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Audiological manifestations in patients with Granulomatosis with Polyangiitis

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Background

Granulomatosis with Polyangiitis (GPA) is a rare, autoimmune, multisystemic disease, characterised by vasculitis and necrotising granuloma, that commonly affects upper and lower respiratory tract and kidneys. The pathogenesis of GPA is complex, with important roles for ANCA, cellular immunity, neutrophils, fibroblasts, vascular endothelial cells, and inflammatory mediators. Otorhinolaryngological symptoms may be the first clinical manifestation of the disease, as the upper respiratory tract is often affected. The nasal cavity and the paranasal sinuses are the most frequent sites of GPA in the head and neck region. Otologic manifestations occur in 8–65% of patients with GPA. Audiovestibular dysfunction in GPA diseases may have different clinical presentations. Otologic involvement in GPA can range from serous otitis media to sensorineural hearing loss and can occur during the course of the disease, in addition to being the first and only sign of GPA . Hearing loss in GPA can vary in severity and can affect one or both ears. Delayed diagnosis and therapy can negatively affect the prognosis of hearing. Early detection and appropriate medical management are important to control inflammation and minimize the impact on hearing.

Objectives

The aim of the present study was to evaluate hearing function in patients with GPA and to compare the results with a healthy control group.

Materials and Methods

A total of 34 individuals participated in the study. GPA group consisted of 14 participants, control group was composed of 20 healthy participants, with no signs or symptoms of ear disease. The age ranged from 18 to 65 years old, with a mean age of 43.8 years. The participants underwent a complete audiological evaluation with otoscopy, impedance audiomety, pure tone audiometry, speech audiometry – evaluation of speech tresholds and speech recognition in quite. Both ears were tested. All of the participants of the study were native Lithuanian speakers. Data were statistically analysed using Statistical Analysis System software SAS® Studio 3,8. P value < 0.05 was regarded as statistically significant.

Results

92,9% patients from GPA group reported hearing – related symptoms: hearing loss, tinnitus, fullness in the ears. In 60.7% of the GPA patients, the pure tone audiogram showed some degree of hearing loss. The most common type of hearing impairment was sensorineural (32.1%); 21.4% of the GPA patients had mixed hearing loss, and 7.1% had conductive hearing impairment. The arithmetic means of all hearing thresholds at all frequencies from 125 Hz to 8000 Hz were significantly higher in the GPA group compared to the controls (Table 1). The results revealed statistically significant differences between the two groups in Speech Detection Threshold, Speech Recognition Threshold, Speech Discomfort level and Word Recognition Scores (Table 2).

	GPA group (dB, average ±SD)	Control group (dB, average ±SD)	P value
125Hz	18.4±12.25	6.0±3.03	<0.0001
250Hz	18.9±15.05	6.6±3.46	0.0002
500Hz	21.3±17.24	7.3±3.19	0.0003
1000Hz	21.6±16.72	7.9±3.17	0.0002
2000Hz	23.9±19.92	8.5±4.26	0.0004
4000Hz	33.8±24.32	10.1±3.83	<0.0001
8000Hz	35.9±29.93	11.5±3.43	0.0003

Table 1. The average arythmetic means of Pure Tone Audiometry hearing thresholds in patients with GPA and control groups

	Speech Detection Threshold (dB) Mean±SD	Speech Recognition Threshold (dB) Mean ±SD	Word Recognition Score (%) Mean ±SD	Speech Discomfort Level (dB) Mean ±SD
GPA group	32.9±17.23	43.6±17.63	97.4±5.67	97.9±8.86
Control group	17.5±4.23	27.4±3.92	99.5±1.33	101.1±3.66
P value	<0.001	<0.001	0.03	0.04

Table 2. Speech Audiometry results in GPA and control groups

Conclusion

The frequency of hearing loss, the average hearing thresholds and speech thresholds were higher in GPA patients than in healthy individuals. The most common type of hearing loss was sensorineural. Audiological assessment should be considered in routine evaluation of patients with GPA disease to prevent hearing related disability.

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