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Could pooled nasopharyngeal and tonsillar swabbing positively impact virological examination?

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Background: Within the programme of ARI surveillance (acute respiratory viral infections) in the Czech Republic, we tested whether pooling tonsil and nasopharyngeal swabs would influence the outcome of the examination.

Material/methods: Two groups of patients aged 1 to 17 years, diagnosed with ARI/ILI: J00, J02, J03, J04, J06, J10, and J11, were sampled from CW 6 to CW 13/2016. Group 1 consisted of 97 patients (median age 8 years) in whom nasopharyngeal swab was collected **avoiding tonsils**. Diagnosis-matched patients (90, median age 6 years), preferably those manifesting acute tonsillitis (69/90), were assigned to Group 2 where the role of adenoviruses was analysed. The clinical specimen collection procedure in Group 2 was extended to include **a tonsil swab.** All patients were tested by qPCR for influenza A/B viruses (Infl A/B), human respiratory syncytial virus (hRSV), human adenoviruses (HAdV), human coronaviruses (HCoV), human metapneumovirus (hMPV), human parainfluenza viruses (HPIV), and human bocaviruses (HBoV).

Equipment and kits used in qPCR detection

Nucleic acid isolation	croBEE NA16 Nucleic Acid Extraction System® (GeneProof)
Infl A/B, and subtypes	CDC protocols – qPCR
HAdV	GeneProof Adenovirus PCR kit
HAdV/HBoV, hRSV/hMPV, HCoV/HPIV,	BioMerieux r-gene®

Results: Group 1: Infl A/B viruses were detected in 46 of 97 patients (46/97 – 47.4 %), non-influenza respiratory viruses in 18 patients (18/97 – 18.5 %), and two or more viruses in 18 patients (18/97 – 18.5 %). In Group 2, the aetiology of infection was elucidated in 82 of 90 patients (91.1 %). Twenty-five patients were positive for Infl A/B viruses (25/90 – 27.8 %), 20 patients for non-influenza respiratory viruses (20/90 – 22.2 %), and 37 patients for two or more viruses (37/90 – 41.1 %). Multiple virus infection was more than twice as common in Group 2 as in Group 1. In 69 patients with tonsillitis, the assumed greater etiological role of adenoviruses was not confirmed. In contrast, the most often detected agents were Infl A/B viruses (23/69 – 33.3 %) and multiple virus infection (28/69 – 40.6 %), with the highest proportion of adenoviruses and influenza B viruses, hRSV (5/69- 7.2 %), HBoV (3/69 – 4.3 %), hMPV (2/69 – 2.9 %) and HAdV (1/69 – 1.4 %).

Conclusions: The pooled nasopharyngeal and tonsil swabs yield higher amounts and diversity of viruses. A surprisingly wide range of viruses were recovered from patients diagnosed with tonsillitis which demonstrates the need for prudent use of antibiotics in these patients. However, it is not clear, whether the higher virus diversity of the pooled specimens resulted from true infections or from remnant nucleic acids, which might persist in the tonsils after previous infections. In our opinion, multiple virus infection needs to be interpreted with caution, with the most abundant virus being indicated and other agents detected only listed.