Management of Vestibular Disorders (Dizziness)

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Instead of introduction

Dizziness - is not one symptom or disease. It means a big variety of naughty sensations related to the pathology of the vestibular system. Among them are vertigo, faintness, balance disturbances, giddiness or pseudovertigo, some authors use lightheadedness, though there is criticism against it. Today there is no exactly wide recognized definition of **dizziness**. They are rather different. Every unusual sensation in the head might be regarded as

dizziness. Let us try to clear cut the identification and verify the complaints of the patients. It means distortion of perception of space, movement and time. Among the complaints we meet feeling the head being in the glass sphere or in fog, difficulties in concentration, foolishness, heaviness in the head, fatigue, forgetfulness, and confusions. Some patients tell about lost of distance perception or mismatching taking the usual things. Reasons of dizziness are multiple. Dizziness has to be differentiated from vertigo and related symptoms, because of differential diagnostics of dizziness and vertigo influences at treatment of dizziness. **Dizziness** is often accompanied with some specific phenomena: vegetative, somatosensory, acoustic and visual. Among vegetative phenomena nausea, retching, vomiting, headaches and migraines, palpitations, sweating are met. Somatosensory distortions are related to numbness, acoustic – to tinnitus. Visual signs are very different: black spots (scotoma) total darkness (ophthalmoplegia), momentary darkness (black-out), white and colored spots (photopsia, mouches-volant), lines like fortification spectra (teichopsia), beating cilia, image fluctuation and fluctuating colored images, disruption of world dimensions – subjects seem to be too big (macropsia), too little (micropsia) or complicated dimensions change occur (horizontal, vertical, diagonal and non-linear disopsia). Rarely, intolerance to fragrances occurs. It is frequently associated with poor tolerance of high places (acrophobia), squares, supermarkets, crowds (agoraphobia), difficulties in ascending and descending the staircase, awkwardness in twilight and darkness (nyctophobia), poor traffic tolerance (kinetosis, motion sickness, sea sickness), increased sensitivity to electric and magnetic fields, meteosensitivity.

Reasons of dizziness are resulting from the structure of the peripheral vestibular receptors. We deal with six functional structures: 1) gravitation, 2) acceleration, 3) vibration, 4) sound and infrasound, 5) magnetic impulse and 6) metabolic. Overloading of each one of these receptors becomes reason of dizziness. For example, head trauma is severe overscale stimulus for vestibular system with long lasting consequences. Motion sickness is also excessive load for vestibular organ. Vibrating machines and mechanisms cause vibration disease, which is one of the most widely spread occupational pathologies. Many people meeting ventilation tubes in their offices or everyday life complain of dizziness and faintness. Magnetic sensor in the vestibular receptor is important to inform the living beings about future rain and thunderstorm. In today technogenic world many retranslators are producing intensive magnetic impulses, which affect our health. The symptoms of seasickness and intoxication are identical, thus meaning that mechanisms of their formation are identical – severe stimulation of vestibular system and switching on the protective reaction – evacuation of toxin from the body.

Among other reasons of dizziness one can name also, stress, Meniere disease, cupulolitiasis, cardio-vascular, metabolic reasons, impairment of electrolyte balance, etc. Reasons of dizziness and vertigo are different, that means different risk of dizziness and vertigo, different diagnostic of dizziness and different individual treatment of dizziness types.

Dizziness, **vertigo** and symptoms related to vestibular dysfunction. **Dizziness** – distortion of perception of space, movement and time. Patient complains of the fact that last month it is difficult for him to

make left turn while driving the car. Usually, he has been able to catch easily the moment when to perform it, but last time he is waiting, when all the traffic from the opposite line will pass.

Objective vertigo – sensation the subjects moving around the patient.

Subjective vertigo – illusion of nonexistent movement, patient feels him moving.

Giddiness – vertigo which is not similar to subjective or objective ones, sometimes called pseudovertigo: very intensive, difficult to describe, patients often tell that something is rotating inside of the head. It has negative correlation with height and positive correlation with complaints of nausea while headache spell.

Imbalance (movement coordination disturbance) – sometimes is met alone. Patients are complaining of swaying, staggering, momentary push…. It correlates with complaints of acrophobia and descendophobia.

Orthostatics – discomfort sensations that appear after sudden standing up. Reasons of dizziness in this case are insufficiency of blood redistribution. It is often accompanied also with complaining of nausea.

Kinetosis – a disorder caused by repetitive angular and linear acceleration and deceleration and characterized primarily by nausea and vomiting. It appeared to correlate with weight increase and photophobia in migraine attacks.

Series of symptoms reflect the space orientation disorders, which are presumably formed in the central portion of vestibular system. Among them: acrophobia, agoraphobia, nyctophobia, claustrophobia, ascendophobia and descendophobia.

Acrophobia (height vertigo, does not belong to true vertigo) – discomfort that appears at height. Has positive correlation with imbalance.

Agoraphobia – (αγωρα – Grecian, market) discomfort in open, public places or crowds. Correlates positively with ascendophobia and associated headaches.

Nyctophobia – discomfort, insureness in darkness and twilights.

Claustrophobia – discomfort appearing in small, closed spaces.

Ascendophobia – discomfort while moving upstairs, patients note the necessity for visual control. Among other complaints correlations with agoraphobia and descendophobia are reported, as well as positive correlation with the duration of P and PQ intervals and negative correlation with ST interval duration at ECG.

Descendophobia – discomfort during walking down the hill or descending the staircase, patients note the necessity of visual control. Among other signs there is positive correlation with age, imbalance, ascendophobia and dyspnoe.

Then, goes some other signs closely connected to vestibular function.

Optokinesis – discomfort evoked by optokinetic stimuli, train or cars movement, sunrays blinking through the row of trees etc. It has positive correlation with increase of systolic and diastolic blood pressure.

Nausea is identified as urge to vomit. It has tight connections with vestibular system and positive correlation with complaints of orthostatic, vomiting episodes, and dyspnoe attacks.

Vomiting – is forceful expulsion of gastric contents. It has positive correlation with nausea.

Headache as a substitute of dizziness is positively correlating with agoraphobia.

Blackout or darkness in the eyes might appear during sudden movements of head, physical loadings or per se. usually short lasting.

Tinnitus as dizziness substitute has positive correlation with numbness.

Numbness is unpleasant sensation of temporary loss of feeling and volunteer control of the parts of the body. Among other complaints it correlates with tinnitus.

Anxiety and depression are often related to dizziness and othe vestibular disorders.

Risk of dizziness in the case of orthostatic might be falling down. Diagnostics of dizziness and related symptoms has to be individualized, depending on the reasons of dizziness. Treatment of dizziness is dependent on the set of the symptoms named and is strictly individual. **It is great mistake to treat subjective and objective vertigo with the same medications. Moreover, giddiness associated with classical migraine with aura and giddiness without aura are treated with the medications of just opposite activity.**

Risks of dizziness. Dizziness is considered to be a predictor of severe diseases. The course of sickness is the same in the cases of light head trauma, ionizing or electromagnetic radiation, vibration disease or intoxication. Most cunning feature of all the vestibular disorders is the fact that initial reaction transforms into the imaginable wellbeing. Both patient and doctor are sure that the disease is over – dizziness episodes disappeared. True risk of dizziness is disclosed during 25-years monitoring dizziness in Chornobyl clean-uppers, it has been shown that after the period of imaginable wellbeing primary peripheral distortion in two-three years starts to involve higher levels of brain, involving motor, vegetative and limbic systems, resulting in organic pathology: neurologic, cardiovascular, psychiatric. Sometimes the disease has recurrent character. When the process reaches brain cortex, risk of dizziness is increased - the balance of cortical processes is disturbed, causing immune failure, which is finished with chronic, autoimmune and oncologic diseases. In the cases of severe damage (severe head trauma, high doses irradiation) this process is running quickly, in moderate – it becomes chronic and long lasting, but its development is the same. So, risk of dizziness is in the severe

delayed consequences of the pathology – it is easier, cheaper and more reliable to start treatment at early stages. Risk of dizziness is also dependent on the reasons of dizziness, differentiation of dizziness from vertigo. From the other side, determination of these risks influences the diagnostics of dizziness and individual treatment of dizziness.

Diagnostics of dizziness depends on reasons of dizziness, types of dizziness, vertigo and related symptoms of vestibular dysfunction and risk of dizziness level. It is also important to consider the vestibular projections: cortical, motor, vegetative and limbic. From the other side, today evidence-based medicine use several parameters to describe the diagnostic methods: sensitivity – percentage of persons with pathology with positive results provided by the method; specificity – percentage of false-positive effects; coherence – percentage of coincidence of the results obtained in the different laboratories. Besides these, authors propose to use the influence of method for understanding of the disease pathogenesis and topography of formation and influence of the diagnostic results at the treatment of dizziness. It is also important to note, that many so called “Gold Standards” today seems to be appointed, even MRI in the cases of stroke – so many cases of MRI-silent strokes being reported.

In the case of vestibular system 28 years monitoring of Chornobyl victims has shown that complaints have been among the earliest signs of the disease, indicating initial process in the sensory cortical projection. Therefore, either NOASC or Types of Dizziness Questionnaires are important. Next method has appeared to be Vestibular Evoked Potentials (VestEP) method (not VEMP). Method

has 92% sensitivity, with more than 90% specificity and 95% coherence. It has been shown that radiation disease starts as peripheral vestibular disorder, then spreads at higher levels of the brain involving also motor and later vegetative and limbic spheres. The same picture is typical for dizziness in diabetes or vertigo in herpes-virus vestibular neuritis. So, VestEP, besides adequate sensitivity, is important for understanding of the disease process and topography, thus providing the keys to therapeutic process. In the vestibulo-motor projection the highest sensitivity has combination of cranio-corpography with nystagmography – 95% sensitivity, more than 90% specificity. Method is used in unique laboratory in Kyiv, Ukraine and therefore no data about coherence is available. Method gives important results about the level of pathological process in the motor projection and provides valuable data for choice of adequate treatment of dizziness. Widely used posturography and nystagmography have diagnostic sensitivity in the range of 30-50% and are good for some scientific solutions. Some parameters (gain in the pendulum test, nystagmus frequency in the caloric test) provide information about excitation-inhibition processes, which are used for selection of the proper medication.

Vestibulo-vegetative projection is examined with the help of ECG with neurological loadings and pupillometry. We do not have yet enough knowledge about sensitivity etc., but they give us a lot of information about cardiac neurosis and headaches, as well as about other vegetative disturbances. We have many years experience of use these diagnostic of dizziness technologies for individual selection of the treatment of dizziness.

Limbic projection influences mood and cognitive function, methods of its diagnostics are under development.

Other methods – MRI, CT, USD, biochemistry etc., - are important, but their sensitivity is 30-40% and they provide additional data for researcher.

Treatment of dizziness is rather complicated and needs qualified stuff. It must include knowledge of the reasons of dizziness, because pharmacotherapy of magnetic sensitive patient is inconsistent, he needs adequate magnetic shielding. Treatment of dizziness has to include differentiation of dizziness from vertigo, because use of activating medication in vertigo cases might result in the further worsening of patient condition. Type of vertigo is important, because in the formation of subjective vertigo histaminergic system takes place, while in objective vertigo cholinergic systems are important. Topographic and cytological levels are important, because type I hairy cells are involved into substance P processes and type II into GABA-ergic. Exact diagnostics of dizziness type, estimation of the specifics of the pathology, allows precise evaluation of the risk of dizziness and therapeutic tactics. Many factors have to be taken into consideration – it is impossible to propose music therapy for the patient with hyperacousis or electromagnetic fields for the patient with hypersensitivity to them. In general, physical culture, physical methods, even specific software solutions are profitable for adequate treatment of dizziness. Among pharmacological agents they name about one thousand medications. Only high level professionals are allowed to prescribe this treatment, because some drugs treating dizziness might cause vertigo and vice versa.

Preliminary data are online, along with updated information and services located at World Wide Web at: http://sites.google.com/site/dizzylita

http://happyvertigo.com

http://neurootology.org

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