VIRAL PATHOGENS ASSOCIATED WITH ACUTE LOWER RESPIRATORY TRACT INFECTIONS IN CHILDREN YOUNGER THAN 5 YEARS OF AGE IN BULGARIA

Ivelina Trifonova¹, Neli Korsun¹, Svetla Angelova¹, Irina Georgieva¹, Iren Tzocheva², Sirma Mileva², Silvia Voleva¹, Atanas Mangarov³, Penka Perenovska²

¹ National Laboratory “Influenza and ARD”, National Centre of Infectious and Parasitic Diseases, Sofia, Bulgaria

² Paediatric clinic, University Hospital Alexandrovska, Medical University, Sofia, Bulgaria

³ Infectious Hospital Prof. Ivan Kirov, Sofia, Bulgaria

Introduction

Influenza A/B viruses, respiratory-syncytial virus (RSV), human metapneumovirus (HMPV), parainfluenza viruses (PIV, type 1/2/3), rhinoviruses (RV), adenoviruses (AdV), bocaviruses (BoV) are involved in the development of acute lower respiratory infections (ALRI) in young children.

This study aimed to determine the viral aetiology of ALRI infections in children younger than 5 years of age during three successive epidemic seasons in Bulgaria (2015/2016, 2016/2017 and 2017/2018).

Methods

- The study population consisted of 515 children aged <5 years suffering from ALRI: 112, 191 and 193 in the first, second and third seasons, respectively, and 19 outside the season in 2017. Children were either outpatients, or hospitalized for acute lower respiratory tract infections (ALRI) in different regions of the country.
- The age of the patients varied from 30 days to 60 months (average $21,53 \pm 12,54$ months).
- All study patients express complications like bronchiolitis, bronchitis or pneumonia.
- Viral aetiology was determined by Singleplex Real Time PCR against 11 respiratory viruses.

Results

Of the 515 children examined, 402 (78.1%) were positive for at least one virus. Co-infections with two and three viruses were found in 64 (15.9%) of the infected children. Respiratory-syncytial virus (RSV) was the predominant pathogen (37.5%), followed by rhinoviruses (13.8%), metapneumovirus (9.1%), adenoviruses (7%), bocaviruses (7%), influenza A(H1N1)pdm09 (4.9%), A(H3N2) (4.3%), type B (4.1%) and parainfluenza viruses 1/2/3 (2.9%). RSV-B were more prevalent than RSV-A during the three seasons. At least one respiratory virus was identified in 82.6% and 70.1% of the children with bronchiolitis and pneumonia, respectively.

Figure 3: Proportions of single infections and co-infections

Figure 4: Respiratory viruses detected in patients with different clinical diagnoses

Figure 1: Age distribution of children with detected respiratory viruses. Positive cases represent the sum of single infections and co-infections for each virus

Figure 2: Monthly distribution of respiratory virus detection among children with ALRI

Learning Points

Respiratory viruses, especially RSV, are principal pathogens of ALRI in children <5 years of age. Diagnostic testing for viral respiratory pathogens is important for initiating of antiviral treatment, avoiding unnecessary antibiotic use, preventing the health-care associated infections. Our results highlight the importance of enhanced surveillance of respiratory viruses and indicate the urgently need for develop effective prevention strategies and new drug treatments.