Frequent detection of human bocavirus in nasopharyngeal secretion of hospitalized children with lower respiratory tract infection

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Background: Human bocavirus (HBoV) is a member of the *Parvoviridae* family that has been associated with respiratory and gastrointestinal tract infection in children. The aim of this study was to determine its incidence among hospitalized children with lower respiratory tract infection (LRTI) according to the age and compare it with incidences of another common viral respiratory pathogens.

Material/methods: From November 1, 2016, through February 28, 2017, a total of 295 children less than three years of age who were admitted to hospitals with LRTI were tested for presence of HBoV, respiratory syncytial virus (RSV), adenovirus (ADV), parainfluenca virus (PIV) types 1 to 3, and human metapneumovirus (HMPV). There were 168 (57%) boys and 127(43%) girls. The inpatients' mean age was 9.7±9.5 months. According to age, the following groups were defined: 0–12 months (n=195), 13-24 months (n=57), and 25-36 months of age (n=43). Upon admission, nasopharyngeal secretions using flocked swabs were collected, and placed in viral transport medium. Human bocavirus was detected using real-time PCR method, and the rest of the viruses were diagnosed using monoclonal antibodies in direct fluorescence assay.

Results: Viral etiology was proved in 225/295 (76.3%) of patients. The most commonly diagnosed virus was RSV (175/295; 59.3%) followed by HBoV (68/295; 23.1%). Other tested viruses were detected in 8.8% of the patients (PIV-3 in 3.7%, ADV in 3.1%, HMPV in 1.4%, and PIV-2 in 0.7%). Mean age of RSV infected patients was 8.4±8.9 months, while mean age of HBoV infected patients was 14.0±10.7 months. The highest RSV detection rate of 67.2% was observed in group of patients 0-12 months of age, followed by 50.9% and 34.9% RSV detection rate observed in 13-24 and 25-36 months group of age, respectively ($P<0.05$).

Fig. 2. Cycle threshold values of positive samples with single and multiple virus detection

Contrarily, the highest HBoV detection rate of 37.2% was observed in the oldest group of patients (25-36 months of age), followed by 31.6% and 17.4% HBoV detection rate observed in 13-24 and 0-12 months group of age, respectively ($P<0.05$) (Figure 1).

Co-infection with two viruses was diagnosed in 11.2% of the patients, and concurrent detection of three or more viruses in 1.7% of the patients. Fifty-one percent of HBoV infections were combined with another respiratory virus detection.
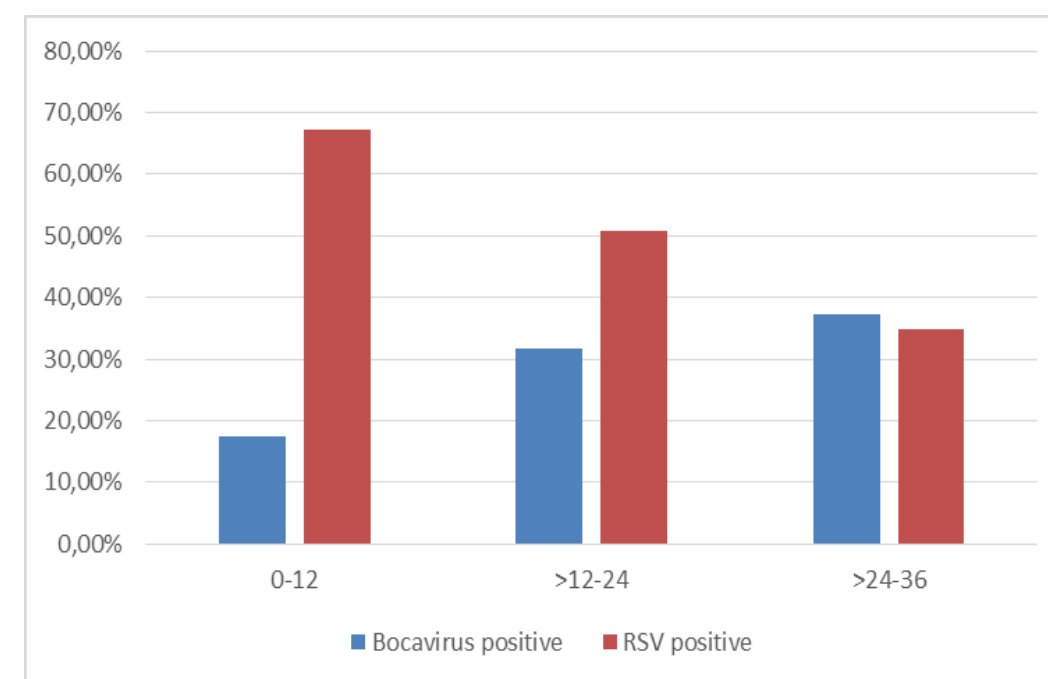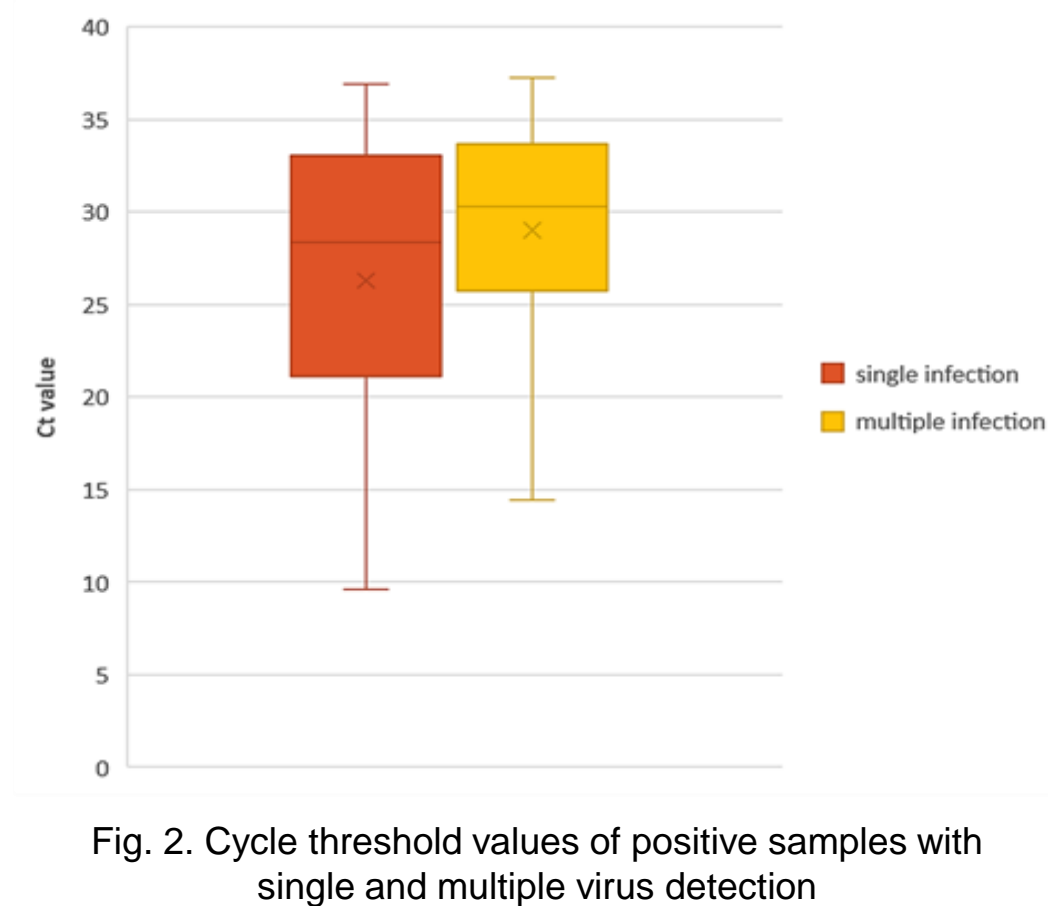

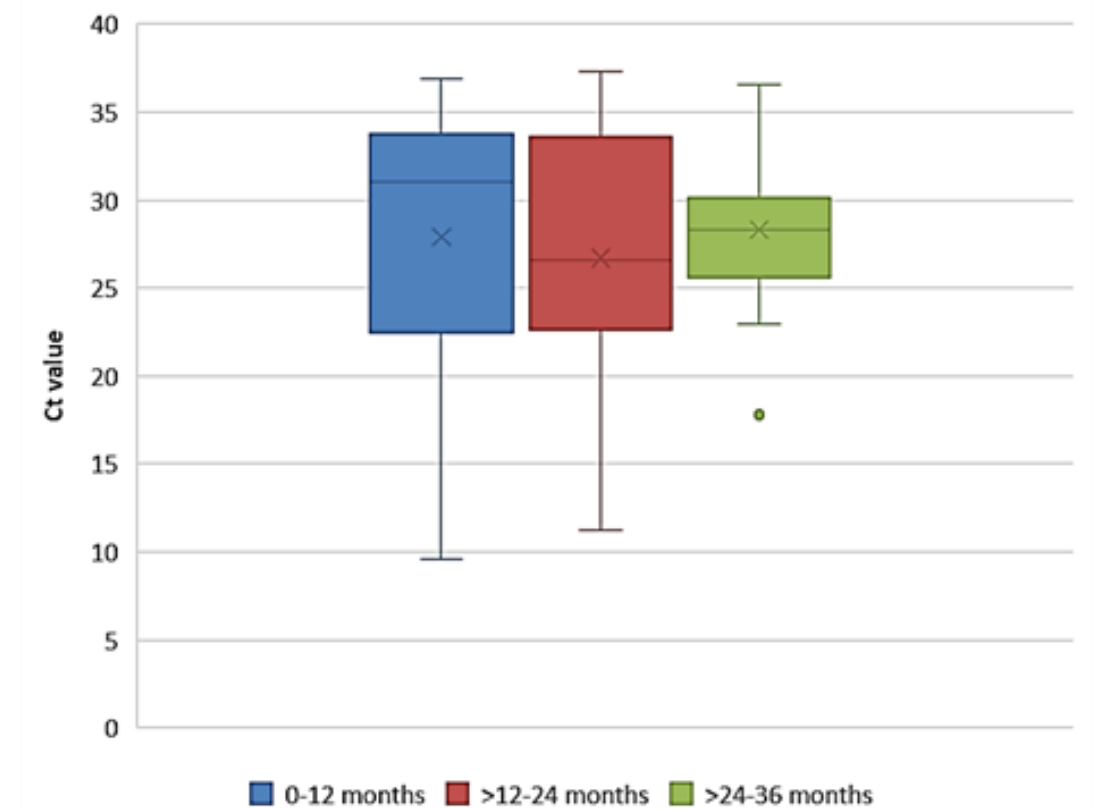Fig. 1. Frequency detection of bocavirus and respiratory siyncytial virus (RSV) according to age (months)

Fig.3. Cycle threshold values of positive samples according to the age of patients

HBoV DNA concentration estimated by cycle threshold value, in samples with single virus detection compared to the samples with multiple virus detection, showed higher values, but no significant difference has been proved ($P=0.056$) (Figure 2.). There was no difference in HBoV DNA concentration in different age groups ($P>0.05$) (Figure 3).

Conclusions: Over 20% of LRTIs that requires hospitalization in small children are related to the HBoV detection. HBoV is frequently co-detected with another respiratory virus which makes difficult to evaluate its clinical significance. HBoV infected children are older than RSV infected children, and detection rate of HBoV infection increase with age, while RSV infection decrease with age.