ORIGINAL RESEARCH

Clinical Efficacy of Vestibular Rehabilitation Training Combined with Medical Wisdom Platform on Vertigo Caused by Vestibular Neuritis

Bisang Zhuang, MM; Cui Su, MM; Chunwei Li, MM; Renli Deng, PhD

ABSTRACT

Objective• The clinical manifestation of vertigo caused by vestibular neuritis is acute and persistent vertigo, accompanied by nausea, vomiting, and dizziness. Low-dose glucocorticoid therapy is recommended in the acute phase, while drug therapy is not recommended in the recovery phase. Therefore, it is of certain clinical value to explore other treatment options. This study hopes to better fill the current research gap in non-drug treatment of vertigo caused by vestibular neuritis.

Methods • The medical data of 96 patients with vertigo caused by vestibular neuritis in our hospital from May 2019 to May 2021 were retrospectively analyzed. According to different treatment methods, they were divided into the control group (routine treatment regimen) and the experimental group (vestibular rehabilitation training combined with the medical wisdom platform), with 48 cases in each group, and the clinical efficacy of the two groups was compared.

Results • The total effective rate of treatment was 95.83% in the experimental group, which was significantly higher than 79.17% in the control group ($\chi^2 = 6.095$, $P = .014$). In the two groups, the scores of dizziness handicap inventory (DHI) and vestibular symptom index (VSI) decreased. In contrast, the scores of Tinetti performance-oriented mobility assessment (POMA) and functional independence measure (FIM) increased after treatment. After treatment, the experimental group had significantly lower DHI score ($t = 12.942$, $P < .001$), distinctly higher POMA score ($t = 9.940$, $P < .001$), overtly lower VSI score ($t = 8.783$, $P < .001$), and notably higher FIM score than the control group ($t = 12.649$, $P < .001$).

Conclusion • The application of vestibular rehabilitation training combined with the medical wisdom platform is beneficial to patients with vertigo caused by vestibular neuritis, which provides reference for the subsequent treatment of this disease and has a certain clinical promotion value. (*Altern Ther Health Med.* 2024;30(7):246-251).

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INTRODUCTION

Vestibular neuritis, a sudden disease of vertigo caused by the involvement of vestibular neurons, is a kind of peripheral neuritis with clinical symptoms such as vertigo, nystagmus, nausea, and vomiting, with a higher incidence in people aged 25-50.[1,2] Most patients with the disease can usually recover within two weeks, and a few patients may have varying degrees of giddiness, dizziness and instability in the short term, lasting for several days or months. The symptoms are aggravated during activities, affecting patients' daily lives and work. For patients with vertigo caused by vestibular neuronitis, symptomatic treatment is usually given according to their clinical manifestations, such as vestibular nerve inhibitors and drugs. In addition, rehabilitation training is also used to enhance patients' tolerance of vertigo and body stability.[3-5] This study aims to explore a non-drug treatment plan, to better improve the clinical symptoms of patients with vertigo caused by vestibular neuritis, and to provide more reference for subsequent clinical treatment.

The earliest vestibular rehabilitation is to improve vestibular function through a series of fixed rehabilitation training, thus achieving the purpose of treating vestibular diseases, known as Cawthorne-Cooksey exercises. Subsequently, some scholars have proposed and confirmed that vestibular rehabilitation, as an effective method for treating vertigo and balance disorders, has gradually developed into modern vestibular rehabilitation. Vestibular rehabilitation training can provide patients with training on

the function of gaze, the tolerance of vertigo, physical stability, and exercise rehabilitation, so as to enhance the balance function, tolerance of vertigo, and physical stability, which is conducive to the functional rehabilitation of the vestibular system.[6,7] With the continuous progress and development of information technology, some advanced technologies are applied to the medical industry to realize the interaction between patients and medical services (medical staff, medical institutions, and medical instruments), and make the services smarter.[8] The medical wisdom platform takes advantage of advanced Internet of Things technology to create a regional medical information platform based on health records. Medical staff can master the medical record information and the latest diagnosis and treatment reports at any time, and formulate diagnosis and treatment plans to provide faster and better medical services for patients.[9] Vestibular rehabilitation training combined with the medical wisdom platform can better realize the interaction between medical staff and patients, which is a new diagnosis and treatment model to improve the medical service level, and has a good development prospect. Currently, their combined application in clinic is rare. Based on this, 96 patients with vertigo caused by vestibular neuritis were selected for the retrospective study to analyze the clinical efficacy of vestibular rehabilitation training combined with the medical wisdom platform in treating vertigo caused by vestibular neuritis. The reports were as follows.

MATERIALS AND METHODS

Patient selection and grouping

96 patients with vertigo caused by vestibular neuritis admitted to our hospital from May 2019 to May 2021 were selected as subjects for the retrospective study. They were divided into two groups in accordance with different treatments. Patients with routine treatment regimens were included in the control group, and patients with vestibular rehabilitation training combined with the medical wisdom platform were included in the experimental group, with 48 cases in each group. This study conforming to the Declaration of Helsinki (2013)[10] was approved by the hospital ethics committee.

Inclusion and exclusion criteria

Inclusion criteria. (1) Bithermal caloric test was abnormal, and head thrust test was positive. (2) Hearing impairment and nervous system damage were absent. (3) The patients and family members were informed about this experiment and signed the informed consent.

Diagnostic criteria. (1) The acute vertigo lasted for hours, which could be relieved within days, and patients were accompanied by prodromic infection. (2) Spontaneous peripheral nystagmus and horizontal or horizontal rotatory nystagmus were detected, and the direction of nystagmus did not change with direction of gazed.

Exclusion criteria. (1) Patients with new intracranial lesions detected by computed tomography or nuclear magnetic resonance; (2) patients with severe heart, liver and kidney dysfunction; (3) patients with cervical vertigo, posttraumatic vertigo and vertebral-basilar insufficiency; (4) patients with central vestibular vertigo and a history of severe internal diseases; and (5) patients with cognitive dysfunction.

Treatment Protocols

The details are shown in Table 1.

Outcome Measures

(1) The general data, including age, gender, infection types, hypertension history, hyperlipidemia history, diabetes mellitus history, marital status, and education level, were compared between the two groups. (2) The clinical efficacy of the two groups before and after treatment was evaluated. The evaluation criteria were as follows. If the clinical symptoms such as vertigo, nausea and vomiting disappeared and patients could take care of themselves in life, the intervention was obviously effective. If the clinical symptoms such as vertigo, nausea and vomiting compared with before treatment were reduced by more than 60%, and partial self-care ability of patients was restored, the intervention was effective. If the clinical symptoms such as vertigo, nausea, and vomiting were not significantly improved, and patients were not able to take care of themselves in life, the intervention was invalid. Total effective rate=obviously effective rate+effective rate. (3) The dizziness handicap inventory (DHI)[14] was used to evaluate the degree of vertigo in patients, including 3 aspects of body,

Table 1. Comparison of treatment protocols in both groups

Treatment protocols in the control group
The control group was given routine antiviral and symptomatic treatment, taking prednisolone (manufacturer: Zhejiang Xianju Pharma Co., Ltd.; NMPA approval No.: H33021098; specification: 5 mg) at a dose of 0.5-1mg/kg and 3 times/day, and the dosage was reduced gradually after stable condition. At the same time, the control group was given betahistine (manufacturer: Shanghai Xinyi Pharmaceutical Factory Co., Ltd.; NMPA approval No.: H31022080; specification: 4 mg) at a dose of 4-8 mg/time and 2-4 times/day. At the same time, patients were given routine neurological care. Spicy, fat or cold food, tobacco and alcohol should not be given to keep a light diet. Meanwhile, it was necessary to keep quiet in the ward, avoid strong light stimulation, and minimize head and neck activities.
Treatment protocols in the experimental group
The experimental group received the intervention of vestibular rehabilitation training combined with the medical wisdom platform based on the control group. (1) Vestibular rehabilitation training. a. Patients were guided to move their head forward and backward, slowly lower their head to make the mandible contact the chest, and tilt the head back. The above process was performed 15-20 times as one cycle, with two cycles per day. b. Patients were instructed to bend their heads to both sides, and the earlobe was as close as possible to the shoulder peak. The above process was performed 15-20 times as one cycle, with two cycles per day. c. Patients were guided to turn the neck to both sides, slowly turn their head to left, and turn right as far as possible after staying for a moment. The above process was performed 15-20 times as one cycle, with two cycles per day. d. Fixation stability training. An object was placed 20-25 cm in front of the patients' vision, and patients should move back and forth and kept eyes on this object for 1-2 min/time. When they adapted, the movement speed of the body could be accelerated, and the fixation time was prolonged. e. Visual tracking training. After the patients sat down, an object was placed 20-25 cm in front of the patients' vision as a target. Patients remained their body stationary and turned their head as far as possible to the maximum while watching the target. In the early stage, patients turned their head slowly, 1-2 min/time, and the fixation time could be extended when they adapted. f. Dynamic balance training. Patients were instructed to do the training such as bending down and stretching their waist in the case of opening and closing eyes, 10-15 min/time. g. Proprioception training. Patients were instructed to walk barefoot on a hard floor or foam material, with the distance from short to long and the speed from slow to fast. They could also do the training, such as bouncing ball alternatively with both hands, each training lasting 10-15 minutes. h. Walk training. Patients were instructed to walk in circles, in an S shape or backward, 5-10 / time. (2) Medical wisdom platform. a. Firstly, relevant medical staff should be trained to master the content and modules and understand the specific operation methods of the medical wisdom platform. b. The Wisdom Hospital APP using cloud server technology, physical network and EaP platform was built, and patients and their families needed to download and install it on mobile devices. On the APP, the functions such as appointment registration, archives query, recharge payment, consultation and information query could be carried out.[11] c. Patients who made a successful appointment were admitted to the hospital for diagnosis and treatment. Patients' clinical data and diagnosis and treatment were recorded in detail and uploaded to the medical wisdom platform for medical staff, patients, and their families to inquire and consult. According to the patients' actual condition, devices such as smart bracelets could be worn to monitor patients' vital signs in real-time, such as the monitoring of heart rate, arterial oxygen and temperature, and the record of steps. If abnormal data were found, medical staff would be informed timely to prevent emergency situations.[12] d. In the wisdom platform, patients used mobile devices such as mobile phones to communicate with attending physicians and nursing staff, and asked medical staff about their questions. Medical staff gave targeted answers to eliminate patients' questions and reduce their anxiety. They also viewed patients' files and the relevant information of inspection and treatment to strengthen communication with patients, improve patients' trust in hospital, reduce doctor-patient conflicts and ensure the smooth progress of treatment. e. Message pushing function was set up in each medical wisdom platform function module. According to the needs of patients, messages such as real-time treatment status, medication orders, diet status, and rehabilitation training methods could be pushed to their mobile devices.[13] f. Health education was carried out on the medical wisdom platform, and medical staff could transmit related knowledge of diseases and rehabilitation methods to the wisdom platform in the form of pictures, text and videos so that patients and their families could view and learn. After studying, patients and their families with questions could consult medical staff, and medical staff would give detailed explanations to eliminate patients' concerns. Since patients with vestibular neuritis would have adverse events such as vertigo, dizziness, and falls during treatment and recovery, medical staff should provide targeted education on health and rehabilitation training for patients to prevent accidents in rehabilitation training. Both groups were treated continuously for 1 month.

emotion and function, with 25 items. The answer 'yes' was recorded as 4 points, 'sometimes' was recorded as 2 points, and 'no' was recorded as 0 points, with a total score of 100 points. The higher the score, the heavier the degree of vertigo. (4) The Tinetti performance-oriented mobility assessment (POMA) scale[15] was used to monitor the dynamic changes of movement and balance ability of patients and predict the fall risk. The scale included a balance test (9 items) and a gait test (8 items), with 17 items and a full score of 28 points (Table 2). 19-24 points indicated a fall risk, and <19 indicated a high risk. The higher the score, the better the balance ability. (5) The vestibular symptom index (VSI)[16] was used to evaluate the vestibular function of patients, including 6 aspects of vertigo, nausea, dizziness, balance, headache, and visual sensitivity. Each item had 0-10 points, and the lower the score, the better the recovery of vestibular function. (6) The functional independence measure (FIM) scale[17] was used to evaluate the patient's self-care ability, sphincter control ability, transfer capability, walking ability, communication ability and social cognitive ability, with a total of 18 items, 7 points for each item, and a total score of 126 points. The higher the score, the better the patients' living ability.

Statistical analysis

In this study, the experimental data were processed by SPSS20.0, and GraPhPad Prism 7 (GraPhPad software, San Diego, CA, USA) was used to draw pictures of the data. The enumeration data and measurement data were tested by χ^2 and t test, indicated by [n (%)] and ($\bar{x} \pm s$). When $P < .05$, the differences were considered to be statistically significant.

RESULTS

Comparison of patients' general information between the two groups

The general data of the two groups were analyzed in Table 3, and the results showed that there was no significant difference in general information, including age, gender, infection types, hypertension history, hyperlipidemia history, diabetes mellitus history, marital status, and education level between the two groups ($P > .05$), which was of importance for further research.

Comparison of patients' clinical efficacy between the two groups

The data in Table 4 showed that the total effective rate of treatment in the experimental group was significantly higher than that in the control group [$P < .05$ ($P = .014$)], indicating that the combined intervention regimen can improve the treatment effect of this disease to a certain extent.

Comparison of patients' DHI scores between the two groups

Figure 1 was the DHI scores of the two groups before and after treatment. Before treatment, both groups had no significant difference in DHI scores ($P > .05$). After treatment, the DHI score in the experimental group was significantly lower than that in the control group ($P < .001$).

Table 2. Tinetti POMA scale

Evaluation projects	Scores	Scoring standards
1. Sitting balance		0=reclining or slipping from seat; 1=stabilization
2. Getting up		0=no method to complete the action without help; 1=completing the action with the help of the arm; 2=completing the action without help
3. Trying to get up		0=no method to complete the action without help; 1=needing to try more than once to complete the action; 2=completing the action in the first attempt
4. Balance function when standing up immediately (the first 5 seconds in standing posture)		0=unsteadiness (shake, movement and obvious swing of body); 1=stabilization, but needing a walking aid or a walking stick, or grasping other objects to support; 2=stabilization without the help of walking aid, walking stick and other objects
5. Balance when sitting down		0=unsteadiness; 1=stabilization, and wide distance between feet [the distance between heel and midpoint more than 4 inches (1 inch=2.54cm)], or needing walking aid, walking stick or other support; 2=stabilization narrow distance between feet and no support
6. Gently pushing (gently pushing patients 3 times by hands when standing with their feet as close as possible)		0=falling down at the beginning; 1=shaking and needing to grab something, but no method to touch other objects; 2=stabilization
7. Closing eyes		0=unsteadiness 1=stabilization
8. Turing for 360°		0=discontinuous actions; 1=unsteadiness (shaking in arms and body); 2=stabilization
9. Sitting down		0=unsafety; 1=completing the action using arms or discontinuous action; 2=safe and continuous action
POMA		
1. Starting		0=no hesitation or multiple attempts required for starting; 1=normal start
2. Height of lifting foot		a. Steeping using left foot 0=rubbing the ground with feet or the height more than 1-2 inches; 1=leaving the ground completely and the height less than 1-2 inches b. Steeping using right foot 0=rubbing the ground with feet or the height more than 1-2 inches; 1=leaving the ground completely and the height less than 1-2 inches
3. Step length		a. Steeping using left foot 0=step length of stride foot less than standing foot; 1=step length of stride foot more than standing foot b. Steeping using right foot 0=step length of stride foot less than standing foot; 1=step length of stride foot more than standing foot
4. Gait symmetry		0=unequal step sizes on both feet; 1=equal step size for both feet
5. Continuity of gait		0=discontinuous or interrupted gait; 1=continuous gait
6. Walking path		0=obvious offset to a certain side 1=mild or moderate offset by assistive devices; 2=going in a straight line without assistive devices
7. Trunk stability		0=obvious shaking or needing assistive devices; 1=no shaking, needing to bend the knee or having back pain when opening arms to maintain balance; 2=no shaking, no knee flexion, no back pain, no need to open arms to maintain balance or use assistive devices
8. Step width (heel distance)		0=heel separation; 1=feet almost together when walking

Comparison of patients' POMA scores between the two groups

Before treatment, both groups had no overt difference in POMA score. After treatment, the POMA score in the experimental group was significantly higher than that in the control group ($P < .001$). See details in Figure 2.

Comparison of patients' VSI scores between the two groups

After treatment, the VSI scores in both groups significantly decreased, and the VSI score in the experimental

Table 3. Comparison of patients' general information between the two groups (n = 48)

Observation indexes	Control group	Experimental group	χ^2/t	*P* value
Average age (years)	44.64±5.27	45.19±5.53	0.499	.619
Gender				
Male	26 (54.17)	27 (56.25)	0.042	.837
Female	22 (45.83)	21 (43.75)		
Infection types				
Respiratory tract infection	29 (60.42)	30 (62.50)	0.044	0.834
Herpes viruses infection	13 (27.08)	11 (22.92)	0.222	0.637
Intestinal infection	6 (12.50)	7 (14.58)	0.089	0.765
Hypertension history	17 (35.42)	15 (31.25)	0.188	0.665
Hyperlipidemia history	10 (20.83)	12 (25.00)	0.236	0.627
Diabetes mellitus history	8 (16.67)	9 (18.75)	0.072	0.789
Marital status				
Married	37 (77.08)	36 (75.00)	0.057	0.811
Unmarried/Widowed	11 (22.92)	12 (25.00)		
Education level				
University	21 (43.75)	23 (47.92)	0.168	0.682
Middle school	14 (29.17)	15 (31.25)	3.562	0.059
Primary school	13 (27.08)	10 (20.83)	0.515	0.473

Table 4. Comparison of patients' clinical efficacy between the two groups

Groups	Obviously effective	Effective	Invalid	Total effective rate
Control group	22 (45.83)	16 (33.33)	10 (20.83)	38 (79.17)
Experimental group	33 (68.75)	13 (27.08)	2 (4.17)	46 (95.83)
χ^2				6.095
P value				.014

Table 5. Comparison of patients' VSI scores between the two groups

Groups	Before treatment	After treatment	*t*	*P* value
Control group	49.35±6.14	31.50±4.71	15.981	<.001
Experimental group	48.72±5.85	24.26±3.23	25.359	<.001
t		8.783		
P value		<.001		

Table 6. Comparison of patients' FIM scores between the two groups

Groups	Before treatment	After treatment	*t*	*P* value
Control group	52.69±4.88	73.27±6.34	17.821	<.001
Experimental group	54.21±5.16	90.58±7.05	28.842	<.001
t		12.649		
P value		<.001		

group was significantly lower than that in the control group ($P < .001$). See details in Table 5.

Comparison of patients' FIM scores between the two groups

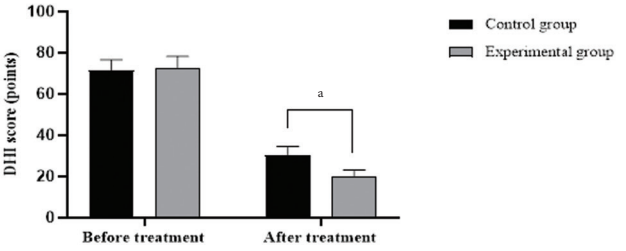
After treatment, the FIM scores of the two groups significantly increased, and the FIM score in the experimental group was significantly higher than that in the control group ($P < .001$). See details in Table 6.

DISCUSSION

Through the analysis and observation, the results of this study revealed that the patients receiving the combined intervention regimen were superior to the routine treatment regimen in terms of clinical effect improvement, balance ability and quality of life. Therefore, the combined regimen is beneficial to patients with vertigo caused by vestibular neuritis, and has a certain clinical application value.

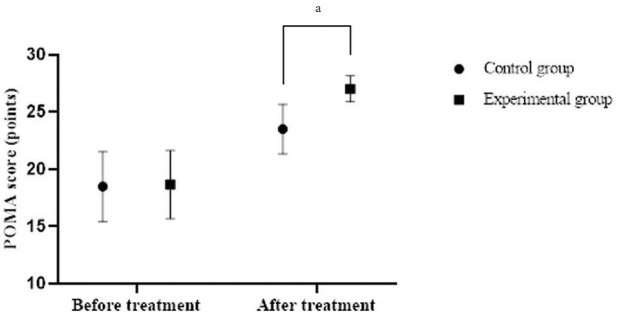
Vestibular neuritis is a peripheral vertigo disease with a high incidence. The lesions occur in the ganglion vestibular or the centripetal part of the vestibular pathway, with the main clinical manifestations being vertigo and spontaneous nystagmus.[18] Relevant study has shown that patients mostly have symptoms such as upper respiratory tract infection before the onset of disease, and the occurrence of the disease is closely related to the pathogenic infection.[19] The vestibular nerve is divided into superior and inferior vestibular nerve. The superior vestibular nerve accompanying blood vessels walks in relatively narrow bony canals so that it is more prone to strangulation and ischemia than the inferior vestibular nerve when non-specific inflammatory swelling occurs.[20,21] Vestibular neuritis mostly occurs in superior vestibular nerves, followed by the simultaneous involvement of superior and inferior vestibular nerves, and inferior vestibular neuritis alone is relatively rare. Many kinds of drugs can be used in the treatment of vertigo caused by vestibular neuritis, such as

Figure 1. Comparison of patients' DHI scores between the two groups. Notes. The abscissa represented before and after treatment, and the ordinate represented the DHI score (points). The DHI scores of the control group before and after treatment were (71.34±5.37) and (30.28±4.45), respectively. The DHI scores of the experimental group before and after treatment were (72.57±5.80) and (20.16±3.09), respectively.



[a]represented a significant difference in the DHI scores between the two groups after treatment ($t = 12.942$, $P < .001$).

Figure 2. Comparison of patients' POMA scores between the two groups. Notes. The abscissa represented before and after treatment, and the ordinate represented the POMA score (points). The DHI scores of the control group before and after treatment were (18.49±3.05) and (23.51±2.17), respectively. The DHI scores of the experimental group before and after treatment were (18.66±2.98) and (27.02±1.13), respectively.



[a]represented a significant difference in the DHI scores between the two groups after treatment ($t = 9.940$, $P < .001$).

antiviral drugs, vasodilators and hormones, but the conventional therapeutic efficacy is not ideal.[22,23] The study has shown that rehabilitation training is needed on the basis of medication for patients with vestibular neuritis, which can improve adverse symptoms such as vertigo, dizziness, fall risk, and physical imbalance.[24]

At present, few studies aim to explore the mechanism and treatment of vestibular rehabilitation in patients with vestibular neuritis. Therefore, in this study, vestibular rehabilitation training was introduced on the basis of conventional therapy and combined with the medical wisdom platform to improve the clinical efficacy of patients. The introduction of the medical wisdom platform positively affects medical staff and patients, such as more convenient exchange and communication and more rapid information transfer. Medical staff can transmit real-time information, contents of health education, treatment condition, and rehabilitation training of patients to the medical wisdom platform, which is convenient for medical staff, patients, and their families to query and understand the disease status and they are committed to providing the best service for patients.[25,26] Vestibular rehabilitation therapy is a training method with non-medicine, non-wounded and highly specialized design for patients with vestibular impairment to alleviate adverse symptoms such as vertigo.[27] Vestibular rehabilitation therapy can alleviate the symptoms, improve the tolerance to vertigo, and promote the generation of vestibular compensation through a variety of different mechanisms. Its main mechanisms are as follows. (1) Vestibular adaptation. Long-term or regular vestibular stimulation can gradually weaken the body's vestibular response under certain conditions. (2) Vestibular substitution. Visual and proprioceptive training replaces lost vestibular functions, and improves body's balance ability. (3) Vestibular acclimatization. Repeated exposure to a certain evoked stimulation will lead to a decrease in the pathological response of the vestibular system.

In this study, the total effective rate of treatment was 95.83% in the experimental group, which was significantly higher than 79.17% in the control group (P<0.05). After treatment, the DHI scores in the two groups decreased, and the DHI score in the experimental group was significantly lower than that in the control group (P<0.001), indicating that vestibular rehabilitation training combined with the medical wisdom platform can improve the treatment effect of vertigo caused by vestibular neuritis, and effectively improve the clinical symptoms and degree of vertigo. In addition, after treatment, the POMA scores of the two groups increased, and the POMA score in the experimental group was significantly higher than that in the control group ($P < .001$) by testing the balance ability and gait of patients, suggesting that combined treatment intervention effectively guides patients to carry out rehabilitation training and accelerates the recovery of patients. The reason is that vestibular rehabilitation strengthens patients' acclimatization training through repeated stimulation of irritating signals, and reduces the imbalance of bilateral vestibule through sensory substitution, behavioral substitution, and new vestibular adaptation mode so as to accelerate the relief of static and dynamic symptoms of patients with vestibular neuritis, improve posture control ability, maintain body balance, and then ensure real-time attention to patients' conditions and achieve targeted intervention in combination with medical wisdom platform.

The assessment of vestibular function and living ability in the two groups found that the VSI scores of the two groups significantly decreased after treatment, and the VSI score in the experimental group was significantly lower than that in the control group ($P < .001$). The FIM scores of the two groups significantly increased after treatment, and the FIM score in the experimental group was significantly higher than that in the control group ($P < .001$). A randomized clinical trial found that the implementation of vestibular rehabilitation training in patients with severe traumatic brain injury greatly improved their gait quality and daily living ability,[28] which is similar to the conclusions of this study, indicating that the implementation of vestibular rehabilitation is conducive to the improvement of patients' gait quality and quality of life. The reason may be that the increase of movement speed and range of the head, eye, and body can make the vestibular function adaptive, which is helpful for reconstructing the vestibular oculomotor function after vestibular function impairment and promoting the recovery of vestibular function. In addition, the combination with the medical wisdom platform enables patients and their families to understand more about diseases and intervention methods in treatment and rehabilitation. Patients carry out correct training according to medical staff's guidance to strengthen self-care, sphincter control, transfer, walking, communication, and social cognitive abilities, thus enhancing the ability of daily life.

Research limitations. As a retrospective study, this study cannot well guarantee the integrity and homogeneity of the data, and as a single-center study, it is limited by the small sample size and the lack of clinical representation. In addition, this disease also occurs in the middle-aged group, but the subjects included in this study are mostly elderly patients, so the age of the patients is under-represented. Therefore, the follow-up study should expand the sample size, select the clinical representative samples, and improve the experimental design scheme, which has also become the future research direction.

In summary, vestibular rehabilitation training combined with medical wisdom platform is not only beneficial for patients with vertigo caused by vestibular neuritis, improving the balance ability and the vertigo symptoms, but also meaningful for health care providers, providing reference for the formulation of follow-up treatment plans.

CONFLICT OF INTEREST

The authors do not have Conflicts of Interest to declare.

AUTHORS' CONTRIBUTIONS

BZ and RD designed the study and performed the experiments, CS and CL collected the data, CS, CL and LC analyzed the data, BZ and RD prepared the manuscript. All authors read and approved the final manuscript.

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ETHICAL COMPLIANCE

This study was approved by the ethics committee of Affiliated Hospital of Zunyi Medical University.

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