The Effectiveness of a Multidisciplinary Collaborative Model for the Diagnosis and Treatment of Vertigo

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Abstract: *Objective:* To investigate the effectiveness of applying a multidisciplinary collaborative model for the diagnosis and treatment of patients with vertigo. *Methods:* The study was carried out in Xianyang Hospital of Yan'an University, in which 100 patients with vertigo were selected from April 2021 to April 2022 and were divided into two groups: the control group was under the single diagnosis and treatment model, whereas the experimental group was under the multidisciplinary collaborative diagnosis and treatment model, with 50 cases in each group. The diagnostic effects of the two groups were compared. *Results:* The diagnostic and therapeutic efficiency of the patients in the experimental group were 94% and 98%, respectively, while those of the patients in the control group were 78% and 82%, respectively, with a significant difference between the two groups ($p < 0.05$). The balance scores of the patients in both groups were low before the treatment, in which the difference was not significant ($p > 0.05$); after the treatment, the scores improved, with those of the patients in the experimental group being significantly higher than those in the control group ($p < 0.05$). Moreover, the satisfaction rate of patients in the experimental group (98%) was significantly higher than that of the control group (80%) ($p < 0.05$). *Conclusion:* The application of the multidisciplinary collaborative diagnosis and treatment model in the diagnosis of patients with vertigo is effective. The multidisciplinary model can improve clinical diagnosis, enhance the treatment effect, improve the clinical symptoms of patients, and increase the satisfaction of patient care. Hence, it is of high clinical application value.

Keywords: Multidisciplinary collaborative diagnosis and treatment model; Vertigo; Diagnostic effect

1. Introduction

Vertigo is a common type of disease in clinical practice, and it can occur in patients of any age, but with a greater proportion in the elderly. The wide range of vertigo disorders, including circulatory ischemia, central nervous system disorders, and multiple sclerosis, requires a multifaceted approach to the management of patients, thus promoting a multidisciplinary approach that can target periventricular disorders in otolaryngology, systemic disorders in internal medicine, and neuropsychological and emotional components [1-3]. It is difficult to accurately identify the cause of vertigo and improve the treatment effect only when a single discipline is involved; therefore, a multidisciplinary approach is needed to reduce the misdiagnosis rate and improve the clinical treatment effect [4-6]. In this study, a single diagnosis and treatment model and a multidisciplinary collaborative diagnosis and treatment model were applied to the patients in Xianyang Hospital of Yan'an University, in which their application effects were compared and analyzed.

2. Methods

2.1. Study population

The study was carried out in Xianyang Hospital of Yan'an University from April 2021 to April 2022, in which 100 patients were included in the study.

Inclusion criterion: patients who met the diagnostic criteria of vertigo disorders. Exclusion criteria: patients with a history of psychiatric disorders, associated major diseases, poor compliance, and poor cooperation. All 100 patients were clear about the process of the study and voluntarily participated in it. The study met the requirements for conducting trials in hospitals and received approval from the hospital.

The patients were divided into two groups, namely the experimental group and the control group, with 50 patients in each group. The two groups received different modes of treatment. The patients' data were compared as shown in **Table 1**, and they were not significantly different ($p > 0.05$), thus meeting the criteria for a comparative study.

Table 1. Comparative analysis of the general data of the two groups

Group	Number of men (n)	Number of women (n)	Age range (years)	Mean age (years)
Experimental group (n=50)	27	23	23-77	45.33 ± 3.23
Control group (n=50)	28	22	24-76	45.87 ± 3.22
χ^2	0.040	0.040	–	0.837
p	0.841	0.841	–	0.405

2.2. Study design

In the control group, a single diagnosis and treatment model was used, with observation and analysis of the cervical spine, x-ray examination, and orthopedic manipulation.

In the experimental group, a multidisciplinary approach was adopted, in which the latest advances in various disciplines, new guidelines, and methods were effectively integrated as the main basis for the diagnosis of patients with vertigo. The diagnosis is based on a combination of fields, including neurology, otorhinolaryngology, orthopedics, and psychiatry. This multidisciplinary approach facilitates discussions among specialists, all of whom are involved in taking the patient's history at the same time, in addition to psychiatric consultation and neurological investigations based on discipline-specific vestibular system localization and bedside examination. Imaging tests such as magnetic resonance intraocular imaging and functional magnetic resonance imaging, combined with proteomic and genomic analysis, ensure that a comprehensive diagnosis is made and that the consultation process for chronic, difficult, and unexplained dizziness is clarified, so that the patient is treated according to the actual state. For example, in the treatment of patients with dizziness associated with cardiovascular and cerebrovascular disease risk factors, it is necessary to ensure that potential central problems and peripheral vestibular diseases are identified in a timely manner and the specific cause of the dizziness is identified, so as to treat the patients effectively. At the same time, a multidisciplinary combination of pharmacological treatment, rehabilitation, and neuropsychological treatment is needed to develop a comprehensive management plan for the patient. The patient should be observed throughout the treatment, and the management plan should be adjusted according to the changes and response of the patient, in order to ensure effective treatment.

2.3. Observation indicators

The diagnostic efficiency of the two groups of patients was compared, the misdiagnosis rate was determined, and the overall diagnostic efficiency was calculated.

The treatment effect of the two groups of patients was compared and analyzed based on the improvement of dizziness. The treatment effect was divided into three categories: significant, effective, and ineffective. With a significant improvement in dizziness after treatment, without any adverse symptoms, the treatment effect was considered significant; with an improvement after treatment, the treatment effect was considered effective; however, without any improvement in the symptom after treatment, it was considered ineffective. The ineffective rate was excluded in the overall effective rate.

The balance function of the two groups of patients was compared by using the two indicators before and after treatment. Berg Balance Scale was used in the study. The scale consisted of 14 items and was scored on a 4-point scale, with scores ranging from 0–56, in which the higher the score, the better the patient's balance function.

In order to compare the treatment satisfaction of the two groups of patients, the hospital's satisfaction questionnaire was used. This self-made scale has a total score of 100, in which above 90 denotes very satisfied, 70–-90 satisfied, and below 70 dissatisfied. The total satisfaction included the former two but excluded the number of patients who were dissatisfied.

2.4. Statistical analysis

SPSS 20.0 was used for data analysis, $(\bar{x} \pm s)$ and (n/%) denote the measurement data and counting data, respectively. The data were validated after the completion of calculation by t-test and χ^2 test. The results were observed and evaluated by $p < 0.05$.

3. Results
3.1. Diagnostic efficiency

The diagnostic efficiency of the patients in the experimental group was 94% and that of the patients in the control group was 78%. The difference between the data was statistically significant ($p < 0.05$), as shown in **Table 2**.

Table 2. Comparison of the diagnostic efficiency between the two groups (n/%)

Group	Underdiagnosed rate (%)	Misdiagnosed rate (%)	Total diagnostic efficiency (%)
Experimental group (n=50)	1 (2)	2 (4)	47 (94)
Control group (n=50)	5 (10)	7 (14)	38 (76)
χ^2			6.353
p			0.012

3.2. Treatment efficiency

In terms of treatment efficiency, the figures for the two groups were 98% and 82%, respectively, with the experimental group having a significantly higher efficiency rate than the control group ($p < 0.05$), as shown in **Table 3**.

Table 3. Comparison of the treatment efficiency between the two groups (n/%)

Group	Significant	Effective	Ineffective	Efficiency
Experimental group (n=50)	37 (74)	12 (24)	1 (2)	49 (98)
Control group (n=50)	21 (42)	20 (20)	9 (18)	41 (82)
χ^2				7.111
p				0.008

3.3. Balance function

Before the treatment, the balance scores of both groups were low, and the difference was not significant ($p > 0.05$); after the treatment, the scores of both groups improved, but the scores of the patients in the experimental group were significantly higher than those of the patients in the control group ($p < 0.05$), as shown in **Table 4**.

Table 4. Comparison of balance scores between the two groups before and after treatment

Group	Pre-treatment	Post-treatment
Experimental group (n=50)	19.23 ± 3.11	36.78 ± 2.34
Control group(n=50)	19.43 ± 3.10	32.10 ± 2.11
t	0.322	10.503
p	0.748	0.000

3.4. Patient satisfaction

The patient satisfaction rate of the experimental group was 98%, which was significantly higher than the control group's patient satisfaction rate (80%), with a large difference in data comparison, $p < 0.05$, as shown in **Table 5**.

Table 5. Comparison of patient satisfaction between the two groups (n/%)

Group	Very satisfied	Satisfied	Dissatisfied	Satisfaction level
Experimental group (n=50)	39 (78)	10 (20)	1 (2)	49 (98)
Control group (n=50)	22 (44)	18 (36)	10 (20)	40 (80)
χ^2				8.274
p				0.004

4. Discussion

Vertigo is a common clinical condition that has a serious impact on patients' health and well-being. In practical terms, there are many factors that may lead to vertigo, and identifying its causes and ensuring effective treatment are important for improving clinical outcomes. From the perspective of current clinical development, there are many departments in which patients with vertigo can be seen, and the fact that doctors from different disciplines have varying levels of understanding of the diseases related to vertigo, it has resulted in different clinical opinions on the treatment of these patients. Inadequate treatment can lead to delays and pose a serious threat to patients' health [7-9]. In practical terms, benign paroxysmal positional vertigo is a common cause of vertigo symptoms, but it is often misdiagnosed and underdiagnosed in clinical practice; instead, patients are being diagnosed as having inadequate blood supply to the basilar artery or cervicogenic vertigo, resulting in patients missing the best window of time for treatment [10-13].

In order to ensure the effectiveness of clinical treatment and to reduce the incidence of misdiagnosis and underdiagnosis, it is necessary to promote multidisciplinary collaboration, so as to give full play to the specialties of various departments involved in the treatment of patients from the perspective of their actual conditions; in addition, multidisciplinary collaborative diagnoses should be made to ensure the clarity of patients' conditions and to formulate precise and individualized management plans for patients. This approach is more standardized and efficient than the single model and can provide good opportunities for clinical research and teaching of patients, which are significant for the development of any discipline [14-16]. At the same time, through multidisciplinary collaboration, the databases of vertigo diseases between

different disciplines can be adjusted and updated, and common problems can be summarized, ensuring timely detection of problems, providing reference for the diagnosis and management of patients with vertigo diseases in a comprehensive manner, strengthening the systematic understanding of common diseases, ensuring mutual promotion in the collaboration, as well as promoting clinical and scientific research development. Furthermore, in the application of this multidisciplinary collaborative model, the senior teams of each discipline can play a leading role in clinical diagnosis and treatment technology research, promote multidisciplinary teamwork, and establish a clinical academic research platform that can provide reference and a foundation for clinical treatment of patients with vertigo [17-20].

The results of this study showed that the experimental group had higher diagnostic and treatment efficiencies, higher patient satisfaction, and higher post-treatment balance scores, all of which were significantly better from those of the control group under the single diagnosis and treatment model ($p < 0.05$). The results ratified the value of the multidisciplinary collaborative model in the diagnosis and treatment of patients with vertigo.

In conclusion, the application of the multidisciplinary collaborative model in the diagnosis and treatment of patients with vertigo is effective in improving clinical diagnosis, enhancing treatment effects, improving patients' clinical symptoms, and improving patient care satisfaction; thus it is of high clinical application value and is worth promoting.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhang J, Jiang R, Bai X, et al., 2021, Research Progress of Multidisciplinary Collaborative Treatment Model in Dizziness/Vertigo Diseases. Chinese Journal of Frontiers in Medicine, 13(4): 1–5.

[2] Jiang ZD, 2019, Multidisciplinary Cooperation in Standardizing the Diagnosis and Treatment of Vertigo/Dizziness. Chinese Journal of Neurology, 52(2): 153–156.

[3] Zheng FF, Wang P, Tang FR, 2022, Effectiveness of SRM-IV Vertigo Diagnosis and Treatment System in Patients with Benign Paroxysmal Positional Vertigo in Different Age Groups. Medical Equipment, 35(7): 94–97.

[4] Yuan H, Zhang J, Liu H, et al., 2021, Considerations on the Treatment of Vertigo in Children from the Latest Consensus on Diagnostic Criteria for Vestibular Migraine and Recurrent Vertigo in Children. Journal of Clinical Otolaryngology-Head and Neck Surgery, 35(10): 865–869.

[5] Guo S, 2019, Efficacy of SRM-IV Vestibular Function Treatment System for Benign Paroxysmal Positional Vertigo Due to Training Injury. Health Friend, 2019(4): 113.

[6] Zhao Y, Zhang H, Chen S, et al., 2022, General Practice Experience of a Patient with Acute Cerebellar Infarction Combined with Neurogenic Tinnitus with Vertigo as the Main Complaint. Chinese Journal of General Practitioners, 21(1): 85–88.

[7] Jiang R, Cao Z, Chen M, et al., 2021, Influence of Vascular Risk Factors on the Seasonal Pattern of

Benign Paroxysmal Positional Vertigo. Chinese Journal of Medicine, 101(29): 2310–2315.

[8] Li N, Ju Y, Zhao SQ, 2016, The Application of Multidisciplinary Case Discussion Teaching Method in the Diagnosis and Treatment of Dizziness and Vertigo Diseases. Chinese Journal of Stroke, 11(9): 808–810.

[9] Li X, 2020, Comparative analysis of the Treatment Effect of Different Repositioning Methods on Benign Paroxysmal Positional Vertigo, dissertation, Hebei North College.

[10] Wang ZH, Wu ZM, 2022, Research Progress of Chronic Benign Paroxysmal Positional Vertigo. Chinese Journal of Otology, 20(2): 365–369.

[11] Wu ZM, Zhang SZ, 2017, Functional Vertigo – A New Level of Vertigo Diagnosis and Treatment. Chinese Journal of Otology, 15(6): 613–618.

[12] Yang B, 2019, Awareness of General Practice Care for Vertigo in Chronic Disease Management. Gansu Science and Technology, 35(11): 145–147.

[13] Xiong X, 2021, Clinical Efficacy of Postauricular Injection of Lidocaine for Acute Attacks of Vestibular Migraine Vertigo, dissertation, Dalian Medical University.

[14] Deng Q, 2020, Clinical Study on the Effectiveness of the Benign Paroxysmal Positional Vertigo Treatment System on Patients with Benign Paroxysmal Positional Vertigo. Chinese Community Physicians, 36(10): 43 + 45.

[15] Yan Y, Cui C, Liu P, et al., 2019, Effect of SRM-IV Vertigo Treatment System on Adjunctive Treatment of Vertigo Caused by Vestibular Neuronitis. Armed Police Medicine, 30(8): 669–671.

[16] Liu CS, Wang D, 2020, Exploring the Clinical Characteristics and Treatment Effects of Traumatic Benign Paroxysmal Positional Vertigo. Contemporary Medicine, 26(12): 103–105.

[17] Sun Q, 2020, Application of Total Nursing Intervention in Patients with Motion Sickness Treated with Intensity Stimulation Training of Vertigo Diagnosis and Treatment System. Health Vision, 2020(24): 162.

[18] Lou Y, Xu L, Cai M, et al., 2019, The Application of Vertigo Diagnosis and Treatment System in the Diagnosis and Treatment of Benign Paroxysmal Positional Vertigo in the Elderly. Chinese Electronic Journal of Geriatric Research, 6(4): 18–22.

[19] Wu T, 2019, Clinical Application Value of Benign Paroxysmal Positional Vertigo Diagnosis and Treatment System. Family Medicine, 2019(3): 118.

[20] Pan YJ, 2021, Clinical Diagnosis and Treatment Analysis of 8 Cases of Benign Paroxysmal Positional Vertigo During Pregnancy. China Medical Digest (Otolaryngology), 36(1): 48–51.