DEVELOPING TOOLS FOR ASSESSING PATIENTS GETTING VOICE SYMPTOMS FROM INDOOR AIR - A PRELIMINARY STUDY

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Introduction: In Finland there is a rather big public concern about indoor air quality and it's effect on health especially in buildings with suspected dampness. Many employees complain about voice problems and respiratory symptoms in such environments. Methacholine is widely used as a nonspecific irritant for airways in diagnosing asthma. In spirometry the inspiratory curves reflect mainly laryngeal dimensions. There is a common interest among pulmonologists on laryngeal reactions. It appears that a significant proportion of asthma diagnosis are false and may be implications of laryngeal constriction under variable exposures, some even to poor indoor air quality.
Methods: Participants in the present study were 32 volunteers (female n=26, male n=6, mean age 44 years, range 22-60 years) who have suffered voice or respiratory symptoms due to exposure to poor air quality in a building with water damage. Participants went through a methacholine challenge test (MCT) with expirograms and inspirograms and a phoniatric videolaryngostroboscopy was done. Voice samples were recorded before and after MCT with a head-mounted condenser microphone and the laryngoscopy was done separately. The Acoustic Voice Quality Index 02.02 (Praat) and the inverse filtering (Aparat) analyses were executed. The participants were divided into two groups depending on their results of the inspirograms and/or whether they got hoarse after MCT.
Results: Twenty of the participants had 25% or more and twelve had less than 25% deterioration in their inspirogram after MCT. The groups differed significantly from each other before MCT for the inverse filtering parameter Open Quotient ($p<0.05$). After MCT the groups differed significantly for acoustic parameters AVQI 02.02, CPPS and HNR ($p<0.05$). The phoniatric finding of the degree of the muscle tension dysphonia (MTD) and the inverse filtering parameter QOQ had low significant negative correlation with each other (Spearman's rho -0.41, $p=0.05$). Also the phoniatric finding of the forward pending corniculate arytenoid cartilages during forced breathing had low but significant correlation with the inverse filtering parameters QOQ (Spearman's rho -0.36, $p=0.05$) and NAQ (Spearman's rho -0.36, $p=0.05$).
Conclusions: The results of this preliminary study indicate that the acoustic and the inverse filtering analyses of voice material could be one of the diagnostic tools detecting laryngeal problems among patients suffering from poor indoor air quality. A larger study group is needed in the future to confirm the results of the present preliminary study.