Frequent Detection of Respiratory Viruses by Real-Time PCR in Adenoid Samples from Asymptomatic Children

In the March 2009 issue of the Journal of Clinical Microbiology, Sato et al. describe the detection of viruses in human adenoid tissue samples by using PCR assays (11). We wish to add our experience from a similar study. Thirty tissue samples were obtained from 30 individual children admitted for adenoidectomy at Bonn University Medical Centre, Department of Otorhinolaryngology. The median age at adenoidectomy was 4 years (range, 1 to 9 years); samples were taken between December 2007 and February 2008. Ear, nose, and throat specialists determined the indication for surgery. All children had clinical symptoms due to hypertrophy of adenoids. At the time of surgery, none displayed symptoms of acute respiratory infection. RNA extraction of 25 mg of tissue was done using a QIAamp RNeasy tissue kit (Qiagen, Hilden, Germany) according to the manufacturer’s instructions. Published real-time reverse transcription-PCR assays were used to detect influenza A and B viruses (12), parainfluenza viruses 1 and 2 (5), rhinoviruses (9), respiratory syncytial viruses A and B (6), human bocavirus (10), enteroviruses (13), adenoviruses (3), human metapneumovirus (1), and human coronaviruses OC43, 229E, and NL63 (2), respectively. In 29/30 (97%) samples, at least a single pathogen was detectable by PCR. Human rhinoviruses were the most frequent in 20/30 (67%) samples, followed by human bocavirus in 16/30 (55%), parainfluenza virus 2 in 11/30 (36%), enteroviruses in 11/30 (36%), adenoviruses in 10/30 (30%), and respiratory syncytial viruses A and B in 7/30 (23%), respectively. Pathogens less frequently detected included influenza A and B viruses in 2/30 (6%) and 1/30 (3%) samples, respectively. Human coronaviruses 229E, OC43, and NL63, human metapneumovirus, and parainfluenza virus 1 were not detectable. A total of 25/30 (83%) samples yielded multiple positive results. This is the first study to evaluate a broad spectrum of respiratory viruses in adenoid samples from children undergoing elective surgery in the middle of the respiratory season. Although prolonged shedding of viral RNA after respiratory infections has been demonstrated for various pathogens, the frequent detection of viral RNA in tissue samples is surprising (4). Intriguingly, similar to the study of Sato et al., all children did not display symptoms typically associated with infection with a respiratory virus at the time of surgery. This finding supports the notion of a longer than previously anticipated persistence of viral nucleic acids. Sato et al. already speculated on a normal viral flora and a chronicity of selected respiratory viruses (11), which is supported by our data and might play a role with respect to the immune response. However, to what extent virus persistence can contribute to inflammation and subsequent hypertrophy needs to be further investigated. Of note, the findings presented here strengthen the hypothesis that positive PCR results from nasopharyngeal specimens should be interpreted with caution in asymptomatic patients, though the contribution of tissue-resident virus to positive PCR results has not been explicitly shown.

The proportion of detected respiratory viruses most likely reflects their increased prevalence in the winter months. Interestingly, a high proportion of human bocavirus-positive adenoid samples was detected, supporting the notion of persistence in adenoids (8). Similar to that found in other studies, a high rate of viral coinfections was detectable (7). It was hypothesized that coivirus-induced cellular damage, which can trigger cell division, might indeed contribute to bocavirus reactivation and replication (8). Coronavirus were detected neither by Sato et al. nor in this study, indicating that these agents instead account for short-lived acute infections. In conclusion, using sensitive real-time PCR assays, we could demonstrate a spectrum of respiratory viruses in the adenoids of asymptomatic children in the respiratory season.

REFERENCES

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