

## Adenovirus infection in children with bronchiolitis or recurrent wheezing

Adenovirus (AdV) and other viruses as Respiratory Syncytial Virus (RSV), Meta-pneumovirus (MPV), Rhinovirus (RV) and Para-influenza Virus (PIV) have been detected in the respiratory tract of children with acute bronchiolitis and recurrent wheezing. Adenovirus (AdV) is an important pathogen concerning respiratory tract infection due to the possibility of respiratory tract sequels and evolution to death. Of the seven AdV species (species A to G), AdV species A, B, C and E have been associated to respiratory tract infection with the AdV specie B type 7 being considered the one with the worst prognosis. In Brazil AdV infection occurs year-round, affecting predominantly children.

In our study children, up to 48 months of age, with acute bronchiolitis or recurrent wheezing, were investigated for the presence of AdV, RSV, MPV and PIV, in the nasopharyngeal aspirate (NPA), detected in association (more than one virus, AdVa) or in the isolated form (AdVi, RSVi, MPVi, PIVi).

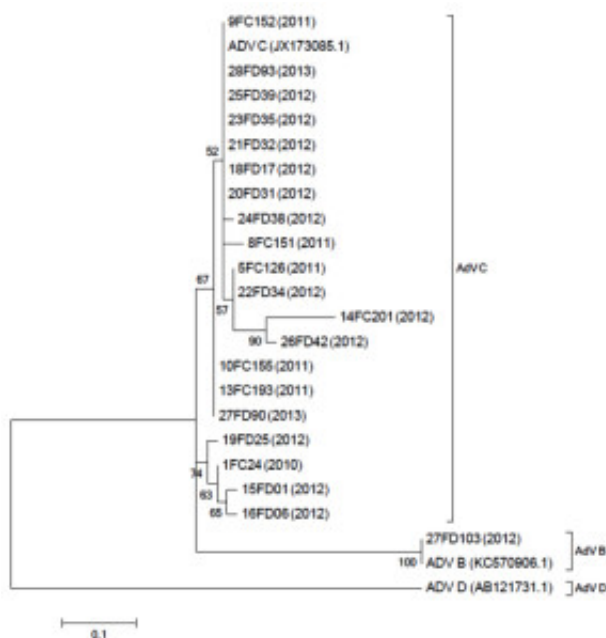


Fig. 1. Phylogenetic tree based on ML algorithm of human AdV sequences (N=21) represented with the year of detection. AdV species C, B and D (outgroup) retrieved from the NCBI databank were included in the analysis to establish a phylogenetic relationship with AdV sequences from the study

Of the 155 children, investigated for the presence of AdV, RSV, MPV and PIV, 94 (60.6%) showed positivity. AdV was detected in 10/155 (6.4%) samples as the unique pathogen (AdVi) and in 29/155 (18.7%) associated with the other viruses (AdVa). RSV (25/29) was the most frequent virus associated with AdV, followed by MPV (16/29) and PIV (1/29). AdV and RSV were detected throughout the studied period (from 2010 to 2013) with RSV being the most frequent viral pathogen detected in the study. We observed a small outbreak of AdV species C, in 2012 and 2013, no detection of MPV in 2010 and detection of PIV only in 2012.

Concerning clinical diagnosis and age groups, acute bronchiolitis was detected predominantly in children of 6 months of age or younger ( $\leq 6m$ ) and recurrent wheezing, in children older than 6 months ( $>6m$ ) ( $p$  less than 0.0001). Acute bronchiolitis was diagnosed in 53/94 (56.4%) children and recurrent wheezing in 41/94 (43.6%) children. In relation to virus etiology, AdVa (17/29) and AdVi (7/10) were more frequently detected in children with recurrent wheezing while RSVi was more frequently detected in children with acute bronchiolitis (33/46). We observed a high correlation between age and clinical diagnosis of bronchiolitis and recurrent wheezing (pearson 0.870;  $p$  less than 0.00010) but no interaction effect in relation to the presence or absence of a particular virus.

Of the 39 AdV-positive samples, 21 were successfully sequenced. The phylogenetic analysis indicated that 20 were species C AdV and one was species B AdV (Fig. 1). The clustering of the samples in the phylogenetic tree was not related to the year of AdV detection or any specific clinical feature.

Concerning disease severity, we observed no statistical significance in the number of patients with co-infection (AdVa) and mono-infection (AdVi,RSVi,MPVi).

Although we detected AdVi and AdVa more frequently in children with recurrent wheezing (17/29 and 7/10, respectively), to our knowledge, there are no studies demonstrating the role of AdV in the pathogenesis of recurrent wheezing, as has been suggested in asthma and in experiments in guinea pig, that showed an increase in lung inflammatory response, due to AdV .

As our study used a convenience sample, in a specific Hospital, its results cannot be extrapolated to the general population.

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## Publication

[Adenovirus species C detection in children under four years of age with acute bronchiolitis or recurrent wheezing.](#)

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