№P060

VERTIGO & BALANCE DISORDERS

Dynamic posture characteristics and hearing capabilities in patients with obstructive sleep apnea

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Abstract

Vestibular, hearing, sleep and posture disorders are frequently diagnosed nowadays, due to raised society general morbidity, bad sleeping, posture and listening habits, self-ignorance.

Vestibular pathology often encircles: benign paroxysmal positional vertigo (BPPV), vestibular neuritis, labyrinthitis, Meniere's disease, ototoxicity and others.

Hearing pathology consists of noise/secondary after a disease/trauma-induced hearing loss, otosclerosis, tinnitus, acoustic schwannoma and others.

The syndrome of Obstructive sleep apnea and snoring affects as a rule more, in total number, middle-aged obese men, with short necks and lower neck circumferences. The mentioned patient group often consumes alcoholic beverages every evening as well.

Coincidence of the ideal Center of Gravity (CoG) – the place of the body where the weight is situated – and the real one (measured), speaks of adequate body static and dynamic stability and better balance. Any shift to either side leads to changes in the normal posture, causing disturbances.

All mentioned pathology has started to affect patients who are younger in age.

Organizing informational and prophylactic campaigns to raise society's knowledge in the field has proven to be effective to lower the number of affected individuals or, at minimum, to diagnose the disorders and an earlier stage.

Objectives

To study dynamic posture characteristics and hearing capabilities of adult patients, suffering from the syndrome of obstructive sleep apnea and snoring.

Fig. 1 *– The HSAT device patients were examined with (Weinmann® somnocheck micro cardio device)*

Fig. 2 *– Audiometer and tympanometer patients were examined with (Interacoustics ®, Dennmark devices)*

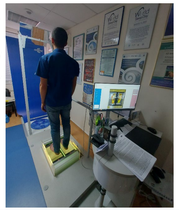


Fig. 3 *– Global postural system – GPS Leonardo Pl0800, (Chinesport®, Italy) – static and dynamic posture and body balance analysis*

Material and Methods

Seventy patients (36 male, 34 female), aged from 23 to 65, were examined in the period 05.2023-04.2024 on the premises of UMDC – MU-Varna. Videonystagmography (VNG), video head impulse test (vHIT) and dynamic posturography were executed. All participants underwent a test with a polygraphic equipment – Home sleep apnea test. Hearing capabilities tested with: audiometry, tympanometry, otoacoustics emissions (OAE). All patients filled in written informed consent forms, sleep questionnaires, forms to report the intake of medications, presence of allergies, general diseases. The study has received approval from Medical University – Varna's Ethic committee.

Results

In 80% of the patients a case of OSAS was proven, more frequent in the male participants. Moderate forms of sleep apnea were the most diagnosed. In 90% of the patients with OSAS, changes in dynamic posture were proven (longer stabilograms, with wider surfaces) speaking of higher instability. The forms of the stabilograms were pathologic (oval). Changes in Center of Gravity (CoG) were detected – shifted backwards and to the right. Patients with proven obstructive sleep apnea, apart from being more unstable, had diminished hearing capabilities (in 90% of sleep apnea cases - a hearing diminishing of more than 30% of sensorineural type).

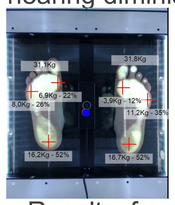


Fig. 4 *– Coincidence between the ideal CoG (red) and the measured one (blue)*

Fig. 5 *– A shift between the ideal CoG (red) and the measured one (blue) – in patients with OSAS syndrome diagnosed*

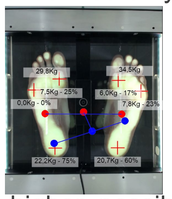
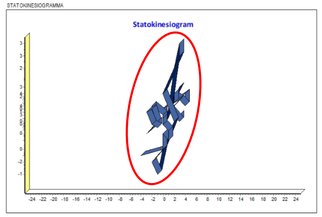


Fig. 6 *– A stabilogram with an oval form in patients with OSAS syndrome diagnosed*



Results from the study confirmed the higher possibility of developing a balance disorder and suffering from a hearing loss for patients with proven obstructive sleep apnea. Newer dynamic posture characteristics (length, surface, form of the stabilogram) were established for those patients. Obstructive sleep apnea and intermittent hypoxia caused are proven factors to develop additional pathologic symptoms from different anatomical systems of the human organism.

Conclusion

More prophylactic campaigns aiming to diagnose sleep disturbances should be regularly organized in order to restore patient's quality of life and society awareness. Those campaigns aid specialists to cope with the negative effects of patients' poor sleep quality and stressful daily routine. Comorbidity, connected with the syndrome of obstructive sleep apnea is diverse, and should be addressed – with prevention and prophylaxis – adequately and in time.

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