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Experiences with complex vestibular rehabilitation

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Abstract

Introduction: Vestibular rehabilitation of patients suffering from balance disorders is a long and difficult process, the exact cause of therapeutic success or failure remains often unknown. In our practice, the complex vestibular rehabilitation consists of medical treatment and rehabilitation training program. Balance training comprises mostly statokinetic exercises, however, the training of the vestibulo-ocular pathways are as important as of the vestibulospinal pathways. Patients: The author used training exercises for the vestibulo-ocular and vestibulospinal pathways in patients who were treated with parenteral and oral vasoactive drugs. **Methods:** For measuring the improvement of the patients, a modified Dizziness Handicap Inventory questionnaire was used. **Results:** The results show that the vasoactive medical treatment combined with optokinetic training improved the patients' condition. Our findings suggest that psychiatric status of the patients influences the outcome of the treatment. **Conclusions:** Medical treatment combined with optokinetic and statokinetic training program is effective in the rehabilitation of dizzy patients and improves the quality of life.

Keywords: dizziness, training, vertigo.

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INTRODUCTION

Rehabilitation of patients having balance disorders is a great challenge for physicians. Vestibular rehabilitation therapy (VRT) is an exercise-based treatment program designed to promote vestibular adaptation and substitution. The goals of VRT are 1) to enhance gaze stability, 2) to enhance postural stability, 3) to improve vertigo, and 4) to improve activities of daily living[1].

According to our clinical experiences, combination of medical treatment with vestibular training is beneficial for every vestibular disorder. The medical treatment modalities are vasoactive drugs (e.g. vinpocetine, piracetam) in chronic vestibular disorders, and corticosteroids in acute unilateral vestibular loss.

Vinpocetine increases cerebral blood flow by decreasing viscosity, platelet aggregation, and intravascular coagulation and by increasing red blood cell deformability. Vinpocetine also has antioxidant and neuroprotective effects, and increases brain glucose supply, however, it has no effect on glucose metabolism[2].

Piracetam has both neuronal and vascular effects. The drug increases neuronal neurotransmission and cell metabolism in hypoxia. Piracetam has favorable effect on neuronal glucose and oxygen metabolism and has several vascular effects on microcirculation, capillary perfusion and platelet aggregation. It decreases red blood cell adhesion, and increases red blood cell deformability[3]. Pentoxyfillin is a xanthine derivative that promotes microcirculation by affecting red blood cell malleability, and decreasing blood viscosity. In the clinical practice, the effectiveness of pentoxifylline on vestibular disorders may be the result of the improved blood flow[4].

Corticosteroids are widely used in cochlea vestibular lesions. High dose parenteral corticosteroid treatment is administered in acute idiopathic sensorineural hearing loss, in vestibular neuronitis, and in acute impairment of multiple sclerosis.

Psychiatric status, the level of anxiety and depression - so as the chronic vestibular dysfunction - influences the quality of life. Vestibular rehabilitation may exert a positive effect on behavioral morbidity but the benefits do not always correlate with physical improvements[5].

Other authors demonstrated that vestibular physical rehabilitation therapeutic strategies produced improvement in different vestibular disorders, e.g. posttraumatic and migrainous vertigo[6].

MATERIALS AND METHODS

The examination of the patients began with taking of detailed case history and routine oto-rhino-laryngological and neurological examinations. The vestibular tests involved statokinetic tests (Romberg, sharpened Romberg and Babinski-Weil tests); spontaneous nystagmus with Frenzel's glasses and with electronystagmographical (ENG) registration as well, positional and positioning nystagmus examination using Frenzel's glasses. The saccadic and smooth pursuit eye movement tests and the optokinetic tests were performed by a computer-based ENG system (ICS Chartr® electronystagmography system). Bithermal caloric test was carried out using the computer-based ENG air caloric system. After the diagnostic process of the chronic vertigo symptoms, a decision was made, if the patient needed complex vestibular rehabilitation therapy.

Patients with chronic vertigo symptoms were treated with parenteral vasoactive drug [vinpocetine (Cavinton®), piracetam (Nootropil®), pentoxyfillin (Trental®) or corticosteroid infusion followed by oral vasoactive treatment. The complex vestibular training contained statokinetic exercises with everyday optokinetic training during the 10-day-long hospitalization. The eye-movement training contained an optokinetic and smooth pursuit eye-movement training. In the OKN test the target points were moving horizontally and vertically with a speed of 20 degrees/seconds. In the smooth pursuit eye movement test the stimulus is a sinusoidally moving light target including 3 cycles of each the following frequencies 2, 3, 4, 5, 6, 7 Hz on a 34 degree screen. The amplitude of the movement is 16.7 degrees. We used these tests both horizontally and vertically.

After the hospitalization period, the patients were asked to perform vestibular training at home which contained eye movement training and vestibulospinal exercises. To help carry out these vestibular training exercises, the patients were given a detailed description. The patients' parenteral vasoactive treatment was followed by orally administered medication.

We analyzed the data of 35 patients with the complex therapy (10-day-long parenteral and optokinetic training, followed by oral treatment along with home training).

For the analysis of the results, a modified Dizziness Handicap Inventory (DHI) was used[7]. Instead of the traditional "yes-sometimes-no"terms avisual analogue scale (VAS) was applied, in which the patients had to sign the severity of the symptoms on a 10 cm long line, and the evaluation of these sets was carried out using a 100 mm long ruler (10 cm = 100%). The score of each answer could be between 0 and 100, while the total score after the 25 questions could be between 0 and 2500. The higher were the scores, the severe was the disorder. Decreasing of the total score meant the improvement of the symptoms and/or quality of life. The patients had to fill in the questionnaire at the beginning (DHI 1) and at the end (DHI 2) of the 10-day-long parenteral treatment and optokinetic training. The third DHI questionnaire was filled in at the control examination, 4-6 weeks later (DHI 3).

RESULTS

The data of 35 patients (11 male, 24 female) were analyzed. The average age was 62.1 years (the range was 34-80).The diagnoses of the patients are shown in Figure 1.

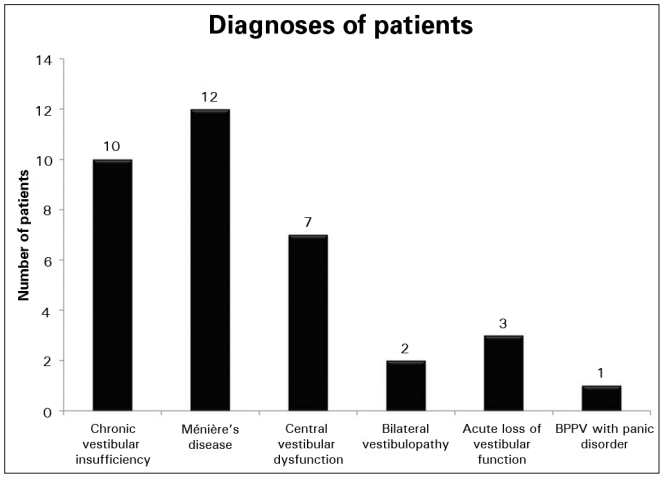

Figure 1.

Most of the patients had improvement during the test period (69%). The complaints remained unchanged in 31% of patients.

The average scores of the patients showed improvement after the hospitalization and after the home training period, too (Figure 2).

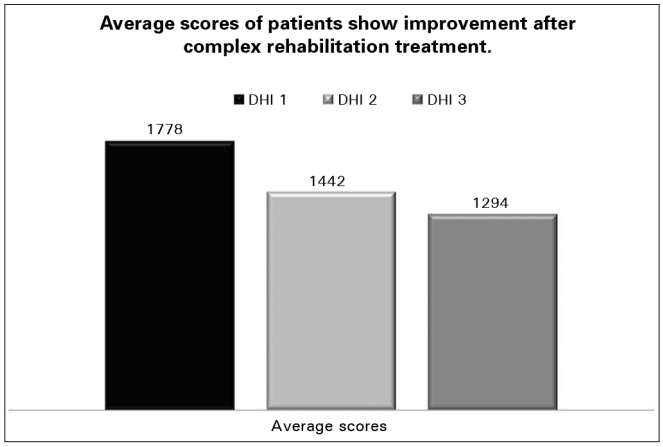

Figure 2.

The initial scores of the vertiginous patients suffering from anxiety and depression were higher than that of psychiatrically healthy patients. Improvement was smaller in the psychiatric patient group than in psychiatrically healthy patients. According to this latter phenomenon, psychiatric disorders influence unfavorably the patients'chances for complete recovery with the self-made vestibular training. Results are shown in Figure 3.

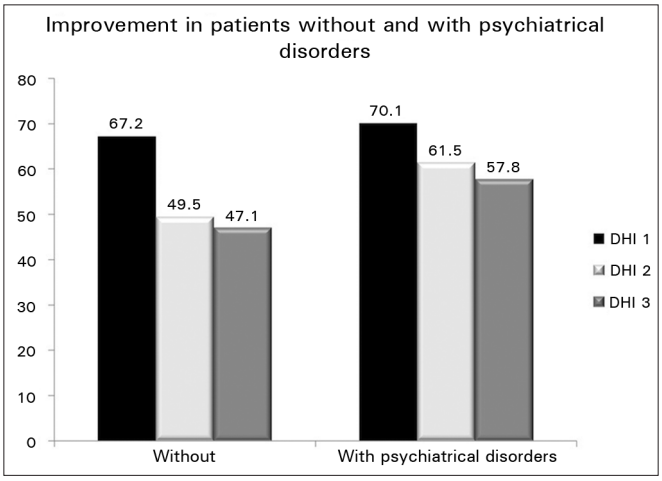

Figure 3.

The questions of Dizziness Handicap inventory were divided into three groups: physical, emotional and functional questions. In each group, the scores of the patients showed improvement (Figures 4, 5, 6).

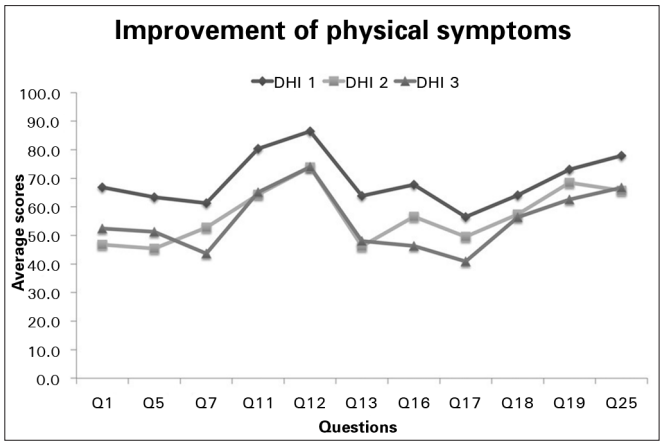

Figure 4.

One of our most successful patients was a 34-year-old female, who suffered from acute vertigo and unilateral total deafness after a severe viral infection. One day after the sudden hearing loss and acute vertigo we started a 10-day-long combined medical treatment along with high dose piracetam (12 gr/die), high dose acyclovir (3 x 250 mg/die), and high dose corticosteroid (250 mg methylprednisolone), additionally, the patient started the optokinetic training. 6 weeks later, the patient became symptom-free and his hearing improved to normal level, and the vestibular status became compensated (Figure 7).

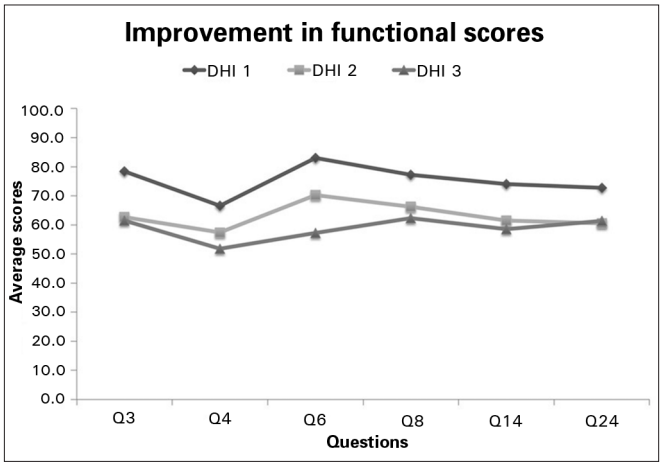

Figure 5.

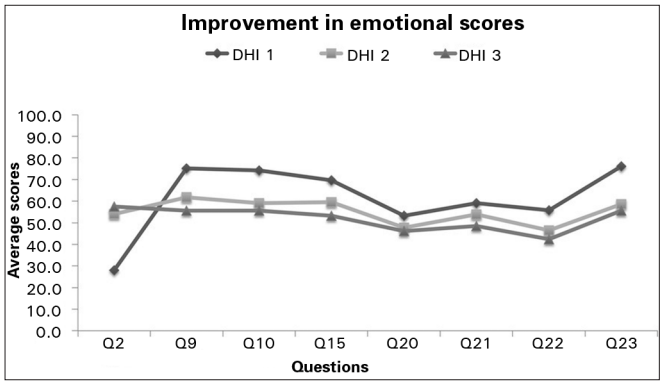

Figure 6.

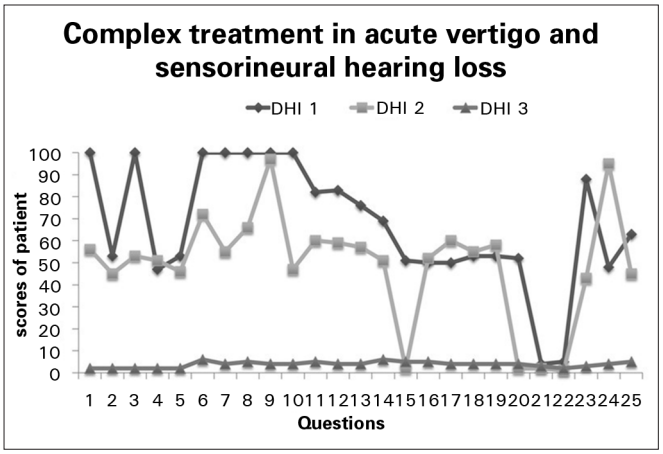

Figure 7.

DISCUSSION

The treatment of chronic vertigo is a great challenge for the physicians. The complex treatment of vertigo must contain medical treatment and vestibular training. Pharmacological therapy can be administered either parenterally and orally, or - sometimes - intratympanically. Parenteral medication comprises corticosteroids or different vasoactive agents. Our opinion is that training of optokinetic pathways is as important as the training of the vestibulospinal pathways. The combination of oral medication and vestibular training is useful in continuing the parenteral vasoactive therapy and optokinetic training. Optokinetic training influences mainly the central vestibular compensation.

In patients with chronic vestibular dysfunction, it is the frequent attacks of vertigo and the constant imbalance that influences unfavorably the quality of life. Their mobility and self-support are destroyed, and chronic balance disorders can cause psychiatric disturbances. The panic and anxiety disorder can superpose upon chronic vertigo. Vertigo has bi-directional connection with psychiatric disorders. The vestibular disorders can provoke panic and several types of anxiety disorders: patients consider the certain disease a life-threatening catastrophe. On the other hand, anxiety and panic increase vestibular responses to positional tests, caloric, and rotational provocations. Previous, compensated and symptom-free vestibular lesions can become decompensated due to anxiety disorders and can cause acute vestibular symptoms. The lack of motivation associated with depression, fear of motion and dizziness are inhibiting the home activity in vestibular training. Our study demonstrates that patients with vestibular lesions and psychiatric disorders have worse chances for complete recovery. Our opinion is that vertigo and psychiatrical disease co-morbidity requires parallel treatment by antivertiginous drugs, anxiolytics, sometimes selective serotonine reuptake inhibitors, vestibular training and psychotherapy.

The Dizziness Handicap inventory is very useful for evaluating the patients'complaints, symptoms and quality of life; however the sensitivity of this questionnaire could be increased by using visual analogue scale (VAS).

CONCLUSIONS

As for a summarization, we can state vasoactive drug treatment with optokinetic training can improve the complaints associated with balance system dysfunction. The quality of life became better after this complex treatment, and the severe complaints and the patients'psychical symptoms were also improved. The patients suffering from vertigo and anxiety disorder (as co-morbidity) have great difficulties to achieve the successful recovery.

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