Article

Application Effect of Multi-Dimension Nursing Combined with GRACE Scoring System in Patients with Atrial Fibrillation after Green Precision Catheter Radiofrequency Ablation

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Abstract

Objective: To explore the application effect of multi-dimensional nursing combined with the Global Registry of Acute Events (GRACE) scoring system in the nursing of patients with atrial fibrillation after radiofrequency ablation with green precision catheter radiofrequency ablation. **Methods**: A total of 274 patients diagnosed with atrial fibrillation undergoing green precision catheter radiofrequency ablation were collected from the Department of Cardiology at our hospital in a retrospective study. After the inclusion, exclusion, diagnostic criteria and physical examination, all the subjects underwent green precision catheter radiofrequency ablation. According to various nursing methods that were adopted, they were divided into two groups with 7–14 days of nursing intervention by digital randomization: the study group (multidimensional nursing combined with GRACE scoring system evaluation, n = 136 cases) and the control group (postoperative routine nursing, n = 138 cases). The MOS item short from health survey (SF-36) score, Hamilton anxiety scale (HAMA) score, Hamilton depression scale (HAMD) score, complication rates and the nursing quality of the two groups were observed. **Results**: After multi-dimensional nursing combined with the GRACE in-hospital scoring system for stratified nursing in the study group, SF-36 scores in both groups increased after conventional nursing in the control group, but there was a statistical difference between the study group and the control group ($p < 0.05$). HAMA score and HAMD score decreased, and there were statistical differences between the study group and the control group ($p < 0.05$). The comparison between the study group and the control group showed that "Cardiac tamponade", "Atrioventricular block", "Peripheral vascular injury" and the total incidence of complications were statistically different ($p < 0.05$). The basic satisfaction, number of satisfaction and total satisfaction rate of the study group were higher than those of the control group, and the difference was statistically significant ($p < 0.05$). **Conclusions**: Multi-dimensional nursing combined with the GRACE scoring system in the nursing care of patients with atrial fibrillation after radiofrequency ablation with the green precision catheter, improves the quality of life, alleviates negative emotions, reduces the incidence of complications, and results in better quality of nursing care.

Keywords

atrial fibrillation; multi-dimension nursing; grace score; precision catheter; radio frequency ablation

Introduction

Atrial fibrillation (AF), is the most common type of cardiac arrhythmia in clinical practice. According to epidemiological research, the risk of atrial fibrillation increases with increased age and is accompanied by altered cardiac function. Atrial fibrillation mainly affects middle-aged and elderly people. With the development and progress of society, and changes of daily living habits and work, the disease now tends to occur at a younger age [1]. The etiology of AF remains unclear, but studies have shown that it can be caused by family inheritance, excessive alcohol consumption, primary cardiomyopathy, rheumatic heart disease and other related diseases [2]. The common clinical manifestations of patients with atrial fibrillation are palpitation, hyperhidrosis, fatigue, and shortness of breath. Atrial fibrillation can lead to rapid and irregular ventricular rates, which can result in congestive heart failure, the development of ventricular thrombi leading to ischemic stroke and death [3].

At present, radiofrequency ablation is the preferred method for the treatment of atrial fibrillation, with the goal of restoring sinus rhythm, controlling ventricular rate and preventing thrombosis [4]. In radiofrequency catheter ablation, a model of the left atrium is constructed using a three-dimensional electrophysiological mapping system. Combined with X-ray images, high-frequency electromagnetic waves, namely radiofrequency energy, are released through a catheter connected to the left atrium and the pulmonary veins. Radiofrequency energy is used to ablate the orifices of the pulmonary veins and achieve normal sinus rhythm [5]. "Green precision ablation technology" makes use of

three-dimensional mapping systems, such as the Carto system to enable the guide wire and catheter to accurately reach the left atrium, and establish real-time three-dimensional contours of the heart cavity and three-dimensional diagrams of the heart. The position and direction of the ablation catheter can be observed in real time, and the discharge times of radiofrequency ablation can be reduced, thus achieving zero-ray ablation. Green electrophysiological ablation can reduce the patients' pain, improve the safety and effectiveness of the ablation, and shorten the procedure time of catheter ablation [6].

Multidimensional nursing involves evaluation, guidance, and evaluation. Patients undergoing an uncomplicated ablation for atrial fibrillation should remain in bed for 6–12 h after the procedure. Multi-dimensional nursing should be observed and applied in these patients, and a comprehensive evaluation should be conducted with the appropriate combination of the Global Registry of Acute Events (GRACE) scoring system [7]. The GRACE risk score is recommended by the guidelines to decrease the risk of patients with acute coronary syndrome, which helps to identify high-risk patients, and has an important role in the clinical diagnosis and treatment of coronary heart disease. GRACE scores include patient age, past history of heart failure or myocardial infarction, resting heart rate, systolic blood pressure, ST-segment depression, initial serum creatinine, cardiac biomarker levels, and in-hospital percutaneous coronary intervention (PCI). It has become the gold standard for acute coronary syndrome (ACS) risk scores and are widely used in clinical practice and scientific research. In addition, the GRACE score also has good predictive value in the prediction of new atrial fibrillation after an acute myocardial infarction (AMI). Clinical studies have shown that anticoagulant therapy is inadequate in some patients with atrial fibrillation, which increases the risk of stroke. Therefore, the application of the GRACE score is a predictive tool derived from the Global Acute Coronary Syndrome Registry Study to assess the risk of long-term death and recurrence of myocardial infarction in AF patients during and after hospitalization, using a risk stratification model. It contributes to the correct and standardized selection of early treatment strategies (conservative or interventional therapy) [8]. This paper aims to explore the effects of applying multi-dimensional nursing combined with the GRACE scoring system in the nursing care of patients with atrial fibrillation after green precision catheter radiofrequency ablation.

Study Subjects

Clinical Data of Patients

In this study, a total of 274 patients diagnosed with atrial fibrillation by green precision catheter radiofrequency ablation admitted to the Department of Cardiology of our hospital from June 2021 to December 2022 were retrospectively collected. Patients were divided into two groups according to the different nursing methods adopted after green precision catheter radiofrequency ablation: the study group (multidimensional nursing combined with the GRACE scoring system assessment, n = 136 cases) and the control group (postoperative routine nursing, n = 138 cases). The data of patients in the two groups were tested for normality. There was no statistical difference ($p > 0.05$). The study was approved for implementation after review by the Medical Ethics Committee of our hospital, with no conflict of interest.

The patients in the study group ranged in age from 45 to 78 years old, and the mean age was 57.88 ± 2.17 years old. There were 76 males and 60 females. The range of body weight was 52–79 kg, with an average of 65.91 ± 2.26 kg. According to the onset time of persistent fibrillation, 39 cases were classified into paroxysmal AF, 37 cases were persistent AF, 38 cases were long-standing persistent AF, and 22 cases were permanent AF. Patients in the control group ranged in age from 45 to 76 years old, with an average age of 58.17 ± 1.92 years old. There were 75 males and 63 females; The body weight ranged from 49 to 80 kg, with an average of 67.19 ± 2.10 kg. According to the duration of persistent fibrillation, 54 cases were divided into paroxysmal atrial fibrillation, 60 cases were persistent atrial fibrillation, and 24 cases were permanent atrial fibrillation. For comparison of general data between the two groups, see Table 1.

Inclusion and Exclusion Criteria

Inclusion criteria: (1) 2020 Guidelines for the Diagnosis and Management of Atrial Fibrillation issued by European Society of Cardiology (ESC) and European Society of Cardiothoracic Surgery (EACTS) were the diagnostic criteria [9]; (2) Clinical atrial fibrillation was confirmed by electrocardiogram; (3) After clinical evaluation, symptomatic paroxysmal atrial fibrillation, symptomatic persistent atrial fibrillation, heart failure with decreased ejection fraction (HFrEF), and tachycardia - bradycardia syndrome were included; (4) The patient and their family members agreed to the study and signed the informed consent; (5) The patient had clear consciousness and complete cognitive function after ablation, and could carry out relevant commands.

Exclusion criteria: (1) Profound coma and cognitive impairment; (2) Patients with abnormal liver and kidney function combined with active tumors; (3) Allergic to multiple drugs; (4) The patient's clinical data were missing and the study could not be completed.

Table 1. Baseline comparison between the two groups ($\bar{x} \pm$ s, n).

General information	Study group (n = 136)	Control group (n = 138)	T/χ^2	p
Gender (M/F)	(76/60)	(75/63)	3.021	0.482[#]
Age (years)	57.88 ± 2.17	58.17 ± 1.92	2.190	0.281[#]
Weight (kg)	65.91 ± 2.26	67.19 ± 2.10	2.184	0.078[#]
Duration of shivering onset				
paroxysmal AF	39	44	3.482	0.102[#]
persistent AF	37	36		
long-standing persistent AF	38	35		
permanent AF	22	23		

Note: #, $p > 0.05$, there is no statistical significance between the two groups. AF, Atrial fibrillation.

Green Precision Catheter Radiofrequency Ablation

Physical Examination

The patient complained of difficulty falling asleep and psychological distress, and the physical signs included irregular pulse rhythm, short pulse, irregular jugular pulsation, unequal strength of the first heart sound, and an irregular rhythm [10].

Laboratory Examination

All patients were preliminarily diagnosed with atrial fibrillation according to clinical symptoms and signs. The definitive diagnosis was confirmed by electrocardiogram examination (an irregular rhythm, uneven P-P interval, no noticeable F-wave or disappearance of P-wave, as shown in Fig. 1). For patients with transient episodes of atrial fibrillation that are difficult to capture, holter electrocardiograms were required. 24-hour holter electrocardiograms are used to detect the fastest and slowest ventricular rates at the time of the episode (100–150 beats/min in most patients). In addition, cardiac echocardiography can demonstrate changes heart function and detect mural thrombus in the left atrium [11].

Green Precision Catheter Radiofrequency Ablation

After evaluation and diagnosis, all patients underwent green precision catheter radiofrequency ablation treatment, followed the following standard techniques and protocols [12–15]: (1) Antiarrhythmic drugs were stopped 3 to 5 days before electrophysiological examination and radiofrequency ablation; (2) Fasting and water abstinence was instituted 6 to 8 hours before the ablation; (3) The femoral vein approach was generally selected and puncture points were located in the groin. The catheter (VascoMed GmbH, Baiduoli Medical Equipment Company, Beijing, China) was navigated by the green electrophysiological precision system (Biosense Webster's three-dimensional cardiac electrophysiological mapping system, ZheRan Instrument Company, Shanghai, China) and electrophysiological mapping instruments (St. Yoda Medical Supplies Company, Shanghai, China). After the mapping catheter and other devices were delivered to the vein through the puncture, three-dimensional reconstruction of the cardiac anatomical structure was carried out. The catheter was precisely positioned and reached the right atrium along the vein, and low voltage and high frequency electric energy (30 kHz~1.5 MHz) was released. Then the atrial septum was punctured to enter the left atrium for circumferential pulmonary vein ablation. The radiofrequency process generates heat and requires a slow infusion of cold saline to cool the ablation site. In general, paroxysmal atrial fibrillation can be completed with pulmonary vein ablation, while in continuous atrial fibrillation, three linear ablation procedures (left roof line, mitral isthmus line and tricuspid isthmus line) may be required after pulmonary vein ablation, together with two "circles" of circumferential pulmonary vein ablation. After each ablation, it is necessary to verify whether the conduction of electrical activity is blocked to ensure complete ablation.

Research Methods

Postoperative bleeding was avoided. After green precision catheter radiofrequency ablation, a bandage was applied to compress the puncture site for at least 12 hours. After the procedure, the patient returned to the ward, where the ward doctor reviewed the electrocardiogram to observe whether the patient had recovered sinus rhythm, and a taped electrocardiogram (ECG) telemetry device was worn to continuously detect the rhythm [16].

In the control group, the conventional nursing mode was applied [17], and the nursing staff carried out holistic nursing, arranged for family visitation, paid attention to the patients' vital signs at all times, and provided patients with medication, diet, rest and other interventions.
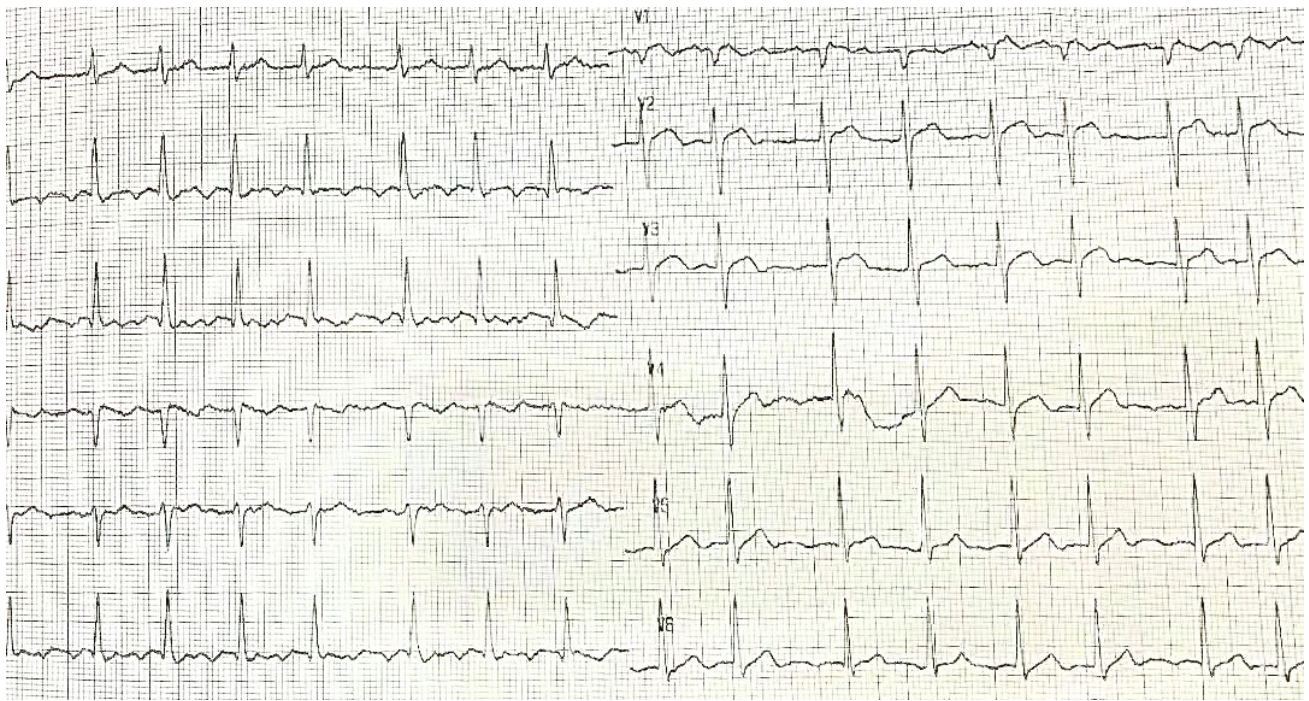
Fig. 1. Ecg examination of patients with atrial fibrillation. Ecg, Electrocardiogram.

The research group received multi-dimensional nursing [18], including psychological nursing, application of nursing skills, health education, family communication and nursing. The in-hospital scoring system combined with GRACE [19–22] is based on 8 dimensions, including: Age (0–93 points), heart rate (0–46 points), systolic blood pressure (58–0 points), creatinine (1–28 points), cardiac function classification (0–59 points), ECG Sinus Tachycardia (ST) segment changes, myocardial biomarkers, and cardiac arrest on admission (0–49 points), in which all dimensions were positive scores except systolic blood pressure. According to the degree of patient risk, hierarchical nursing paths were constructed for patients in the high-risk group (141–372 points), the middle-risk group (109–140 points) and the low-risk group (1–108 points), so as to implement multi-dimensional targeted nursing for patients and continuously improve the quality of nursing.

The low-risk group, the medium-risk group and the high-risk group were given routine infusion and respiratory care, and the patients were instructed to rest in bed and were helped be turned. The emotions of the patients were monitored, disease-related knowledge and postoperative precautions were explained in a simple and understandable way, and the importance of cooperative treatment were emphasized. The changes in heart rate, myocardial enzyme levels and clinical symptoms were observed.

The low-risk group [23–25]: Had a green warning at the bedside of the patient, received routine infusion and respiratory care, were placed on bed rest, and were assisted to turn during bed rest. In addition, the psychological emotions of patients were observed, disease-related knowledge

and postoperative matters needing attention were given in a simple manner, and the importance of cooperative treatment was emphasized; Changes in heart rate, myocardial enzymes and clinical symptoms of the patients were observed, and the GRACE scoring system was evaluated each day. If the patient's condition worsened, a higher level of nursing measures were initiated. If the patient's condition improved continuously for 3 days, the GRACE evaluation time could be appropriately extended.

In the medium-risk group [26–28]: A yellow warning was placed at the bedside of patients, and the patients were given routine oxygen inhalation for 3–4 days. Patients received "one-to-one" communications, asked about the source of their negative emotions, and patiently guided through negative emotions to improve their confidence in treatment. The changes of clinical symptoms and related indicators were observed, and the GRACE scoring system was evaluated once each day. If the patient's condition improved, the evaluation could be later changed to 4 times a week.

The high-risk group [29–32]: Had a red warning at the bedside of patients. (1) Vital signs were closely monitored to observe the changes of heart rate, heart rhythm, blood pressure, and prevent the recurrence of arrhythmias, atrioventricular block, reflex vagus nerve excitation, cardiac tamponade and other complications; (2) The prevention of abnormal bleeding included sandbag compression (4–6 h), surgical limb braking (6–8 h), and 24 h bed rest; (3) Prevention of infection included monitoring body temperature, regularly change dressing for the wound every 4 hours, and observation to detect whether the wound is red, swollen,

hot and painful, to observe whether the puncture site is oozing blood, and whether there is ecchymosis or hematoma. An ice pack for external application was used for 24 hours for acute hematomas. Wounds were observed for oozing—compress was used to stop bleeding if necessary; (4) Diet care consisted of postoperative cold liquid diet for 1 week, supplemental vitamins and inorganic salts, a smaller size of meals, and institution of a bowel regimen. (5) Psychological care: In addition to "one to one" communication with patients. Methods were instituted to divert attention, such as listening to newspapers, playing soothing music, asking family members to care for patients, sharing the past treatment of successful cases, all to enhance the confidence of the patients.

Patients in both groups were closely monitored from the postoperative period to the period when they could get out of bed. The nursing cycle including laboratory indicators and vital signs were strictly recorded for 7–14 days.

Outcome Measures

(1) Quality of life: The improvement of quality of life before and after care was compared between the two groups. SF-36 Simple life scale was selected, including physical function, social function, emotional role and mental health, and the positive score was scored. The higher the score, the better the improvement of physical signs. (2) Mood improvement: Hamilton anxiety scale (HAMA) and Hamilton depression scale (HAMD) were used to evaluate the negative emotions of the two groups of patients before and after nursing. The HAMA scale has 14 items. All items were evaluated by 5 grades, with a total score of 56. There were 17 items in HAMD scale. Items 1~3, 7~11, 15 and 17 were evaluated by 5-level scoring method, and items 4~6, 12~14 and 16 were evaluated by 3-level scoring method, with a total score of 54. Higher scores in HAMA and HAMD scales indicate more serious negative emotions. (3) Complications such as cardiac tamponade, atrioventricular block, pneumothorax, peripheral vascular injury and thrombosis were recorded in the two groups during the nursing period, and the complication rate = (number of cases / total number of cases in the group) × 100%. (4) Nursing satisfaction: After nursing, the nursing satisfaction scale made by our hospital was used to evaluate the nursing satisfaction of the two groups of patients, with Cronbach's α coefficient of 0.847 and retest reliability of 0.822; The scale included nursing knowledge, nursing application skills, nursing operation and verbal communication. All aspects were graded by 3, with a total score of 100. Score >20 is very satisfied, score 11–120 is basically satisfied, score <10 is not satisfied, total satisfaction = (very satisfied + basically satisfied) cases / total cases × 100%.

Statistical Analysis

All data in this study were analyzed using SPSS 28.0 software (IBM Corp., Armonk, NY, USA), in which measurement data including mean ± standard deviation was expressed as ($\bar{x} \pm s$), and enumeration data were expressed as n (%), and statistical calculations were performed using t-test and χ^2 test, respectively. After statistical test, a $p <$ 0.05, indicated that the data was statistically significant.

Results

Comparison of SF-36 Evaluation in Two Groups of Patients with Different Nursing Modes

In the SF-36 scores of patients with different nursing intervention modes after green precision catheter radiofrequency ablation, there were no significant differences in the four indexes of physical function, social function, emotional role and mental health ($p > 0.05$). In the study group, the multi-dimensional nursing combined with GRACE in-hospital scoring system was used for hierarchical nursing, and in the control group, after the application of conventional nursing, the scores of both groups increased, but the scores of the four indicators were significantly increased in the research group compared with the control group ($p <$ 0.05). See Table 2 for details.

Emotional Function Evaluation of Patients in the Two Groups with Different Nursing Modes

There was no statistical significance in HAMA score and HAMD score between the two groups of patients with different nursing intervention modes after green precision catheter radiofrequency ablation ($p > 0.05$). In both the study groups after multi-dimensional nursing combined with the GRACE hospital scoring system for stratified nursing and the control group after conventional nursing, HAMA scores and HAMD scores of the two groups decreased, with statistical differences between the study group and the control group ($p < 0.05$), as shown in Table 3.

Comparison of the Incidence of Complications of Different Nursing Modes between the Two Groups

The incidence of pneumothorax and thrombosis was lower in the study group compared with the control group. There was no statistical significance ($p > 0.05$), but there were statistical differences between the study group and the control group in the comparison of cardiac tamponade, atrioventricular block, peripheral vascular injury and total incidence of complications ($p < 0.05$), as shown in Table 4.

Table 2. Comparison of SF-36 evaluation between two groups of patients with different nursing modes ($\bar{x} \pm s$, points).

Group	Somatic function		Social function	
	Pre-nursing	After nursing	Pre-nursing	After nursing
Study group (n = 136)	53.18 ± 3.22	72.90 ± 4.21	50.84 ± 0.25	74.92 ± 0.02
Control group (n = 138)	54.29 ± 4.24	60.23 ± 2.39	50.82 ± 0.28	60.34 ± 0.08
t	12.304	3.013	4.724	5.235
p	0.402#	0.038*	0.591#	0.041*

Group	Emotional role		Mental health	
	Pre-nursing	After nursing	Pre-nursing	After nursing
Study group (n = 136)	39.18 ± 3.22	67.90 ± 4.21	50.84 ± 0.25	70.14 ± 0.23
Control group (n = 138)	43.29 ± 4.24	60.23 ± 2.39	50.82 ± 0.28	60.39 ± 0.75
t	9.273	4.134	2.903	3.582
p	0.405#	0.010*	0.901#	0.013*

Note: Intra-group comparison. #, $p > 0.05$; *, $p < 0.05$.

Table 3. Emotional function evaluation of patients in two groups with different nursing modes ($\bar{x} \pm s$, score).

Group	HAMA scores		HAMD scores	
	Pre-nursing	After nursing	Pre-nursing	After nursing
Study group (n = 136)	16.46 ± 1.23	6.90 ± 0.37	15.24 ± 0.39	7.92 ± 0.10
Control group (n = 138)	16.29 ± 1.92	11.23 ± 1.83	15.35 ± 0.24	10.34 ± 0.52
t	3.018	4.839	2.748	4.993
p	0.892#	0.028*	0.670#	0.018*

Note: Intra-group comparison. #, $p > 0.05$; *, $p < 0.05$. HAMA, Hamilton anxiety scale; HAMD, Hamilton depression scale.

Comparison of Evaluation of Nursing Standards between the Two Groups

The basic satisfaction, number of satisfaction and total satisfaction rate of the study group were all higher than those of the control group, with statistical significance ($p < 0.05$), as shown in Table 5.

Discussion

Atrial fibrillation (AF) is a common event in middle-aged and elderly patients with cardiovascular and cerebrovascular disease. Atrial fibrillation patients require heart rate control (usually at resting. 100 times/min) to control symptoms and prevent tachycardia induced cardiomyopathy. A systematic 4S-AF program was performed for AF patients, including Stroke risk, Symptom severity, Symptom Severity of AF burden, and Substrate severity. In order to reduce postoperative complications, it is recommended that patients receive appropriate multi-dimensional nursing measures after radiofrequency ablation to reduce postoperative adverse reactions and complications [33].

The GRACE risk stratification scoring system applied to AF patients can predict the risk of severe cardiovascular adverse events according to different clinical manifestations, electrocardiograms, and enzyme levels of patients. As the score increases, the risk of death increases signif-

icantly. It is helpful for nurses to provide more accurate prognostic information and guide treatment. The GRACE risk stratification for low-risk, medium-risk and high-risk patients should be actively involved in treatment and nursing. Risk stratification is helpful for the selection of early treatment strategies. A large number of studies have shown that the GRACE score has good predictive value for the risk of stroke and thrombosis in AF patients. A Finnish study showed that GRACE risk scores were predictive for in-hospital mortality in AF patients [34].

Multi-dimensional nursing strengthens the composition of the nursing team, expands the field of nursing services, promotes the coordinated development of multi-angle nursing, enhances nurse service and communication ability, and the practical application of patients to make them obtain continuous, comprehensive nursing, promotes effective communication between doctors and patients, and improves the quality and level of nursing service. In this study, all subjects underwent radiofrequency ablation with green precision catheter after assessment and diagnosis [35].

The results of this study show that: After multi-dimensional nursing combined with GRACE in-hospital scoring system for stratified nursing in the study group and routine nursing in the control group, SF-36 scores in both groups increased, but there was a statistical difference between the study group and the control group ($p < 0.05$). Through the highly dedicated spirit of all nursing staff, bet-

Table 4. Comparison of complication rates of two groups with different nursing modes (n, %).

Group	Cardiac tamponade	Rioventricular block	Pneumothorax	Peripheral vascular injury	Thrombosis	Total incidence
Study group (n = 136)	6 (4.41)	4 (2.94)	6 (4.41)	1 (0.73)	1 (0.73)	18 (13.24)
Control group (n = 138)	12 (8.70)	12 (8.70)	9 (6.52)	5 (3.62)	3 (2.17)	41 (29.71)
χ^2	2.389	3.892	3.910	3.174	3.892	39.018
p	0.035*	0.012*	0.057#	0.031*	0.076#	0.019*

Note: Intra-group comparison. #, $p > 0.05$; *, $p < 0.05$.

Table 5. Comparison of evaluation of nursing norms between the two groups (n, %).

Group	Very satisfied	Basic satisfaction	Not satisfied	Satisfaction rate
Study group (n = 136)	78 (57.35)	45 (33.09)	13 (9.57)	123 (90.43)
Control group (n = 138)	56 (40.58)	32 (23.19)	50 (36.23)	88 (63.77)
χ^2	4.384	4.083	2.874	5.713
p	0.012*	0.026*	0.002*	0.027*

Note: Intra-group comparison. *, $p < 0.05$.

ter patient experience, respect and dignity were achieved. Relevant studies have shown that the risk of recurrence of atrial fibrillation after surgery is reduced by 7% for every 1-point increase in the mental health score of SF-36 scale [36]. Pleasant emotions have a protective effect on the occurrence of atrial fibrillation. Currently, it is believed that the influence of psychological factors on the occurrence of atrial fibrillation may be realized through the autonomic nervous system. The research team conducted stratified nursing for patients with atrial fibrillation through the GRACE score, and applied different color warnings to remind nurses and patients that patients with atrial fibrillation may often suffer from tension, anxiety, depression and irritability. Care and support were given to patients with negative emotions such as depression, to help them eliminate worries and fear, maintain peace of mind, and enhance their confidence in the treatment of disease. HAMA score and HAMD score decreased, and there was a statistical difference between the study group and the control group ($p < 0.05$).

Atrial fibrillation can lead to many serious complications. Effective control of ventricular rate of atrial fibrillation can prevent the occurrence of serious complications. The optimal target value of ventricular rate control in patients with atrial fibrillation is not clear, and needs to be determined individually according to patients' symptoms, complications, cardiac function status and other conditions. By performing GRACE scores on postoperative patients, the research team can not only predict the risk of all-cause death in AF patients during hospitalization [37], but also predict the long-term prognosis of patients and guide the individualized treatment of patients. Compared with the control group, there were significant differences in the incidence of cardiac tamponade, atrioventricular block, peripheral vascular injury and the total incidence of complications ($p < 0.05$). Implementing the core nursing system, performing multi-dimensional and multi-angle comprehensive nursing, strengthen nursing humanistic care, optimizing nursing services, achieving quality nursing service expansion and quality improvement, effectively improved the sense of gain of patients, and their basic satisfaction. The total satisfaction rate was higher than the control group, the difference was statistically significant ($p < 0.05$).

The limitation of this study is that there was no complete random sampling in the cohort-controlled study of cases, so selection bias occurred. Because the departments have different choices when treating patients, the patients themselves and their families also have different needs for diagnosis and treatment. In order to reduce the influence of selection bias, the principle of random sampling was adopted as much as possible in the selection of research subjects. The observation indicators of the research results are all objective indicators, which reduces the investigation bias to a certain extent. In order to exclude the role of confounding factors, the method of stratification analysis and multi-factor analysis were used.

Conclusions

Multi-dimensional nursing combined with GRACE scoring system can improve the quality of life of patients with atrial fibrillation after green precision catheter radiofrequency ablation, alleviate negative emotions, reduce stroke and the incidence of complications, and significantly improve the quality of nursing services and satisfaction according to the number of patients, postoperative characteristics, medical care needs, and the degree of risk.

Availability of Data and Materials

The data can be provided on reasonable request to the corresponding author.

Author Contributions

WD conducted study design and wrote the manuscript. BR conducted data analysis. WD and BR contributed to revise the manuscript. Both authors contributed to editorial changes in the manuscript. Both authors read and approved the final manuscript. Both authors have participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity.

Ethics Approval and Consent to Participate

This study has been reviewed and approved by the Ethics Committee of Affiliated Hospital of Inner Mongolia Medical University (20210511), and all study subjects has received informed consent.

Acknowledgment

Not applicable.

Conflict of Interest

The authors declare no conflict of interest.

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