

MATERIAL AND METHODS

The study in the Department of Otolaryngology, Phoniatries and Audiology of Lublin Medical University involved 37 children aged 3-16 during six months, from October 1998 to March 1999. The study group included patients with bronchial asthma -17 patients, seasonal allergic rhinitis - 5 patients and both asthma and allergic rhinitis -15 patients. The diagnosis of allergic disease has been confirmed by high serum concentration of total and/or specific IgE and skin "prick" tests.

The clinical examination was performed with videostroboscopy of larynx, rhinoscopy, otoscopy and phoniatic examination, which included subjective and objective acoustic analysis of voice. From the recorded material, voice parameters of mean Fo, minimum and maximum F0, jitter, shimmer, harmonic structure, were defined.

The results were compared with a control group of patients of Orthopaedic Department of Lublin Medical University.

RESULTS

In the laryngological examination pathological changes were not observed. Subjectively all the examined voices were clear and production of the voice was physiological in all of the subjects. From acoustic analysis of voice the values of Fo, jitter, shimmer and NNE (Normalised Noise Energy) were evaluated.

Mean Fo in the study group was 239Hz, which was close to this of the control group 236Hz. Mean values of jitter were 0.54% and 0.36% in the study group and in the control group respectively. Although higher in the allergy group, jitter values were not significantly different from values of the control group. Shimmer analysis revealed mean values for the allergy group equal to 3.8% and for the control group 2.9%. Values of NNE were greater in the allergy group -13dB, compared to -8dB of the control group.

Tab. 1. Acoustic parameters of voice in the study group and the control group

	Fo (Hz)	Jitter (%)	Shimmer (%)	NNE (dB)
Study group N=37	239	0.54	3.8	-13.2
Control group N=37	236	0.38	2.9	-8dB

In a sonographic voice analysis of the allergy group frequencies between 900-1200Hz were present more often, while in the control group frequencies between 200-700Hz dominated. The results are shown in Table 1.

The Kolmogorow-Smirnow test was used for the statistical analysis of the results. Significant differences in Fo and jitter between groups were not observed ($p > 0.01$). Significantly greater mean values of shimmer were found in the allergy group. Also subtle differences in the spectral analysis were found. In the allergy group NNE was significantly greater than in the control group.

Kosztyła-Chojna et al. (1) studied the quality of voice in patients with allergic rhinitis. The authors revealed voice changes resulting mainly from improper nose resonance. This study did not include the acoustic analysis of laryngeal tone.

Leinonen et al. (2) concluding that atopic patients are more susceptible to voice dysfunction than healthy individuals used histamine provocation tests in patients with asthma. The acoustic analysis revealed no changes in both Fo and jitter in these patients.

Pedersen (4) analysed phonetograms of allergic patients with hoarse voice and found reduction of the speech area in this group.

There are few references dealing with the influence of allergy on the larynx. Parameters used in our study do not describe satisfactorily voice disorders. Extraction of significant acoustic parameters is difficult due to variability of voice in the same individual and due to multidimensional nature of an acoustic signal.

Allergy affects the whole respiratory system but with the use of presently available methods it is difficult to make objective judgement based on the results of voice analysis.

REFERENCES

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STRESZCZENIE

Choroby atopowe w obrębie górnych dróg oddechowych mogą sprzyjać powstawaniu stanów zapalnych w górnych i dolnych drogach oddechowych, także w obrębie krtani. Doniesienia dotyczące alergicznego zapalenia krtani są rzadkie. Celem pracy była analiza akustyczna głosu u dzieci z chorobą atopową. Dokonano komputerowej analizy wypowiedzianych w izolacji samogłosek. Określono wartości: Fo min, Fo max, Fo średnie, jitter, shimmer NNE, analizę widma głosu w zakresie 90-4000 Hz.

Na podstawie uzyskanych badań stwierdzono statystycznie istotne zmiany w wartościach shimmer oraz różnice w analizie widma pod postacią wzmocnienia formantów w zakresie 900-1200 Hz.