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Letter to the Editor

Asthma exacerbation and viral infection in adult patients, Brazil

Dear Editor,

Asthma is a common respiratory condition associated with a significant socioeconomic burden affecting 300 million people worldwide. Environmental factors and, in children, viral respiratory infections have been associated with acute exacerbations of asthma.[1] Although the impact of viral infections in adults is less clear with regard to asthma exacerbation, studies suggest that viral infections are involved in about 50% of adult asthma episodes.

We conducted a descriptive, observational, cohort study in 47 patients (38 female and 9 male) previously diagnosed with asthma, who attended the Hospital Universitário Clementino Fraga Filho (HUCFF)/Federal University of Rio de Janeiro (UFRJ) between August 2010 and November 2012. Median age was 50.2 years, ranging from 21 to 80 years. Respiratory samples (nasal/throat swabs) were obtained from participants during routine visit to the clinic and whenever the patients visited the hospital due to asthma exacerbation. Sixty-seven samples were collected during an episode of asthma exacerbation and 63 in the absence of asthma symptoms. Asthma severity was classified as mild (52.2%; $n=35$) and moderate/severe (47.8%; $n=32$). Each patient provided at least one sample during an asthma episode and one sample in the absence of asthma symptoms. The study protocol was approved by the Ethics Committee of the HUCFF/UFRJ, Rio de Janeiro, Brazil (protocol number 011/10) and informed consent was obtained from all participants before the start of the study. The specimens were tested by real time or conventional PCR for presence of respiratory viruses. Statistical analysis was performed using Minitab® for Windows Release 16.0 (Minitab Inc., State College, PA, USA).

Eighteen patients (38.3%) tested positive for respiratory viruses at least once during the study; no respiratory viruses were detected in the absence of asthma symptoms. Of the 67 samples collected during asthma episodes, 20 (29.9%) were positive for respiratory viruses, namely six HAdV, six HBoV2, two HRV-A/B, two FLUVB, and one HRV-C, HRSV, and HMPV. HAdV, KIPyV, and HRV-A/B co-infections were detected in one sample. FLUVA, HPIV1-4, HCoV, HBoV1 3 and 4, and WUPyV were not detected in any of the samples examined (Table 1). One patient had two samples positive for HBoV2 and another patient had one sample positive for HRV-A/B and one for HBoV2 (Table 1). No samples collected in the absence of asthma symptoms tested positive for the viruses screened. A statistically significant association between Severity of the asthma episode was significantly associated with viral infection: 42.4% of the patients with a severe/moderate asthma episode were positive for viral infection compared to 16.7% of patients with mild episodes ($p=0.015$). The relative risk for viral infection in asthmatic patients in this study was found to be 2.34 (95% CI: 1.88–2.90). These data suggested that viral infections and asthma symptoms were associated, and these infections could trigger exacerbation of the disease. Indeed, the data demonstrated that an individual suffering from a viral infection were 2.34 times as likely to develop moderate or severe asthma.

In our study only nine out of 47 patients were male. Many epidemiological studies suggest that women are at increased risk of developing adult-onset asthma and also suffer from more severe disease than men. These gender differences appear to result from biological sex differences as well as sociocultural and environmental differences. Biological sex differences include genetic, pulmonary, and immunological factors. There is compelling evidence that sex hormones are major determinants of these biological sex differences.[3]

Previous studies have demonstrated an association between asthma and infections with various respiratory viruses, including HRSV, HRV, HMPV, HPIV, HAdV, and FLUV.[4] More recently, HBoV has been isolated from patients presenting with mild or severe asthma. In older children and in adults, HRV infections accounted for more than 50% of all viral-triggered exacerbations.[5] In the present study, HBoV and HAdV were the most common viruses identified, accounting for 60% (12/20) of infections compared to HRV detected in 15% (3/20) of cases.

The management of asthma in older adults represents a substantial cost burden associated with hospital treatment, prescriptions, health-care, and management of comorbidities. Viral respiratory infections can potentially trigger asthma exacerbation in adults in general and in the elderly in particular. Therefore, development of effective treatments or vaccines to prevent such infections would have a significant impact on the burden of asthma as well as on other

Table 1 – Characteristics of patients infected with respiratory viruses.

Patient	Sex	Age (years)	Asthma attack[a]	Date of collection	Duration of symptoms (days)[b]	Virus detected
1	F	44	MO	04/25/2011	4	HAdV
		45	–	05/13/2012		
2	F	45	MO	10/18/2010	>60	FLUVB
		46	–	05/30/2011		
		46	–	11/28/2011		
		47	S	04/09/2012	2	
3	M	31	M	08/03/2011	2	HRSV
		32	–	05/05/2012		
4	F	29	M	08/23/2010	15	
		30	MO	04/04/2011	4	HAdV
		30	–	06/20/2011		
		30	–	08/06/2012		
5	F	66	M	10/25/2010	5	
		67	–	07/05/2011		
		68	S	02/27/2012	15	HAdV
6	M	34	M	10/13/2010	4	
		34	M	10/18/2010	9	HBoV2
		36	–	10/16/2012		
7	F	30	M	10/13/2010	4	HBoV2
		30	M	10/18/2010	9	
		30	M	02/10/2011	3	
		31	MO	08/18/2011	1	
		31	MO	09/12/2011	7	HBoV2
		31	–	07/16/2012		
8	F	45	MO	08/25/2010	15	HBoV2
		46	–	09/14/2011		
9	M	52	MO	08/11/2010	15	HAdV+KIPyV+HRV
		52	–	02/20/2011		
		53	–	09/14/2011		
10	F	78	M	04/18/2011	15	HAdV
		79	–	11/28/2011		
11	F	58	MO	08/09/2010	60	HBoV2
		59	–	01/24/2012		
		60	MO	06/18/2012	7	
12	F	62	S	08/24/2010	5	HRV-A/B
		62	MO	04/11/2011	15	
		62	M	04/10/2012	15	HBoV2
		63	–	05/07/2012		
13	F	50	MO	03/28/2011	15	HRV-A/B
		50	M	06/13/2011	1	
		50	–	03/21/2011		
		51	M	05/14/2012	30	
14	F	54	MO	05/30/2011	30	HAdV
		55	–	07/02/2012		
15	M	57	M	10/18/2010	7	
		58	MO	04/22/2011	30	
		58	MO	10/31/2011	30	HAdV
		58	–	08/22/2011	–	
16	F	67	M	09/13/2010	15	
		68	–	10/03/2011		
		69	M	08/13/2012	3	HRV-C
17	F	25	MO	10/25/2010	2	HMPV
		26	–	04/18/2011		
18	F	48	S	08/25/2010	5	FLUVB
		48	–	04/12/2011		
		49	–	12/13/2011		

[a] Based on reference 2: M, mild; MO, moderate; S, severe.
[b] Duration of symptoms at the time of sample collection. (–), no asthma symptoms.

respiratory diseases, such as allergic rhinitis and chronic obstructive pulmonary disease (COPD).

Conflicts of interest

The authors declare no conflicts of interest.

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