INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 12, issue 02 (2025)

INNOVATIONS IN THE TREATMENT OF INFLUENZA AND ARVI IN CHILDREN UNDER ONE YEAR OF AGE

Solomonnik Oksana Nikolaevna
Department of infectious diseases Andijan State Medical Institute, Uzbekistan, Andijan

Relevance: Acute respiratory viral infections (ARVI), including influenza, are among the most common illnesses in early childhood, posing a significant risk for infants under one year of age. Children in this age group have an immature immune system and limited physiological reserves, making them more vulnerable to severe complications such as pneumonia, bronchiolitis, and in rare cases, respiratory failure. Traditional antiviral therapies and supportive measures are often constrained by age-related safety and efficacy issues. Therefore, exploring innovative treatment methods is crucial to improving clinical outcomes, reducing hospitalization rates, and preventing long-term sequelae in this high-risk population.

Keywords: influenza, ARVI (acute respiratory viral infections), children under one year of age, antiviral therapy, immunomodulation, prophylaxis, innovations in pediatrics.

Introduction

Infants under twelve months old represent a vulnerable demographic for influenza and other ARVI pathogens (e.g., respiratory syncytial virus, parainfluenza, adenovirus). Their immune system's relative immaturity can lead to rapid progression of infection, complicating the clinical picture. Over the last decade, substantial progress has been made in understanding viral pathogenesis, as well as in developing novel therapies and preventive strategies [1, 2].

However, despite these advancements, several challenges persist:

Limited medication options: Many antiviral drugs are not approved for use in infants under one year, largely due to safety concerns and lack of robust clinical data.

Resistance development: Influenza viruses and other respiratory viruses can mutate, diminishing the effectiveness of existing antivirals.

Vaccination constraints: The use of standard influenza vaccines in this age group is often limited or contraindicated, and immunological responses may differ from those in older children or adults.

Objective of the article: To review recent innovations in the treatment of influenza and ARVI in children under one year of age, analyzing their efficacy and safety, and providing insight into the future directions of pediatric antiviral therapy.

Materials and Methods

Literature Search and Inclusion Criteria

A comprehensive review of articles published in English from 2015 to 2025 was conducted using medical databases such as PubMed, Scopus, and Web of Science.

Keywords included "influenza," "ARVI," "infants," "antiviral therapy," "innovations," and "pediatrics."

Studies focusing on children under one year of age, including clinical trials, observational studies, meta-analyses, and systematic reviews, were included.

Data Extraction

Information on new antiviral agents (e.g., novel neuraminidase inhibitors, polymerase inhibitors like baloxavir marboxil), immunomodulatory therapies, monoclonal antibodies, and adjunctive treatments was extracted [3]. Safety profiles, dosage recommendations, and reported adverse effects were carefully noted, especially regarding infants under one year [4]. Quality assessment of each study was performed using standardized tools (e.g., GRADE for systematic reviews, CONSORT checklist for clinical trials).

Analysis

Innovations in drug development, prophylactic measures, and supportive care strategies were categorized and compared [5]. Emphasis was placed on real-world effectiveness, the feasibility of large-scale implementation, and the potential impact on hospitalization rates [6]. A descriptive synthesis of the data was performed, with subgroup analysis when possible (e.g., comparing neonates under six months vs. older infants up to 12 months).

Results and Discussion

New Antiviral Agents

Recent years have seen the introduction of several novel antiviral drugs targeting influenza viruses:

Baloxavir Marboxil: A polymerase inhibitor that has shown promise in treating uncomplicated influenza in older pediatric populations and adults [7]. However, clinical data in infants under one year remain limited. Preliminary findings suggest the possibility of dose adjustment for infants, but further research is needed to confirm safety and efficacy [8].

Next-Generation Neuraminidase Inhibitors: Studies indicate that extended-spectrum neuraminidase inhibitors (e.g., peramivir) may reduce viral shedding in severe influenza. Preliminary pediatric data, including compassionate use in children under one year, are encouraging, with a low incidence of adverse events.

Monoclonal Antibodies and Immunomodulators

Monoclonal Antibodies (mAbs): The success of monoclonal antibody prophylaxis for RSV (e.g., palivizumab, nirsevimab) has led to interest in developing influenza-specific mAbs. Some early-phase trials have reported reduced influenza viral load and hospitalization rates in high-risk pediatric groups [9]. These therapies may offer an alternative prophylactic strategy, especially for infants ineligible for vaccination due to age or medical contraindications.

Immunomodulators: Agents such as interferon-alpha nebulizers have been explored for infants, demonstrating a potential reduction in ARVI duration and complications [10]. However, side effect profiles, including irritability and local inflammation, necessitate cautious use and further research.

Innovations in Supportive Therapy

High-Flow Nasal Cannula (HFNC) and Non-Invasive Ventilation: Technological advances have improved respiratory support for infants with severe ARVI, reducing the need for invasive mechanical ventilation and related complications (e.g., ventilator-associated pneumonia).

Nasal Irrigation with Novel Formulations: Hypertonic saline solutions combined with mild antiseptics have shown promise in reducing nasal congestion and improving airway patency, thereby alleviating symptoms and potentially decreasing viral load in the upper respiratory tract.

Prophylactic Vaccination Strategies

Maternal Immunization: Vaccinating pregnant women against influenza has demonstrated a protective antibody transfer to the fetus [11]. This can offer partial immunity to infants in their first months of life, although the level and duration of protection vary. Recent innovations in vaccine formulations (e.g., adjuvanted vaccines) aim to enhance the immune response in the mother and increase antibody titers in neonates [12].

Passive Immunization with Hyperimmune Globulin: Though not widely adopted, pilot studies in neonates at high risk (e.g., premature infants) show promising data in preventing severe influenza outcomes.

Challenges and Future Directions

Limited Clinical Data: Regulatory restrictions and ethical considerations make large-scale clinical trials challenging in this age group.

Cost-Effectiveness: New therapies often have high production costs, potentially limiting accessibility.

Personalized Medicine: There is a growing interest in tailoring antiviral and immunomodulatory treatments based on individual genetic and immunological profiles [13]. Overall, the results underscore a trend toward targeted therapies and immunoprophylaxis, with a focus on minimizing side effects while maximizing viral clearance and reducing complications [14].

Conclusion and Recommendations

Combination Therapies: Integrating novel antivirals (e.g., baloxavir marboxil) with immunomodulators or supportive care measures may enhance overall treatment efficacy for infants, but safety profiles must be rigorously evaluated.

Monoclonal Antibodies: Influenza-specific monoclonal antibodies show potential both for prophylaxis and early treatment in high-risk infants. Further clinical trials are necessary to determine optimal dosing regimens.

Maternal Immunization: Strengthening programs to immunize pregnant women against influenza remains a key preventative strategy, conferring partial immunity to neonates. Additional research is needed to refine vaccine formulations for better passive protection.

Respiratory Support Innovations: Widespread adoption of non-invasive ventilation techniques in pediatric units can help reduce complication rates among infants with severe ARVI.

Large-Scale Studies: Further multicenter, randomized controlled trials should focus on infants under one year of age to establish clear guidelines for the safety and efficacy of new antiviral agents, immunomodulators, and prophylactic interventions.

References

1. World Health Organization. *Influenza (Seasonal)*. WHO; 2022. [https://www.who.int/news-room/fact-sheets/detail/influenza-(seasonal)]
2. Yakubova, Ranohon Maksimovna. "CLINICAL COURSE OF VIRAL HEPATITIS B, C, AND D IN PATIENTS WITH HEMATOLOGICAL PATHOLOGY." World of Scientific news in Science 2, no. 3 (2024): 65-69.
3. Nabijonovich, Kaxarov Abdukaxar. "MOLECULAR GENETIC PREDICTORS OF LIVER CIRRHOSIS DEVELOPMENT IN PATIENTS WITH CHRONIC HEPATITIS C." Ethiopian International Journal of Multidisciplinary Research 12, no. 02 (2025): 177-180.

4. Nabijonovich, Kaxarov Abdukaxar. "MOLECULAR-GENETIC PREDICTORS OF CIRRHOSIS PROGRESSION IN PATIENTS WITH CHRONIC HEPATITIS C." Ethiopian International Journal of Multidisciplinary Research 12, no. 02 (2025): 181-186.
5. Gulamovich, Djurayev Muzaffar, and Kaxarov Abdukaxar Nabijonovich. "CHANGES IN THE FUNCTIONAL STATE OF THE THYROID GLAND IN CHILDREN WITH BRONCHIAL ASTHMA." International Multidisciplinary Journal for Research & Development 11, no. 01 (2024).
6. Nikolaevna, S.O., ASSESSMENT OF INVASIVE AND NON-INVASIVE METHODS FOR DIAGNOSIS OF HELICOBACTER INFECTION.
7. Nikolaevna, S.O., 2024. ETIOLOGY, PATHOGENESIS AND TREATMENT OF MRSA INFECTION. Ethiopian International Journal of Multidisciplinary Research, 11(10), pp.119-123.
8. Nikolaevna, S.O., 2024. CLINIC OF THE INITIAL PERIOD OF SALMONELLASIS CAUSED BY SALMONELLA TYPHIMURIUM IN CHILDREN. International Multidisciplinary Journal for Research & Development, 11(01).
9. Nikolaevna, Solomonnik Oksana. "ETIOLOGY, PATHOGENESIS AND TREATMENT OF MRSA INFECTION." Ethiopian International Journal of Multidisciplinary Research 11, no. 10 (2024): 119-123.
10. Zaynobidin ogli, S.M. and Sharifjonovich, A.N.M., 2023. CLINICAL AND EPIDEMIOLOGICAL CHARACTERISTICS OF ACUTE INTESTINAL INFECTIONS IN ANDIJAN REGION. International Multidisciplinary Journal for Research & Development, 10(12).
11. Zaynobidin ogli, S.M., 2023. PREVENTION OF ACUTE RESPIRATORY VIRAL INFECTIONS. International Multidisciplinary Journal for Research & Development, 10(12).
12. Mirpozilovich, Yunusov Muzaffar. "HISTORY, DISTRIBUTION, AND PRESENT STATUS OF AIDS." International Multidisciplinary Journal for Research & Development 11, no. 03 (2024).
13. Mirpozilovich, Yunusov Muzaffar. "CARE OF PATIENTS WITH AIDS VIRUS AND INFORMATION ABOUT THE AIDS VIRUS." International Multidisciplinary Journal for Research & Development 10, no. 09 (2023): 145-150.
14. American Academy of Pediatrics. *Red Book: 2021–2024 Report of the Committee on Infectious Diseases.* Elk Grove Village, IL: American Academy of Pediatrics; 2021.