

Epidemiology of Respiratory Viruses in a Pediatric Department with Real-time PCR

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Background:

Respiratory Tract Infections (RTI) are the most common disease in children. They range from short, auto-limited infections to severe disease requiring admission, with great economic and social impact. The majority of RTI are caused by viruses with overlapping clinical manifestations. Knowledge of the etiology of RTI may help to create a better understanding of the natural history of each virus, and eventually improve diagnosis and treatment. Real-time (RT) multiplex PCR is a highly accurate molecular test useful for identification of respiratory viruses.

Methods:

Prospective observational study, from December 2016 to May 2017 of patients admitted in a Pediatric inpatient service (< 18 years) with respiratory symptoms. Demographic data, clinical symptoms and signs were collected. RT-PCR was performed on aspirated nasopharyngeal swabs for the following viruses: respiratory syncytial virus (RSV) A and B, adenovirus, influenza A H₁N₁, H₁N₁pdm09, H₃N₂ and B, parainfluenza 1, 2, 3 and 4, rhinovirus, human bocavirus, metapneumovirus, enterovirus and coronavirus OC43, 229E and NL63.

Methods (cont.):

The commercial tests used were Allplex™ Respiratory Panel Assays 1, 2 and 3 - Seegene® (specificity 100%; sensitivity 8 copies/uL except for metapneumovirus and parainfluenza 4 with 80 copies/uL).

Results and Discussion:

Eighty-three patients were included in this study, 50.6% (42) of which were boys. The distribution according to ages is shown in table 1, with one third of patients admitted between one and six months.

Table 1- Distribution of Pediatric inpatients per age group

Age group	n=83
Newborn	4
1-6M	33
7-12M	13
13-24M	11
2-4A	12
5-9A	5
≥10 A	5

At least one virus was isolated in 87.95% (73/83) of children (Table 2). In patients with negative RT-PCR, only two had less than 12 months. Seventy-one percent (52/73) had one virus identified, 21% (15/73) two and 8% (6/73) three or more viruses (Table 2).

Table 2- Number of viruses isolated in Pediatric inpatients

Viruses	n=83
0	10
1	52
2	15
≥ 3	6

Table 3- Distribution of viruses per age group in Pediatric inpatients

≤ 6 M (n=46)	Viruses	> 6M (n=56)
24	RSV	20
12	Rhinovirus	7
1	Adenovirus	9
1	Influenza	6
0	Parainfluenza	1
3	Metapneumovirus	3
2	Bocavirus	3
1	Enterovirus	6
2	Coronavirus	1

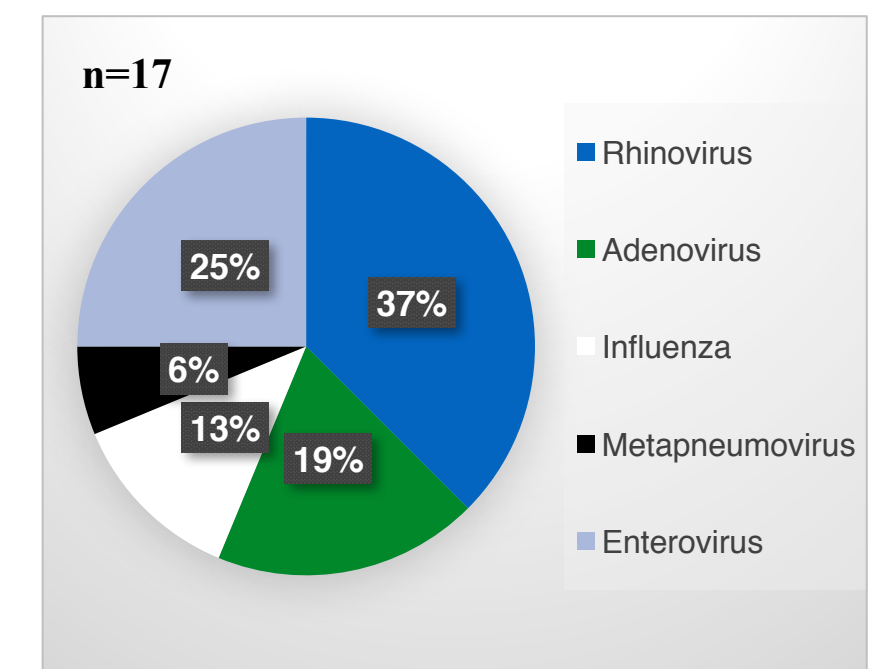
Results and Discussion (cont.):

One hundred and two viruses were isolated in 73 patients. The most common viruses isolated in children with less than six months were RSV (24/46) and rhinovirus (12/46). In older children, RSV (20/56) and adenovirus (9/56) were the most frequent (table 3).

Results and Discussion (cont.):

In RSV infections, 38.6% (17/44) were co-infections (Figure 1), which were more prevalent in older children (> 6 months). Three patients needed intensive care: one month old with RSV and enterovirus; newborn with RSV and one year old with Influenza A.

Figure 1 – RSV co-infections



Conclusions:

This RT-PCR technique allowed the identification of viruses in almost 90% of admitted patients with RTI. RSV was the most prevalent virus in both age groups. About one third of patients had co-infections. The RT-PCR technique is accurate and can help to understand the role of etiologic agents in RTI and to prevent nosocomial infection by cohort isolation of infected patients.