (33%) were up to 12 years. All three groups received appropriate therapy according to age-based treatment standards.

Among children with acute bronchitis, 55% had coexisting ENT (ear, nose, and throat) conditions: 15% had acute rhinopharyngitis and purulent rhinosinusitis, while 12% showed signs of gingivitis and stomatitis. Additionally, 37% of these children had iron-deficiency anemia. In the group with recurrent bronchitis, 60% had associated ENT diseases, including catarrhal rhinopharyngitis (12%), catarrhal rhinitis (33%), allergic rhinitis (22%), chronic tonsillitis (10%), and iron-deficiency anemia (40%). In the pneumonia group, 50% presented with acute rhinitis, 17% had purulent rhinosinusitis and stomatitis, and 35% were affected by iron-deficiency anemia.

All patients underwent clinical, laboratory, biochemical, and instrumental assessments, including fluoroscopy or radiography, which confirmed bronchitis and pneumonia. The patients were also examined by specialists, including an ENT physician, surgeon, and cardiologist.

Since all admitted patients had accompanying conditions—particularly tonsillitis, purulent rhinitis, and rhinosinusitis—each group was prescribed at least 5-6 medications in line with treatment standards, considering the etiology and pathogenesis of their conditions. The primary route of drug administration was parenteral (70-80%) [16]. Pharmacotherapy included standard treatments for the primary condition, such as third-generation cephalosporin antibiotics, with 70% receiving ceftriaxone and 30% cefazolin, administered intravenously, targeting microbial pathogens in the nasopharynx and lungs [17], [18]. Additionally, glucocorticoids (dexamethasone) and antihistamines (diphenhydramine solution or suprastin) were added to the treatment regimen in 50% of the patients. For fever reduction, a lytic mixture was used in the first two days as needed. All patients underwent statistical analysis of their clinical and laboratory data.

RESULTS AND DISCUSSION

Medical history revealed that all patients received treatment in their local area prior to hospitalization, which included antipyretics, antispasmodics, antibiotics, and expectorants. One of the common laboratory methods used was a general clinical blood test. The analysis of clinical laboratory studies indicated that all three patient groups showed reduced hemoglobin levels—an essential respiratory marker—by 20-21%, and a reduction in red blood cell count by 12-13% compared to normal values. These findings collectively suggest iron deficiency anemia in these groups and indicate impaired oxygen

delivery by red blood cells. A slight increase in leukocyte count (moderate leukocytosis) was also observed, reflecting inflammatory changes in the body, while ESR (erythrocyte sedimentation rate) and lymphocyte counts remained within moderate normal limits.

Table 1. Clinical And Laboratory Blood Tests of Patients Before Treatment.

No	Conducted Tests	Group 1: Acute Bronchitis	Group 2: Recurrent Bronchitis	Group 3: Pneumonia
1	Hemoglobin (M+m)	111.8 ± 3.6 (130-160 g/L)	112.9 ± 3.5	109.9 ± 3.5
2	Erythrocytes (M+m)	3.58 ± 0.02 (M: 4.0-5.0 × 10^{12}/L, F: 3.9-4.7 × 10^{12}/L)	3.5 ± 0.34	3.6 ± 0.57
3	Leukocytes (M+m)	7.54 ± 1.62 (4-10.3 × 10^{9}/L)	7.83 ± 0.03	7.81 ± 0.035
4	Segmented Neutrophils (M+m)	48.5 ± 0.01 (17-72%)	48.2 ± 2.5	47.6 ± 2.4
5	Lymphocytes (LYM%)	45.5 ± 1.02 (18-40%)	47.3 ± 0.001	46.5 ± 0.001
6	ESR	6.8 ± 0.02 (2-10 mm/h)	6.5 ± 0.01	6.7 ± 0.04

Specific changes in enzymatic reactions can identify the cause or effect of various pathological conditions. To assess disruptions in enzymatic functions, levels of ALT (alanine aminotransferase) and AST (aspartate aminotransferase) were measured. An increase in these enzymes indicates impaired cell membrane permeability in blood serum. Additionally, protein-based bilirubin pigments were analyzed, as bilirubin exists in both free and bound states in the human body. Mainly produced in the reticuloendothelial system and the liver, bilirubin is poorly water-soluble and toxic. Upon entering the liver, it is detoxified in hepatocytes by binding to glucuronic acid, which makes it water-soluble and allows it to be excreted with bile into the gallbladder and then into the duodenum. Bilirubin binding to phospholipids may be observed in blood serum during bile duct dyskinesia or obstruction. Biochemical blood tests in patients with bronchopulmonary pathology and coexisting conditions across the three groups showed no abnormalities in biochemical indicators.

CONCLUSION

Fundamental Finding : The analysis of pharmacotherapy for bronchopulmonary pathology in children revealed that third-generation antibacterial agents, alongside glucocorticoids like dexamethasone, antibiotics, and antihistamines, are effective in promoting rapid recovery. These medications, when administered following established therapeutic protocols, support the normalization of respiratory functions and overall health restoration. **Implication :** This study highlights the importance of carefully

selecting treatment regimens for children with bronchopulmonary diseases, ensuring a combination of appropriate antibiotics, glucocorticoids, and antihistamines. Furthermore, it emphasizes the need to consider individual medical histories, particularly epilepsy, as medications like diphenhydramine could exacerbate seizures or lead to CNS depression, complicating treatment outcomes. **Limitation :**The study's limitations include the lack of a larger sample size and the absence of a control group to compare the effects of different therapeutic approaches. Additionally, the potential variability in individual responses to the medications was not fully explored, limiting the generalizability of the findings. **Future Research :** Future research should focus on expanding the sample size to validate the effectiveness and safety of the proposed pharmacotherapy. Additionally, studies that explore the specific mechanisms of how diphenhydramine and other antihistamines interact with pre-existing conditions, such as epilepsy, could help refine treatment protocols and minimize adverse effects in children with complex medical histories.

REFERENCES

[1] R. A. Azizova, M. I. Mukhitdinova, and A. O. Abdullaev, "Effective and Safe Pharmacotherapy for Bronchopulmonary Diseases in Children," *Education and Science in the 21st Century*, vol. 5, no. 25, pp. 1587, Apr. 2022.

[2] World Health Organization, "Rational Use of Medicines," 62nd World Health Assembly, Geneva, 2009, Resolution WHA60/16, WHO Technical Report Series no. 950.

[3] M. G. Romantsov and F. I. Ershov, *Frequently Ill Children: Modern Pharmacotherapy – A Guide for Physicians*, Moscow: GEOTAR-Media, 2006.

[4] A. G. Chuchalin et al., "Pulmonology," no. 3, pp. 15, 2014.

[5] E. Eber and F. Midulla, Eds., *ERS Handbook of Paediatric Respiratory Medicine*, 2013. DOI: 10.1183/9781849840392-hbp01, ISBN (electronic): 978-1-84984-039-2.

[6] V. K. Tatochenko, *Diseases of the Respiratory Organs (Practical Guide)*, Moscow: Pediatr, 2012.

[7] P. Di Filippo, A. Scaparrotta, M. I. Petrosino et al., "An Underestimated Cause of Chronic Cough: The Protracted Bacterial Bronchitis," *Ann Thorac Med.*, vol. 13, no. 1, pp. 7-13, 2018. DOI: 10.4103/atm.ATM_12_17.

[8] B. R. Celli and W. E. MacNee, "Hoog J.C.," *Lancet*, vol. 364, p. 709, 2004.

[9] I. B. Mikhailov, *Clinical Pharmacology*, 2nd ed., St. Petersburg: Folio, 2000.

[10] A. Z. Musina, N. A. Seitmagambetova, and L. M. Zhamalieva, "Indicators for Evaluating the Rationality of Drug Therapy," *Science and Health*, no. 2, pp. 29-46, 2016.

[11] A. G. Chuchalin et al., "Modern Classification of Clinical Forms of Bronchopulmonary Diseases in Children," *Pediatrics: Journal of G. N. Speransky*, no. 4, 2010.

[12] A. B. Chang, J. W. Upham, I. B. Masters et al., "Protracted Bacterial Bronchitis: The Last Decade and the Road Ahead," *Pediatric Pulmonology*, vol. 51, no. 3, pp. 225-242, 2016. DOI: 10.1002/ppul.23351.

[13] N. T. T. Nhung, C. Schindler, T. M. Dien, N. Probst-Hensch, L. Perez, and N. Künzli, "Acute Effects of Ambient Air Pollution on Lower Respiratory Infections in Hanoi Children: An Eight-Year Time Series Study," *Environmental International*, vol. 110, pp. 139-148, 2018.

[14] S. I. Ovcharenko and V. I. Leshchenko, *Chronic Obstructive Pulmonary Disease: A Guide for Practitioners*, edited by A. G. Chuchalin, Moscow, 2016, p. 129.

[15] A. B. Chang, C. F. Robertson, P. P. Van Asperen et al., "A Multicenter Study on Chronic Cough in Children: Burden and Etiologies Based on a Standardized Management Pathway," *Chest*, vol. 142, no. 4, pp. 943-950, 2012. DOI: 10.1378/chest.11-2725.

[16] M. I. Mukhitdinova, R. A. Azizova, and B. A. Karabekova, "Problems of Rational Drug Use," *Biomedicine and Practice*, no. 3, 2021. DOI: 10.26739/2181-9300.

[17] S. S. Postnikov, "Pediatric Aspects of Clinical Pharmacology," *Medical Practice*, no. 3, pp. 4-13, 2012.

[18] R. A. Azizova, M. I. Mukhitdinova, B. A. Karabekova, and K. Sh. Shoabidova, "Rational Pharmacotherapy in Children with Bronchitis," *Chin J Ind Hyg Occup Dis*, vol. 39, no. 13, pp. 313-318, 2021.

* **Rihsi Abdumavljanovna Azizova (Corresponding Author)**
Department of Family Medicine 2 Clinical Pharmacology, Tashkent Pediatric Medical Institute

Tamila Abdulazizovna Valieva
Department of Family Medicine 2 Clinical Pharmacology, Tashkent Pediatric Medical Institute